Email Stress and its Management in Public Sector Organisations

by

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Abstract

Email stress: *what are its causes? how is it measured? can it be solved?* The literature review revealed that, despite the term being well used and recognised, discussions surrounding the root cause of email stress had reached little consensus and the concept was not well understood. By its very nature, email stress theory had fallen victim to the academic debate between psychological vs. physiological interpretations of stress which, as a result of either choice, limited more progressive research. Likewise an array of email management strategies had been identified however, whilst some generated quick successes, they appeared to suffer longevity issues and were not maintained a few months after implementation in the workplace. The purpose of this research was to determine whether email communication causes employees psychological and physiological stress and investigate the impact of email management strategies in the workplace.

A pragmatic philosophy placed the research problem as central and valued the differences between paradigms to promote a mixed-method approach to research. The decision to pair both case studies and action research methods ensured a framework for presenting results and an actionable solution was achieved. In direct response to the research aims an original email stress measuring methodology was devised that combined various data collection tools to measure and investigate email stress. This research design was applied and evaluated 'email free time' and email filing at the ███ ██████. Results of the study showed an increased stress response to occur during email use, i.e. caused employees' increased blood pressure, heart rate, cortisol and perceived stress, and a number of adverse effects such as managing staff via email, social detachment, blame and cover-your-back culture were identified. Findings revealed 'email free time' was not a desirable strategy to manage email stress and related stressors, whereas email filing was found more beneficial to workers well-being. Consolidation of the data gathered from the literature review and research findings were used to develop an initial conceptualisation of email stress in the form of two models, i.e. explanatory and action. A focus group was conducted to validate the proposed models and a further investigation at the ██████████ was carried out to critique the use of an email training intervention. The results showed some improvements to employees' behaviour after the training, e.g. improved writing style, email checked on fewer occasions each day and fewer sufferers of email addiction. The initial models devised, alongside the latter findings, were synthesised to create a single integrative multidimensional model of email stress and management strategies. The model made an original contribution to knowledge in terms of theory, i.e. to conceptualise email stress, and practice, i.e. to offer practical solutions to the email worker.

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Chapter 1 Introduction

"The beginning is the most important part of the work"
*** Plato ***

1.1 Chapter overview

This chapter introduces the background for this research by highlighting the recent impact of email communications in the workplace and the techniques that organisations employ to manage its multifaceted business uses. The need to "manage" email communications in organisations is explained and provides the foundations and rationale on which the aim and objectives of this research are built. Finally, an outline of the thesis is summarised.

1.2 Background

The Internet, as designed by ARPANET, was first implemented in the university research community to promote the academic tradition of open publication. The ability to access information for free, with only a connection to a modem, promoted a rapid expansion fuelled by the realisation of quick information sharing. The Internet is as much a collection of communities as a collection of technologies, and its success is largely attributable to both satisfying basic needs, and effectively utilising the push forward infrastructure. Commercialisation of the Internet involved not only the development of competitive private network services but also the creation of new and innovative technology products (Leiner *et al.* 2009, pp.14-18). Electronic mail was one of these advancements and can be otherwise considered a file directory of the Internet (Leiner *et al.* 2009, p.18). An illustrated summary of the evolution of email is shown in Figure 1.1.

Initially electronic mail, also known as email or e-mail, was designed by ARPANET as a means to allow one user to put a message in another user's directory where they could eventually see it when they logged in. Less than 40 years on email is now considered the most widely used Internet technology and communication medium to date, with 91% of users actively using the Internet to send and receive email (*Radicati* 2012; Zickuhr & Smith 2012). Despite its success, one paradox is how little email has changed. Early text-based systems were replaced by graphical user interfaces, and, aside from a few minor modifications such as inclusion of attachments, folders and address book, today's systems are remarkably similar to those introduced in the 1970's (Whittaker, Bellotti & Moody 2005; Zickuhr & