

A STUDY OF CONTEXTUAL FACTORS INFLUENCING MOBILE PERSONAL  
EMAIL USE

A Thesis

by

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## ABSTRACT

Email use, productivity, overload, and management in a work setting has been studied and researched since the creation of electronic mail in the early 1970s. Much of the existing literature studies in depth the impact of work email on the person's everyday tasks, behavior, and other factors in relation to business. The findings of recent studies suggest that the spread and impact of mobile devices are changing the way modern society interacts with email. A major driver of this change is the convenience of having the ability to respond and check email from anywhere and at any time of day. With email now integrated in our everyday portable devices, such as smartphones and smartwatches, we are transforming the 'how' and 'what for' of email use, not just for work but also for personal purposes. The continuous growth of messaging applications on mobile devices for personal communication has shifted the original functionality of a personal email, initially intended for personal communication, to a business to consumer relationship. With this recent data it has been pointed out that the functionality and design of personal email applications has not yet adapted to accommodate these changes. To further explore how we can improve the functionality of personal email applications to better serve the needs of mobile email users, this research will focus on studying and analyzing the contextual factors associated with the use of personal email on a mobile device.

## DEDICATION

To my loving family, for all the sacrifices they have made to make it possible for me to pursue my dreams.

## ACKNOWLEDGEMENTS

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### **Contributors**

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All work for the thesis was completed independently by the student.

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## NOMENCLATURE

AMT	Amazon Mechanical Turk
ESM	Experience Sampling Method
QA	Quality Assurance testing
UI	User Interface

## TABLE OF CONTENTS

	Page
ABSTRACT .....	ii
DEDICATION .....	iii
ACKNOWLEDGEMENTS .....	iv
CONTRIBUTORS AND FUNDING SOURCES.....	v
NOMENCLATURE.....	vi
TABLE OF CONTENTS .....	vii
LIST OF FIGURES.....	ix
LIST OF TABLES .....	x
CHAPTER I INTRODUCTION .....	1
CHAPTER II BACKGROUND.....	3
CHAPTER III METHODOLOGY.....	7
Approach I: Amazon Mechanical Turk (AMT) Study.....	7
Approach II: Experience Sampling Method (ESM) Study .....	8
Data Analysis .....	11
Chapter IV RESULTS.....	14
Descriptive Statistics.....	14
Correlation Tests .....	22
CHAPTER V DISCUSSION .....	29
Context of How .....	29
Context of When .....	32
Context of Why.....	33
Limitations .....	36
Implications for Design.....	37
Chapter VI CONCLUSION .....	39

REFERENCES .....	40
APPENDIX .....	44
Amazon Mechanical Turk Survey Data .....	44
Paco User Study Data.....	47



## LIST OF FIGURES

	Page
Figure 1. Paco application installed on the participants' mobile devices (a). Notification received to fill out the survey when entering Gmail (b). Example of the survey presented on the Paco application (c). .....	9
Figure 2. Breakdown of association tests ran during data analysis.....	12
Figure 3. Distribution of time used to check personal email throughout the day. ....	15
Figure 4. Distribution of performed activities while checking personal email. Checking while at work (a), checking email in a social setting outside of work (b), checking email during a personal activity outside of work (c).....	19
Figure 5. Frequency of personal email checks per Paco user and their average time spent in Gmail when entering the application during the Paco user study .....	20
Figure 6. Type of activities performed by users while checking their personal email (a), and the location of the user while checking personal email (b). Paco data.....	22
Figure 7. Suggested Tile design of personal email applications on a mobile device.....	37

## LIST OF TABLES

	Page
Table 1. Breakdown of the Paco survey triggered by participants accessing Gmail on an Android mobile device.....	11
Table 2. Summary of general data from AMT study. ....	14
Table 3. Percentage breakdown of email uses, AMT data.....	16
Table 4. Percentage breakdown of categories of incoming emails in a participant’s personal email account, AMT data.....	17
Table 5. Breakdown of the significant correlations tested from objective data, Paco study.....	27

# CHAPTER I

## INTRODUCTION

Electronic email was originally designed to be used for asynchronous communication, but it has greatly evolved since then to serve as a multipurpose application [23]. As the popularity of email has expanded throughout the years, email has been adopted as one of the primary applications and most popular form of communication used in a business environment. Since the adoption of email, researchers have been studying its effects on productivity, overload, management, and the use of the software especially in work settings for over 40 years [1, 6, 16, 22, 23]. However, new technology platforms rekindle the interest in the study of email use time and again. In 2016, Cecchinato et al., at the Interaction Center University of London, studied email management techniques across multiple accounts and multiple devices to conclude that there are two distinct types of email accounts: work email and personal email. They state that work email accounts and personal email accounts should be studied separately due to varying management techniques users demonstrated when interacting with different types of email accounts [5]. They also pointed out that personal email applications have had little change to their core functionality and design to keep up with how email was currently being used day to day [2, 5]. Despite this, the application has still shown continuous growth in the number of accounts created and owned per user [5].

Extending the research on personal email, our work primarily focuses on the general use of personal email with the overarching goal of informing future innovative

designs of the application that align better with how it is currently used. The study we present in this paper explores the elements of context in which personal email is used on a mobile device. Two approaches were used in our investigation: I) An online survey with a diverse range of personal email users through the Amazon Mechanical Turk (AMT) platform; and II) The use of the Experience Sampling Method (ESM) to capture contextual information of email use in-situ for a smaller group of participants.

## CHAPTER II

### BACKGROUND

Over the past two decades, mobile devices supporting email applications have been acquired by tens of millions of users supporting the driving concept of mobility: “information at your fingertips anywhere, anytime” [20, 22]. Affirming the benefits of mobility, Davis states, that in unlimited access to mobile computing a user has access at all times and all places to information and communication resources which remove the burden of time and location constraints [7]. Kakihara & Sorensen define “being mobile” not just as a concept of traveling geographically but, argue that being mobile is also related to the way humans interact with each other socially [12]. They put forth that context is an important dimension in the study and improvement of mobile technologies.

Bentley et al. [2] extended the research by asking: What are the main uses of personal email accounts in people’s daily lives? By studying the development of personal communication such as instant messaging, along with messaging applications such as *WhatsApp* and others, Bentley et al.’s research made apparent that person-to-person communication was no longer dominantly held over email, thus providing evidence that personal email accounts no longer serve as the main source for personal communication [2]. The findings of Bentley et al. state that “the majority of email that consumers receive is from commercial sources, such as coupons, deals, receipts, confirmations, tracking numbers, etc.” leading to the idea that the relationship we currently hold with our personal email accounts has changed to a business to consumer

platform [2]. With this shift in purpose of use, we also see a significant shift in the devices used to access personal email from the desktop to mobile technologies.

The mobility of platforms used for email then begs the investigation of context. Dey et al. surveyed a variety of definitions used to describe context [8]. They considered the very first work that utilized the term “context-aware” by Schilit & Theimer [21], who defined context as the “location, identities of nearby people and objects, and changes to those objects”. However, they argue that defining context as just those categories is too specific of a characterization. Dey et al. finally concluded that context is a characteristic of the whole situation relevant to its set of users and provide their own definition of context [8]: “Context is any information that can be used to characterize the situation of an entity. An entity is a person, place, or object that is considered relevant to the interaction between a user and an application, including the user and applications themselves.” Although Greenberd agreed with that definition, he argued that it left out a vital point, that “context is a dynamic construct”. Context is observed over time and although some elements of context can be stable and predictable, there are many that are not [11]. All in all, researchers of contextual impact agree that context is a form of information and it is a variable that can be known and understood through well-designed empirical studies [8, 9, 11].

For example, Leung & Chen [14] investigated how mobile TVs are used in context so as to determine the fine-grained contextual attributes of the application and technology. They rationalized that the user’s lifestyle affects the adoption and consumption rate of technology, further arguing that “habitual behaviors are activated by

features of the situation and the context in which the behavior occurs” [14]. Liang et al. [15], in 2013, researched how contextual factors may affect the intention to use mobile applications generally. The main research question in their study asked: “What factors affect a user’s intention to continue using mobile application services?” [15]. To examine the contextual effects in a narrower spectrum, they divided mobile applications into four categories, with one category focusing directly on communication (short messages, email, multimedia messages) along with six contextual scenarios below [15]:

- home, busyness, time pressure
- home, busyness, no time pressure
- office/classroom, busyness, time pressure
- office/classroom, busyness, no time pressure
- home, no busyness, no time pressure
- office/classroom, no busyness, no time pressure.

Results showed that perceived behavioral control has positive effects on user’s intention to use communication application services and ‘that the contextual factors had moderating effects on the intention of use’ [15].

Ferreira et al. [10], studied how people managed their time while utilizing their smartphones. During a three-week study, application usage patterns were collected from 21 participants using the Experience Sampling Method (ESM). They coined a new term ‘application micro-usage’, defining this mobile interaction as a “brief burst” of 15 seconds application launches performed by mobile users [10]. They conducted follow-up interviews where the participants of the study admitted that checking mobile email

notifications took them less than a minute, thus resulting in a short application access time.

Furthermore, carrying our phones with us everywhere we go results in mobile notifications continuously pushing the boundaries between work, private life, and the increased amount of daily interruptions. In a study of mobile notifications, it was found that actively disabling notifications lead to fewer email checks per day [19]. Pielot et al. conclude that the mobile user on average receives a total of 63.5 notifications per day, of which the majority arrived from messenger and email applications [19]. Ferreira et al. point out that one of the top three most frequently utilized applications in their study was Google Email, resulting in 52% of application's use intended for micro-usage [10]. The participants in the micro-usage study also revealed that their use of a mobile application depended on where they were located, with whom they were, and at what time that activity was taking place.

Considering the findings from the literature, the questions that we posed were:

- What are the contextual factors of personal email use on mobile devices?; and
- How do the contextual factors affect personal email use on mobile devices?



## CHAPTER III

### METHODOLOGY

For our study we considered five main aspects that are typically considered as part of context: i) Behavioral aspects of context (what are people doing during mobile personal email use); ii) Social aspects of context (who is around and with whom one is interacting); iii) Temporal aspects of context (when people engage in mobile email use), and iv) Infrastructural aspects of context (platform and technology used in mobile email use). We also looked at person attributes, including mostly demographic information. We used a two-pronged approach in our study. Each approach is described in turn below.

#### **Approach I: Amazon Mechanical Turk (AMT) Study**

We conducted an online survey through the crowdsourcing Amazon Mechanical Turk platform. AMT provides access to an on-demand, global workforce where participants can complete the survey at any time of day and from a place of their convenience. Only two criteria had to be met for participation in the survey. First, the participant needed to own a smartphone, and second, he/she had to have a personal email application installed on their phone that they check regularly. Each participant who completed the survey fully was compensated \$0.60. The survey was left opened on AMT for a span of three days. At the end of the third day we obtained 270 entries. Out of these, 150 were successfully completed. The rest were from users that did not meet the required criteria and were removed from the data.

The survey asked 70 questions in total concerning interaction practices with a personal email application on their mobile device. To develop the questions for the survey we referred to our four defined contextual categories mentioned above. Within these categories the questions gather qualitative and quantitative data that provided insight into the user's mobile personal email habits. The survey was divided into four sections. The first section collected personal information about the participant. This included mostly demographic questions. The second section asked questions pertaining to the users' work and personal email habits. This included social, temporal, and behavioral questions of email practices. The third section of the questionnaire asked structural questions concerning email use on a mobile device, for example, where is your personal email application icon located on your device. The fourth section expanded on users' habits with free response, descriptive, reflective, and essay style questions.

The aim of the AMT study was to collect self-reported data from a wide spectrum of participants reflecting about their practices. The aim of our second approach was perhaps more objective data of when people actually use personal email on mobile phones.

### **Approach II: Experience Sampling Method (ESM) Study**

The second study uses the Experience Sampling Method (ESM) to gather context data of the participants' everyday activities when they use their personal email. ESM is akin to a daily dairy method whereby participants are asked to record information about their experience in real time or quasi-real time. With the advancement in mobile technologies ESM applications are now "equipped with sensors, thus can take part of the



**Figure 1.** Paco application installed on the participants’ mobile devices (a). Notification received to fill out the survey when entering Gmail (b). Example of the survey presented on the Paco application (c).

reporting burned off of the participant” and collect some of the data automatically [17].

The study was ran using *Paco*, an ESM mobile application that users can download on both iOS and Android devices (Figure 1). However, for this particular study, due to limitations of the iOS platform with respect to *Paco*, we strictly focused on the users that owned an Android smartphone device.

We recruited 15 participants (7 female, 8 male), ages ranging between 20 and 32. To participate in this phase of the study the participants had to own an Android smartphone as mentioned above, have a personal email account through Gmail, and be able to meet for an in-person interview at the end of the study. The study ran for three days throughout a regular work week for each participant. At the beginning of the study, participants were asked to fill out an online survey on the Qualtrics platform. The online survey was almost identical to the AMT one. This provided us with data that we could later compare with their *Paco* data.

*Paco* participation was activated by a built-in customized trigger within the application. We aimed to capture human behavior as it happens without creating extra interferences in our participants' day to day life. Smartphones are already incorporated into our lifestyle and by using the event trigger coded into the *Paco* application on the participant's phone we can avoid interrupting user's natural behavior. This specific trigger acts as a response to a pre-set cue in the software that can detect actions taken by the user on an Android device. For this study, the application detected specifically when participants opened their personal Gmail application on their smartphone devices and prompted the user to take a short survey whenever they did so. *Paco* identified when and how the user entered the application, even when the paths to accessing the Gmail application may have been different depending on the user. For example, the participant can open their Gmail account from viewing a notification on their lock-screen or they can open the Gmail application by unlocking their device and entering the application by locating the Gmail icon on the home screen.

Ferreira et al. [10] used five context categories in the design of the ESM questionnaire to report on the micro-usage of mobile applications. We followed Ferreira et al.'s categories for the short survey triggered by email access on the phone: Identity, Activity, Location, Trigger, and Time [10]. Each triggered survey consisted of four questions and took no more than 2 minutes to complete per entrance into Gmail (see Table 1). Once the user entered Gmail application on their mobile device they were presented with an alert to fill out our *Paco* survey which forced them to assess their current activity, location and reason for entering their personal email.

**Table 1.** Breakdown of the Paco survey triggered by participants accessing Gmail on an Android mobile device

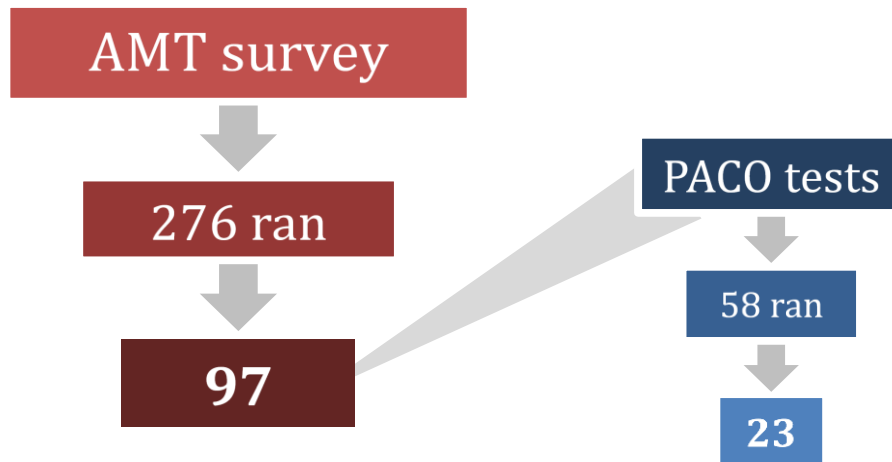
Category	Question	Answer Choices
Identity	Are you currently alone or in a middle of a social activity?	Alone; With family; With friends; With coworkers
Activity	What are you currently doing? (e.g. eating breakfast)	Free response
Location	Where are you? Please be specific (e.g. sitting on a couch in my living room)	Free response
Trigger	Why did you open the email application?	Saw an incoming email notification; Regular daily email check; Awaiting an important email; Passing time; Sending/replying to an email; Looking for information; Cleaning inbox
Time	This category was automatically collected by the Paco application. It detected and recorded at what time of day, how many times the user accessed their Gmail application, and how long the user spent within the opened application.	

To conclude the user study, each participant was asked to participate in an in-person interview. The interview asked the participant to elaborate on of their *Paco* application entries and asked follow up questions to further understand the participant’s general usage of personal email on the mobile device.

### **Data Analysis**

To understand the participants’ practices with personal email we first coded any text, free response answers into numerical categories. This procedure was followed for all collected responses from both approaches. This included AMT questions, the Qualtrics survey participants had to complete prior to their participation in the *Paco*

study, and *Paco* entries from the triggered surveys during the user study. Qualitative data included interviews from the *Paco* user study. These were transcribed and then an open coding analysis was done to uncover themes from the data. Descriptive statistics were run for the quantitative data that included the AMT data, Qualtrics data from the user study, and the triggered *Paco* survey data.



**Figure 2.** Breakdown of association tests ran during data analysis.

The results and findings from our analyses were used to extend and further detail our initial framework based on the four main context categories: Behavioral, Social, Temporal, and Infrastructural. Our research question was to explore what factors of context are associated with personal email use. The Chi-Square test for independence was used for nominal or categorical variables, and Pearson correlation tests were run for interval or ratio level variables. Totaling in 342 Chi-Square tests and resulting in 124 overall significant correlations. We ran 276 individual association tests with the AMT (included approach I survey and approach II pre-study survey) survey data in total, out of which 97 resulted in significant associations (Figure 2). Then, we were able to

replicate 58 out of the 97 significant tests and using data from the Paco application study, 23 out of 58 were significant. Results from these tests were compared to the Qualtrics survey data. Both data sets from Paco and Qualtrics were filled out by the same set of 15 participants. We narrowed down significant association results by taking a closer look at the tests that ran significant across all three data sets. For a list of all of the associations resulting in a significant value please see the appendix.

## CHAPTER IV

### RESULTS

We first present the descriptive statistics of our data from the first (AMT) and second (ESM) approach. We will then describe the results of our association tests. Lastly, we relate our qualitative data post analysis to our quantitative results where appropriate.

#### **Descriptive Statistics**

##### *Amazon Mechanical Turk Survey*

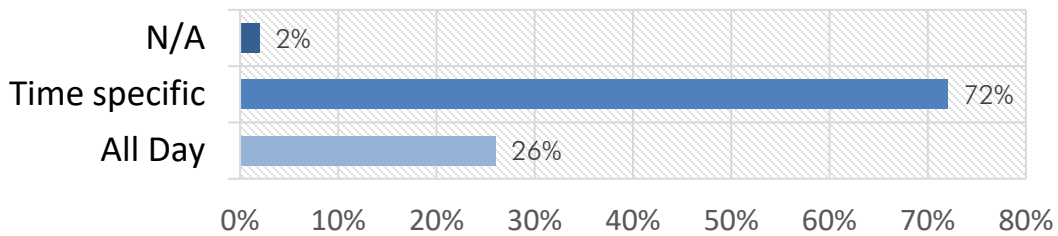
Table 2 summarizes general statistics from the AMT survey data. Overall, 150 users participated in filling out the online survey, 55.33% were male and 44.63% female. The average age of the participant was 33 years of age (min=19; max=62). The majority of users owned an Android mobile device, larger than iPhone owners by 17.34% or 26 users. While averaging at two personal email accounts per user, there were 5.33% of participants owning 4 personal email accounts and 1.33% owning 7 personal email accounts.

**Table 2.** Summary of general data from AMT study.

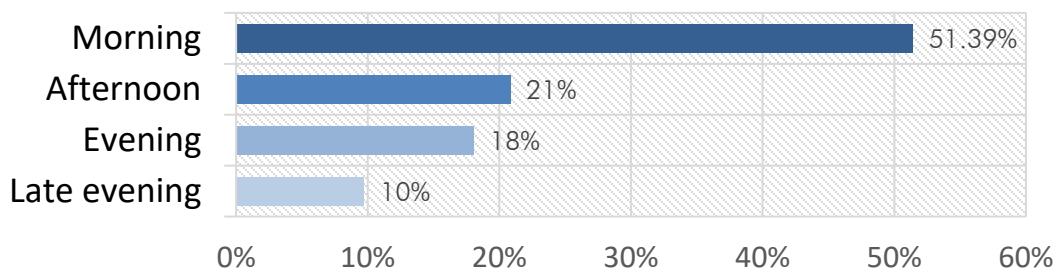
<b>Measure</b>	<b>Mean</b>
Age	33
Number of personal email accounts	2
Time spent in an email application	<1min
Daily number of incoming emails	25-50
% of phone usage dedicated for email use	38%



### Time of personal email checks



### Time specific personal email checks



**Figure 3.** Distribution of time used to check personal email throughout the day.

The average amount of time spent in an email application was less than one minute per entrance. These statistics support the conclusion of Ferreira’s et al. study on micro-usage [10]. We will discuss the relationship between the length spent in the application further when we look at the more exact data gathered from the *Paco* study later in the paper. We also wanted to know when people tend to check their personal emails throughout the day. Figure 3 shows the distribution of time used to check personal email throughout a typical day. The most common time to check personal email is in the morning (51% participants). The least common time to check email is in the late evening where only 10% of participants indicated that they check their personal email during that time.

**Table 3.** Percentage breakdown of email uses, AMT data.

<b>Use of email</b>	<b>Percent</b>
Work Emails	10.85%
Advertisements/Coupons	19.17%
Communication	16.94%
Confirmation details	16.20%
News/Sports updates	9.81%
Bills/Finances	17.53%
Medical	9.51%

Bentley et al. [2] studied the main uses of personal email accounts, concluding that the relationship of use has changed from a main source of communication to a business to consumer type of relationship. Prior to data analysis we expected to see similar traits in the purpose of a personal email account. We included several questions to observe and confirm this changing relationship between a personal email account and its user. Their survey was conducted of 150 participants over an online survey service, *SurveyMonkey* [2]. The participants were asked to specify their top three uses of their personal email. Averaging as the most common choice at 67% was “Receive advertising/deals/coupons”, followed by “Send emails to friends/family” at 66%, and “Receive receipts or bills” at 56% [2]. In our study, we asked a sample of 150 participants also over an online service, AMT, to choose from a list of possible email uses based on the findings of Bentley et al. (refer to Table 3). We see similar patterns in the category of which type of emails our users tend to receive within their personal email accounts. Similarly, to Bentley et al. conclusions, our top category of email uses is

“Advertisements/Coupons” averaging at 19.17%, followed by “Bills/Finances” at 17.53%.

**Table 4.** Percentage breakdown of categories of incoming emails in a participant’s personal email account, AMT data

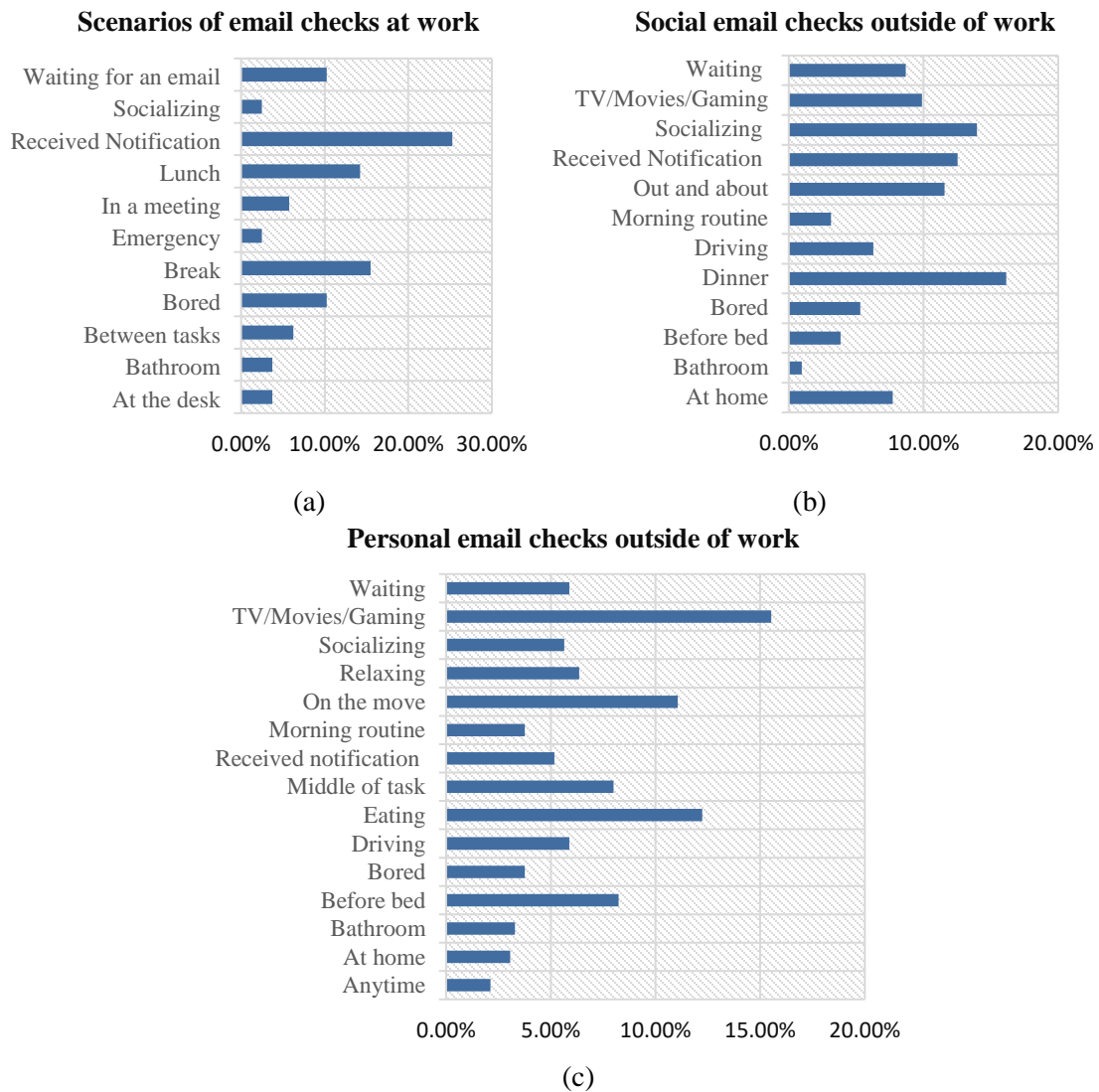
Category of Emails	Percent received
Work Emails	14.59%
Advertisements/Coupons	29.46%
Communication	19.95%
Confirmation details	8.79%
News/Sports updates	8.10%
Bills/Finances	12.37%
Medical	4.23%
Other	2.52%

To further investigate the purpose and use of a personal email account we followed up with a question asking users to allocate a total of 100 points among the same categories to understand what percentage of these following categories of email our participants receive in their personal email accounts. The user may use an email account for a certain purpose but, could potentially receive a higher volume of emails in a different category. Table 4 shows the percentage of incoming emails in a participant’s personal inbox. Confirming the use of personal email from the previous question “Advertisements/Coupons” ranks as the highest volume of incoming emails taking up 29.46% of a person’s inbox. While at the next spot we see a change, where “Communication” ranks higher and out ranks “Bills/Finances” by 7.58%, placing “Bills/Finances” after “Work Emails” in the fourth place.

Now knowing the use of email and the categories of emails participants receive we now look at what actions do the users perform in their personal email accounts daily. We classify this category as the Activity Type in personal email. The most frequently performed activity with a personal email is to check inbox for new emails (37.12%, 111 user reports). Reading and responding to emails both equaling to 17.73%. While, the least performed actions are flag/mark emails, search feature, and forwarding.

Participants were asked during what activities do they check email in a free response question asking to list at least three examples. The category was broken down into three separate questions: In what situations at work do you find yourself checking your personal email? In what social situations outside of work do you check your personal email? During what personal activity outside of work do you find yourself checking your personal email?

In Figure 4 (a) we summarize the results addressing the activity performed by a user at work while checking their personal email account. Concluded from the given data, participants tend to check their personal email account during work hours due to noticing a notification on their mobile device. Figure 4 (b) summarizes the types of activities performed in a social setting outside of work when a user chooses to check their personal email account. Data shows that 16.14% of the time users check email while eating dinner in a social setting. Figure 4 (c) displays types of activities performed in a personal (alone) setting while checking a personal email account. From the graph we can conclude that the most popular personal activity which we choose to check email in



**Figure 4.** Distribution of performed activities while checking personal email. Checking while at work (a), checking email in a social setting outside of work (b), checking email during a personal activity outside of work (c).

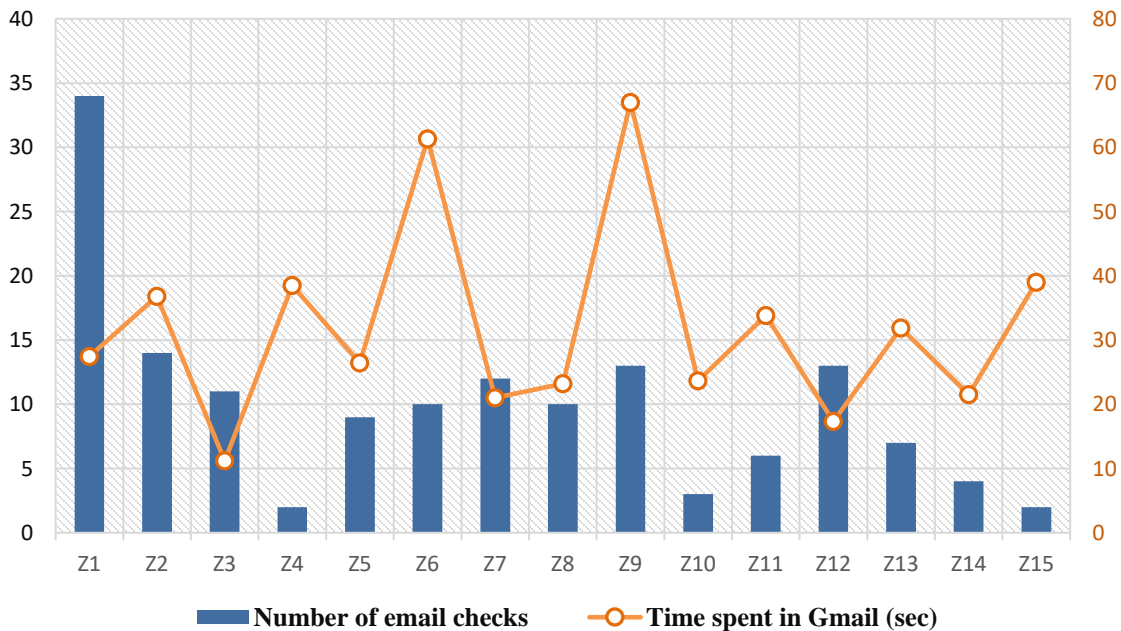
is during watching TV, movies, playing games, or other similar forms of entertainment (15.53%) followed by eating (12.24%) and on the move (11.06%) categories.

*ESM Paco Application User Study*

As described in earlier sections we recruited 15 participants for the ESM Paco

user study, 8 male and 7 female users. The average age of the participant was 24 (min=20; max=32). Due to the requirements of the user study all participants owned an Android mobile device, data averaging at two personal email accounts per user.

The study ran for a span of three days, throughout that time we tracked the number of times participants entered their email application. All users were made aware that once they accessed their Gmail account they would be prompted by a notification to fill out the Paco survey concerning their current activity. Mid-situational data gave us a detailed look into the daily habits of personal email use. In the span of three days, data shows the max=34 checks/user and the min=2 checks/user, mean/median=10 checks within three days of participation (Figure 5). The total number of data entries received

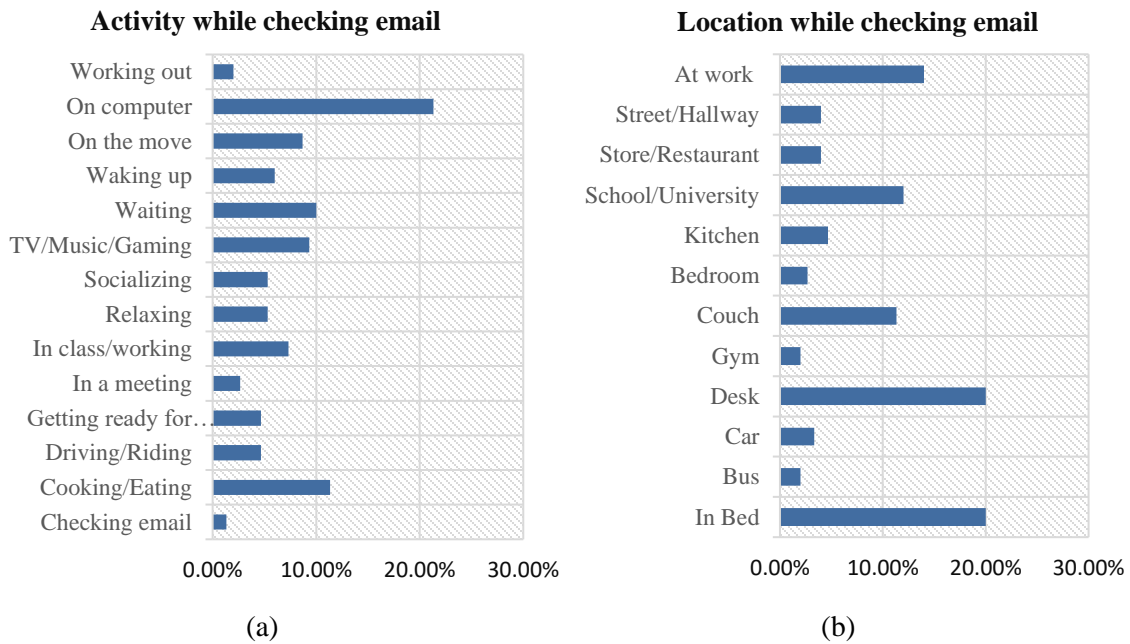


**Figure 5.** Frequency of personal email checks per Paco user and their average time spent in Gmail when entering the application during the Paco user study.

from all participants (each data entry counts as one email check entry) during the user study is 150.

The temporal contextual factor of the Paco application was automatically recorded by the software for the user. It logged the exact time (in seconds) each user spent within the Gmail application upon entrance (Figure 5). Average time of spending in Gmail is 32 seconds (min=5sec; max=470sec).

Lastly, we look at the four main questions asked by the triggered survey in the Paco application. The first question asked the user to select if they were currently checking email while being alone, with family, with friends, or with coworkers. 71.33% of the time users checked personal email was while they were alone, 16.00% of the time with coworkers, 9.33% with friends, and 3.33% with family. The second question asked the participant to evaluate what they were doing at the exact moment they decided to check their email (Figure 6 (a)). We followed up on this data during the post-user-study interview to further evaluate the reasoning behind what prompts users to stop what they are doing and check their personal email. The third question asked the user to take their surroundings into consideration and write down in detail where they were located. The summary of the collated data can be seen in Figure 6 (b). From the displayed data we can conclude that most of email checks happen in bed (20.00%) and at a desk (20.00%). We now know the temporal, social, and spatial contextual contributions affecting the use of personal email.



**Figure 6.** Type of activities performed by users while checking their personal email (a), and the location of the user while checking personal email (b). Paco data.

The final question asked in the Paco survey collected data on the reasoning behind the trigger of opening the personal email application, studying the behavioral contextual factor. Out of 150 data entries, 54 were triggered by receiving a notification on a mobile device. Passing time was the second common trigger for opening personal email account, tallying at 25. The third most common trigger at 22 out of 150 entries is performing a daily email check on a mobile device.

### Correlation Tests

A total of 342 Chi-Square tests were run resulting in 124 overall significant correlations. The significant correlations we chose to address ran significant through the AMT data and Paco data. When creating pairings for nominal, ordinal, and scale variables we cross matched the main five contextual categories discussed earlier to study



the relationship of all possible contextual pairings. In each contextual category the self-reported data tests from AMT will be displayed first followed by objective data tests from Paco.

### *Demographic-Behavioral*

We analyzed our data to identify any potential relationships between demographics and the users' behavior with their personal email. Looking at the self-reported (AMT) data tests, analysis showed a significant relationship between the age of participants and the activity type performed in their personal email account  $\chi^2(32, N=670)=70.83, p<0.001$ . The relationship between the age of participants and types of activities performed alone while checking a personal email account also resulted in a significant value  $\chi^2(44, N=746)=130.57, p<0.001$ . We also found that level of education and types of activities performed alone while checking a personal email account also resulted in a significant value  $\chi^2(55, N=746)=126.72, p<0.001$ . The next demographic-behavioral pairing we tested was position level/category at work and types of activities performed alone while checking a personal email account. This relationship concluded significant, position level  $\chi^2(66, N=746)=137.82, p<0.001$  and position category  $\chi^2(132, N=746)=296.48, p<0.001$ . Position category at work and the activity type performed in a personal email account also presented a significance value  $\chi^2(96, N=299)=139.84, p=0.002$ .

We now consider the same correlation tests but with data collected from the *Paco* user study to test for repeating patterns and to validate our findings. This step was

performed for all contextual categorical pairings. As these tests are calculating the same variables we display their results as a list.

- Age of participants and the activity type performed in their personal email account  $\chi^2(6, N=142)=14.81, p=0.022$ .
- Age of participants and types of activities performed alone while checking a personal email account  $\chi^2(10, N=142)=42.36, p<0.001$ .
- Level of education and types of activities performed alone while checking a personal email account  $\chi^2(20, N=142)=71.68, p<0.001$ .
- Position level/category at work and types of activities performed alone while checking a personal email account  $\chi^2(40, N=142)=151.52, p<0.001 / \chi^2(50, N=142)=199.39, p<0.001$ .
- Position category at work and the activity type performed in a personal email account  $\chi^2(30, N=142)=57.82, p=0.002$ .

#### *Demographic-Infrastructural*

We analyzed the data and found that both position level and category resulted in a significant relationship with the number of personal email accounts owned. Position level:  $\chi^2(24, N=299)=50.60, p=0.001$ . Position category:  $\chi^2(48, N=299)=86.19, p=0.001$ . Following the self-reported data results, below is the list of the objective *Paco* tests for the same correlations.

- Position level at work with the number of personal email accounts owned  $\chi^2(12, N=21)=34.80, p=0.001$ .

- Position category at work with the number of personal email accounts owned  $\chi^2(12, N=21)=43.09, p<0.001$ .

### *Demographic-Social*

The first AMT chi-square analysis within this category showed that there was a significant relationship between the age of participants and the social activity performed by a user at work while checking their personal email account  $\chi^2(40, N=670)=92.19, p<0.001$  and between the age of participants and the social activity performed by the user outside of work when checking personal email  $\chi^2(44, N=746)=130.57, p<0.001$ . Based on the results of these two tests we decided to run some other demographic questions against the social activities performed at work and outside of work. Number of children and the social activity performed by the user outside of work when checking personal email  $\chi^2(55, N=746)=113.06, p<0.001$ . Number of people in the household and the social activity performed by a user at work while checking their personal email account  $\chi^2(50, N=610)=166.37, p<0.001$ . Number of people in the household and the social activity performed by the user outside of work when checking personal email  $\chi^2(55, N=746)=121.19, p<0.001$ . Position level/category at work and the social activity performed by a user at work while checking their personal email account  $\chi^2(60, N=670)=94.66, p=0.003/ \chi^2(120, N=670)=224.54, p<0.001$ . Position level/category at work and the social activity performed by the user outside of work when checking personal email  $\chi^2(66, N=746)=137.82, p<0.001/ \chi^2(132, N=746)=296.49, p<0.001$ . Objective correlation results are displayed below.

- Age of participants and the social activity performed by a user at work/outside of work  $\chi^2(7, N=99)=26.03, p<0.001/ \chi^2(9, N=70)=21.09, p=0.012$ .
- Number of children and the social activity performed by the user outside of work when checking personal email  $\chi^2(9, N=70)=48.88, p<0.001$ .
- Number of people in the household and the social activity performed by a user at work/outside of work  $\chi^2(28, N=99)=86.92, p<0.001/ \chi^2(36, N=70)=138.33, p<0.001$ .
- Position level/category at work and the social activity performed by a user at work while checking their personal email account  $\chi^2(28, N=99)=69.67, p<0.001/ \chi^2(35, N=99)=136.00, p<0.001$ .
- Position level/category at work and the social activity performed by the user outside of work when checking personal email  $\chi^2(36, N=70)=135.64, p<0.001/ \chi^2(45, N=70)=135.97, p<0.001$ .

#### *Infrastructural-Behavioral*

An AMT chi-square analysis showed a significant relationship between the number or personal email accounts and the types of activities performed alone while checking a personal email account  $\chi^2(44, N=746)=91.32, p<0.001$ . Gathered data from the *Paco* study showed to be significant for this correlation pair as well.

- Number or personal email accounts and the types of activities performed alone while checking a personal email account  $\chi^2(30, N=142)=120.59, p<0.001$ .

### *Infrastructural-Social*

The self-reported (AMT) data analysis showed a significant relationship between the number of personal email accounts and the social activity performed by a user at work while checking their personal email account  $\chi^2(40, N=670)=67.68, p=0.004$ .

Respectively, the relationship between the number of personal email accounts and the social activity performed by the user outside of work when checking personal email showed a significant relationship  $\chi^2(44, N=746)=91.32, p<0.001$ . Objective correlation results are displayed below.

- Number of personal email accounts and the social activity performed by a user at work while checking personal email  $\chi^2(21, N=99)=133.00, p<0.001$ .
- Number of personal email account and the social activity performed by the user outside of work while checking personal email  $\chi^2(27, N=70)=54.56, p=0.001$ .

### *Objective associations*

**Table 5.** Breakdown of the significant correlations tested from objective data, Paco study.

<b>Category</b>	<b>Relationship</b>	<b>p-value</b>
Social-Temporal	Social status and duration within personal email application.	0.016
Social-Behavioral	Social status and current activity	0.000
Behavioral	Current activity and the reason for opening email	0.000
Infrastructural-Behavioral	Surrounding environment and the reason for opening email	0.030

After examining all significant associations, there are four relationships from the Paco user study that tested significant while the same data relationships from AMT did not. Due to the nature of the objective data we believe that this data provides detailed insight into the ‘why’ and ‘when’ the user interacts with their personal email account. Table 5 shows four significant associations resulted from the Paco user study described above.

## CHAPTER V

### DISCUSSION

Throughout quantitative and qualitative data we have studied contextual factors of personal mobile email use. Our work relates to the general use of personal email focusing on behavioral, social, temporal, and infrastructural contextual factors. In the first study we captured the self-reported behavior in a form of an online survey. In the second study we intervened with Paco, and ESM mobile application to gather objective, in-situ, data to better understand personal email use.

After reviewing our significant data we chose to discuss what we found to be the most interesting associations. Our results summarize that some of the main factors influencing personal email use on a mobile device are age, person's social status when checking email, location/setting in which email is checked, purpose for opening personal email, and position held at work. We breakdown the relationships between these main factors to describe how, when, and why our participants use personal email on their mobile devices.

#### **Context of How**

First, we consider how users interact with their personal email, how do they go about using their application day to day. Our findings indicate that age has an impact on what actions are performed within a personal email application. Through AMT data we observed that the younger age group (18-34) mostly opens their personal email to check for any newly received emails or enters the application to read the existing or unread

emails, in result, becoming consumers of incoming messages. While the older age group (35-64) chooses to read, delete, and respond to email, resulting in a higher outcome of production of emails than the younger age group. Our Paco data included ages of 20-32, therefore, we can expand on practices by the younger age group. The results from the user study analysis follow the same pattern of most frequent activity in email. When choosing to open their personal email on their mobile device 36% of the time is was due to checking an incoming notification. Gathered data from interviews showed that participants did not like to respond to emails on their mobile device. Our coded themes form qualitative data justify the user's dislike to respond to emails on a mobile device. Many mentioned that formatting on any mobile email application is very difficult, the screen is too restrictive for typing out a proper response, and the keyboard is too small.

*"I hate typing on the phone screen. I am also usually in a meeting or a private setting or a loud environment where speech to text doesn't work as well as I would like it to or is not an option"* (Paco participant).

*"I like typing with a keyboard much more than typing on my phone. If I will be typing a long message I would not want to do it on my phone. The screen size too, I like to have multiple things open for reference when I am typing an email and I cannot do that easily with my phone. But mostly the keyboard and formatting issue"* (Paco participant).

We also saw a relationship between the position a person held at work and type of activity they performed in their personal email. Positions categorized as an Administrator and higher stated that the main functions performed are to respond to emails, read, and delete. While participants with jobs at an entry level and non-administrative focus on checking their email frequently and reading the incoming emails, responding very rarely.



The Paco survey data also indicated a relationship between the users' social status and the duration within their email application. We concluded that 67% of the time participants entered their personal email they spent less than 30sec within the application, and in 78% of those instances they were alone. Ferreira et al. [8] findings concerning email micro-usage stated that 62% of the time it was due to a notification. Looking at our data across all studies we see a similar trend. Our results demonstrate that the majority of the time users open their personal email application is due to a received notification.

*“I probably spend about less than a minute, I only use my email to read the emails so if I see that the email is important, and I need to attend to the notification, then I will pull it up on my computer” (Paco participant).*

Considering this data, we state that users, more often than not, open their personal email when they are alone but spend less time within the application. We relate that back to our observation that the younger age group mostly performs the actions of checking for a notification and reading/scanning emails (consumption of emails) rather than dedicating time to responding (production of emails) or organizing their inbox on a mobile device. We conclude that age plays a significant role in how a person interacts with their personal email on a mobile device.

*“When I check my email, it is usually me opening it because of a notification and there usually is only one thing to deal with. Usually the email just needs to be scanned very quickly” (Paco participant).*

Speculating that the younger age group uses email for quick, on the go, notification driven interactions could be a result of the younger generation growing up invested in mobile technologies and due to social media integration into their daily routines. While the older generation grew up with the original creation and purpose of email and is

interacting with their personal email based on their developed habits prior to the boom of mobile integration.

### **Context of When**

The existence of personal email on a mobile device removes restrictions of where and when we are able to check our email. We take a look at three types of activities performed by a user when they decide to open their email application: scenarios of activities at work, social activities outside of work, and personal activities outside of work. Based on our objective data we see a significant association between the user's social status and their current activity. We began to see a pattern of user's activity based on their Paco entries as well. Specifically, we found that when the user is at work most of their checks are performed while bored or waiting on something, working on a computer, eating.

*“I keep my phone on my desk, in front of me and every once in a while, I will check the time on it even though I have a clock on my computer. If I see notifications like this I will either enter it or swipe them away. It is easier to check my email on the phone than have to open up a new window on a computer while working” (Paco participant).*

If the user is in a social setting the trends show that most frequent checks of personal email happen during socializing/social meeting, bored or waiting on something, or eating. Similarly, we saw alike responses within our qualitative data.

*“If my input is not really need while socializing and I am more of a passive listener then I will start zoning out and pick up my phone as a response to that. I will check my phone when I am with friends if we are socially doing the same thing” (Paco participant).*

*“I was in a middle of a work meeting, we were discussing something in the meeting and I had the information stored in my email that was relevant, so I checked my email.” (Paco participant).*

*“We just finished cooking, another friend would come over to our house and we would cook and hang out a couple of times a week. This was one of those instances and after cooking dinner we were just sitting on the couch I guess, just talking. I realized, ok I might need to check my email for something or just passing time” (Paco participant).*

Considering user’s activity and their social setting we also evaluated when personal email checks happen while the user is alone. From significant associations previously ran we concluded that the most frequent instances of email checks while alone happen when the user is on a computer, cooking/eating, while on the move, or in bed.

*“My phone is somewhere around me, and the sound is always on. I like to hear it. While you’re cooking and you’re alone you have nothing to do so I check my email” (Paco participant).*

### **Context of Why**

First, we explore the relationship of the user’s environment and the reason why they decide to open their personal email. We consider three most frequent locations where our participants indicated they check their personal email: in bed, at a desk/table, and school/work. While lying in bed 30% of checking instances were to perform a daily email check (56% in the morning; 44% at night) and 27% of instances of opening email were to check on an incoming notification (38% in the morning; 62% in the evening). During the interview we asked participants to elaborate why they check their email in bed, we found that users have a set routine of waking up and going through notifications to prepare themselves for the day or to conclude their day.

*“It is relatively regular for me to check my email as soon as I wake up. I have a habit to take my phone with me in bed and it is resting on the night stand while I am sleeping” (Paco participant).*

Another frequent place users check their personal email on their phone is while sitting at a desk or table. Checking email due to receiving a notification happens 53% of all email checks at a desk. After reviewing interviews from the user study, we noted that participants check their personal email on phones even while working on a computer. They state that it is significantly easier for them to tap on the screen of the phone and preview the content of a notification rather than going through the hassle of opening a new window and signing into their email on the computer.

*“When I am at my desk I sit with my phone right in front of me between myself and the keyboard so that I can see the notifications as they come in. Generally, with my phone I will check or read things, but I will not send things from the phone” (Paco participant).*

Bentley et al., studied the use of personal email on desktop computers discovering that 149 out of 150 participants in the study primarily accessed email on their mobile devices. They found that the use of email on desktops is performed mainly when: “they are on the desktop anyway for another task, needing to print something, or needing to type a longer response or include a document – such as emailing a real estate or insurance agent” [2]. Similarly, our findings support that personal email use is primarily accessed on mobile devices, while desktop email use is performed primarily when a user needs to achieve a task or cannot perform an email action successfully on a mobile device. In result, personal email use on desktop computers is becoming limited when today’s mobile devices are providing constant access to real-time notifications and updates without location constraints.

Similarly, we found that while at work or school participants chose to enter their personal email application because they received a notification (50%), were passing time

(33.33%), or were looking for information (33.33%). We referred to Paco data entries to define what passing time meant in that context. Passing time at work or school was categorized by participants as time spent in a meeting, eating lunch, or waiting on someone/something. Themes from the interviews support this data. When asked why you were passing time we received similar statements:

*“I was taking a lunch break, and while I was eating I thought that I should check my email to pass the time and make sure I did not miss anything important for work” (Paco participant).*

*“I was at school waiting for my professor to come back. As the means of passing time I ended up checking my email” (Paco participant).*

60% of Paco users rely on personal email to pass time, forming a habit of quickly accessing their inbox to occupy a certain block of time. We see this association with the majority of our Paco participants using their personal email to pass time when they are waiting on someone/something or eating.

*“I tell myself do I really need to check email, when I listen to myself I do not check the email. Most of the time I am fighting a hunch to check the email, I feel the pressure to stay on top of things because I do not want to miss out on information in the notifications” (Paco participant).*

*“Just killing time going through different notification on my phone and clearing out my inbox while waiting in my car. I know I already went through Instagram, Facebook, and Twitter, so the next thing to go through was my email. I usually switch frantically between my email and other applications daily” (Paco participant).*

Though other users also rely on their personal email as their main source of information. They create a personal email account to hold their subscriptions, news/updates, and accounts. When observing what type of notifications were received by our Paco participants during the study, we determined that their personal email account is

occupied with emails concerning subscription notifications and updates/news regarding other existing user accounts.

*“My personal email serves as a repository of all other applications sending you updates. So instead of having to go to every single website separately that you have an account on or every single establishment that you want to follow, it will tell if one of these 10,20,30 sites have anything new for you to take a look at”*  
(Paco participant).

Considering all the instances of personal email checks and how, when, and why the user interacts with their personal email we form a perspective that personal email is used as a tool for quick scanning of information, a form of entertainment, and intermediary application for collection of all subscriptions.

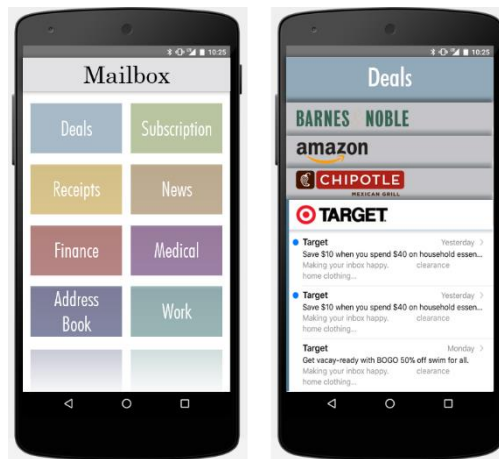
### **Limitations**

Due to the use of an ESM application for our user study and needing to utilize the event trigger for the Paco survey, we were unable to gather objective data from iPhone owners. We also had access to a younger age group for the Paco study because of our location. For future research on personal email use we suggest targeting a larger range of participants for the user study and lengthening the time of participation.

Our study is a correlational study to figure out which variables are connected and what significant associations exists within those variables. We suggest that a causal-comparative study should be developed to determine the cause or consequences of the existing variables in the use of personal email on mobile devices.

## Implications for Design

To develop a better functioning UI design for personal email QA testing will need to be performed prior to producing a new application design. For the purpose of our study we suggest design features based on the gathered data to assist in the future UI upgrades. Due to a large number of incoming advertisement and promotional emails we



**Figure 7.** Suggested Tile design of personal email applications on a mobile device.

propose a system that implements a quick sorting feature “Tile organization” (Figure 7). Where categories of incoming emails are automatically sorted into the top uses of personal email gathered from research. With this feature in place we allow the user to navigate to their desired destination quicker. Once a user enters one of the overarching categories (Deals figure 7) the emails inside that specific category are collapsed by the business, company, or contact and then organized by the date received.

Email currently is not a context-aware application; however, it is moving towards becoming integrated into our daily habits. We suggest for personal email to develop location awareness feature which will sense your arrival at a location which you have a

subscription to. Example, as a user you could turn off your notifications to minimize constant interruptions knowing that when you arrive at a location like *Target* your email will sense your location and notify you that you have a coupon from *Target* in your inbox which you could use on your current visit. Personal email on mobile devices can be updated to include a feature which remembers your activity in the application. It could learn that you check your email for news and updates during lunch every work day and notify you with that category of emails to simplify your access to the application. We suggest that possibilities of context-aware features should be researched and implemented into personal email to better integrate the application with its current purpose of use.



## CHAPTER VI

### CONCLUSION

The purpose of this paper is to observe what contextual factors affect the use of personal email on a mobile device. In this research we inspected how personal email is being used, when and in what situations personal email is accessed, and why users own and check personal email to this day. Our finding suggest that personal email is more than just a tool for communication. We have confirmed the findings of previous research that the relationship users hold with their personal email accounts has changed, evolving to us becoming consumers of email. Based on our finding, we observed that personal email has many functionalities and that contextual factors of age, social status, location, and reason for opening the email have the greatest impact on the use of personal email on a mobile device. Concluding that it is used as a form of entertainment in social/behavioral context, central application for collection of all subscriptions and accounts, and a tool for quick access to information. We suggest that the future design of a personal email should take into consideration the new functionality and use of personal email as well as the context in which it is being used.

## REFERENCES

1. Bellotti, V., Ducheneaut, N., Howard, M., Smith, I., & Grinter, R. E. (2005). Quality versus quantity: E-mail-centric task management and its relation with overload. *Human-computer interaction*, 20(1), 89-138.
2. Bentley, F., Daskalova, N., & Andalibi, N. (2017, May). If a person is emailing you, it just doesn't make sense: Exploring Changing Consumer Behaviors in Email. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems* (pp. 85-95). ACM.
3. Bentley, F. R., Peesapati, S. T., & Church, K. (2016, May). I thought she would like to read it: Exploring Sharing Behaviors in the Context of Declining Mobile Web Use. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems* (pp. 1893-1903). ACM.
4. Brown, B. A. T., & Perry, M. (2000). Why don't telephones have off switches? *Understanding the use of everyday technologies: A research note. Interacting with computers*, 12(6), 623-634.
5. Cecchinato, M. E., Sellen, A., Shokouhi, M., & Smyth, G. (2016, May). Finding email in a multi-account, multi-device world. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems* (pp. 1200-1210). ACM.
6. Dabbish, L. A., Kraut, R. E., Fussell, S., & Kiesler, S. (2005, April). Understanding email use: predicting action on a message. In *Proceedings of the SIGCHI conference on Human factors in computing systems* (pp. 691-700). ACM.

7. Davis, G. B. (2002). Anytime/anyplace computing and the future of knowledge work. *Communications of the ACM*, 45(12), 67-73.
8. Anind K. Dey. 2001. Understanding and Using Context. *Personal Ubiquitous Comput.* 5, 1 (January 2001), 4-7. DOI=<http://dx.doi.org/10.1007/s007790170019>
9. Dourish, P. (2004). What we talk about when we talk about context. *Pers Ubiquit Comput* 8: 19. <https://doi.org/10.1007/s00779-003-0253-8>
10. Ferreira, D., Goncalves, J., Kostakos, V., Barkhuus, L., & Dey, A. K. (2014, September). Contextual experience sampling of mobile application micro-usage. In *Proceedings of the 16th international conference on Human-computer interaction with mobile devices & services* (pp. 91-100). ACM.
11. Saul Greenberg. 2001. Context as a dynamic construct. *Hum.-Comput. Interact.* 16, 2 (December 2001), 257-268.  
DOI=[http://dx.doi.org/10.1207/S15327051HCI16234\\_09](http://dx.doi.org/10.1207/S15327051HCI16234_09)
12. Kakihara, M., & Sorensen, C. (2002, January). Mobility: An extended perspective. In *System Sciences, 2002. HICSS. Proceedings of the 35th Annual Hawaii International Conference on* (pp. 1756-1766). IEEE.
13. Korhonen, H., Arrasvuori, J., & Väänänen-Vainio-Mattila, K. (2010, December). Analysing user experience of personal mobile products through contextual factors. In *Proceedings of the 9th International Conference on Mobile and Ubiquitous Multimedia* (p. 11). ACM.

14. Leung, L., & Chen, C. (2017). Extending the theory of planned behavior: A study of lifestyles, contextual factors, mobile viewing habits, TV content interest, and intention to adopt mobile TV. *Telematics and Informatics*.
15. Liang, T. P., Ling, Y. L., Yeh, Y. H., & Lin, B. (2013). Contextual factors and continuance intention of mobile services. *International Journal of Mobile Communications*, 11(4), 313-329.
16. Middleton, C. A., & Cukier, W. (2006). Is mobile email functional or dysfunctional? Two perspectives on mobile email usage. *European Journal of Information Systems*, 15(3), 252-260.
17. Oulasvirta, A. (2004). Human-computer interaction in mobile context: a cognitive resources perspective.
18. Pejovic, V., Lathia, N., Mascolo, C., & Musolesi, M. (2016). Mobile-based experience sampling for behaviour research. In *Emotions and Personality in Personalized Services* (pp. 141-161). Springer International Publishing.
19. Pielot, M., Church, K., & De Oliveira, R. (2014, September). An in-situ study of mobile phone notifications. In *Proceedings of the 16th international conference on Human-computer interaction with mobile devices & services*(pp. 233-242). ACM.
20. Satyanarayanan, M. (2010, June). Mobile computing: the next decade. In *Proceedings of the 1st ACM workshop on mobile cloud computing & services: social networks and beyond* (p. 5). ACM.

21. B. N. Schilit and M. M. Theimer. 1994. Disseminating active map information to mobile hosts. *Netwrk. Mag. of Global Internetwkg.* 8, 5 (September 1994), 22-32.  
DOI=<http://dx.doi.org/10.1109/65.313011>
22. Turel, O., & Serenko, A. (2010). Is mobile email addiction overlooked?.  
*Communications of the ACM*, 53(5), 41-43.
23. Whittaker, S., & Sidner, C. (1996, April). Email overload: exploring personal information management of email. In *Proceedings of the SIGCHI conference on Human factors in computing systems* (pp. 276-283). ACM.

## APPENDIX

All of the correlations resulting in a significant p-value are listed below by data type.

### Amazon Mechanical Turk Survey Data

Category	p-value
Mobile Device Type vs Most used email functionality	0.000
Age vs Number of email accounts	0.000
Age vs Situations of email check at work	0.000
Age vs Social situations of email checks outside of work	0.000
Age vs Personal situations of email checks outside of work	0.000
Age vs Activity type in email	0.000
Age vs Email MGMT technique	0.000
Gender vs Personal Email Icon Location	0.000
Number of Children vs Social situations of email checks outside of work	0.000
Number of children vs Personal situations email checks outside of work	0.000
Number of people in household vs Situation email checks at work	0.000
Number of people in household vs Social email checks outside of work	0.000
Number of people in household vs Personal email checks outside of work	0.000
Number of people in household vs Activity type in email	0.000
Level of Education vs Social situations email checks outside of work	0.000
Level of Education vs Personal situations email checks outside of work	0.000
Level of Education vs Email MGMT technique	0.000
Level of Education vs Sort	0.000
Position Category vs Situations email check at work	0.000
Position Level/Category vs email checks outside of work	0.000
Position Level/Category vs Personal email checks outside of work	0.000
Position Category vs Email MGMT technique	0.000
Position Level vs Most used email functionality	0.000
Position Level/Category vs Personal Email Icon Location	0.000

Position Level/Category vs Work Email Icon Location	0.000
Position Category vs Glance at notification	0.000
Position Level vs Open email application	0.000
Position Category vs Delete	0.000
Position Category vs Sort	0.000
Number of Personal Emails vs Social email checks outside of work	0.000
Number of Personal Emails vs Personal email checks outside of work	0.000
Number of Personal Emails vs Organization and Task MGMT	0.000
Number of Personal Emails vs Main Communication	0.000
Number of Personal Emails vs Scheduler	0.000
Number of Personal Emails vs File Storage	0.000
Number of Personal Emails vs Reminder Log	0.000
Number of Personal Emails vs Other	0.000
Number of Personal Emails vs Personal Email Icon Location	0.000
Number of Personal Emails vs Glance at notification	0.000
Number of Personal Emails vs Dismiss notification	0.000
Number of Personal Emails vs Flag	0.000
Number of Personal Emails vs Read	0.000
Number of children vs Activity type in email	0.001
Number of people in household vs Email MGMT technique	0.001
Level of Education vs Dismiss notification	0.001
Position Level vs Number of email accounts	0.001
Position Category vs Number of email accounts	0.001
Position Category vs Dismiss notification	0.001
Mobile Device Type vs Reminder Log	0.002
Age vs Personal Email Icon Location	0.002
Position Category vs Activity type in email	0.002
Position Level vs Mark Read/Unread	0.002
Position Level vs Respond	0.002
Mobile Device Type vs Organization and Task MGMT	0.003
Number of children vs Email MGMT technique	0.003

Position Level vs Situations email check at work	0.003
Position Level vs Read	0.003
Have work email vs Frequency of Checks at work	0.003
Number of Personal Emails vs Collection of Subscriptions	0.003
Frequency of Checks at work vs Open email application	0.003
Mobile Device Type vs Personal Email Icon Location	0.004
Number of Personal Emails vs Situations email check at work	0.004
Age vs Dismiss notification	0.008
Mobile Device Type vs Number of email accounts	0.010
Number of people in household vs Notifications On/Off	0.011
Number of children vs Situation email checks at work	0.012
Position Level vs Delete	0.013
Age vs Delete	0.015
Position Level vs Glance at notification	0.015
Frequency of Checks at work vs Glance at notification	0.019
Position Category vs Open email application	0.021
Level of Education vs Delete	0.022
Position Level vs Dismiss notification	0.022
Age vs Glance at notification	0.025
Have Pets vs Social situations email checks outside of work	0.025
Have Pets vs Personal situations email checks outside of work	0.025
Position Level vs Time of checks	0.026
Level of Education vs Mark Read/Unread	0.027
Mobile Device Type vs Notifications On/Off	0.028
Marital Status vs Activity type in email	0.029
Position Category vs Frequency of Checks at work	0.031
Age vs Read	0.033
Position Level vs Notifications On/Off	0.034
Level of Education vs Glance at notification	0.038
Position Level vs Email MGMT technique	0.038
Position Level vs Sort	0.041



Number of Personal Emails vs Forward	0.041
Mobile Device Type vs Mark Read/Unread	0.042
Marital Status vs Email MGMT technique	0.046

### Paco User Study Data

Category	p-value
Age vs Situations email check at work	0.000
Age vs Personal situations email checks outside of work	0.000
Number of Children vs Social situations email checks outside of work	0.000
Number of people in household vs Situation email checks at work	0.000
Number of people in household vs Social email checks outside work	0.000
Number of people in household vs Personal email checks outside work	0.000
Level of Education vs Social situations email checks outside of work	0.000
Level of Education vs Personal situations email checks outside of work	0.000
Position Category vs Situations email check at work	0.000
Position Level/Category vs Social email checks outside of work	0.000
Position Level/Category vs Personal email checks outside of work	0.000
Number of Personal Emails vs Personal email checks outside of work	0.000
Position Level vs Situations email check at work	0.000
Number of Personal Emails vs Situations email check at work	0.000
Have Pets vs Social situations email checks outside of work	0.000
Social surrounding vs Current activity	0.000
Current activity vs reason for opening email	0.000
Number of Personal Emails vs Social email checks outside of work	0.001
Position Category vs Activity type in email	0.002
Age vs Social situations email checks	0.012
Number of people in household vs Activity in email	0.013
Social surrounding vs Duration within email application	0.016
Age vs Activity type in email	0.022
Position Category vs Open email application	0.027
Surrounding location vs reason for opening email	0.030

Have Pets vs Personal situations email checks outside of work	0.040
Position Level vs Activity type in email	0.045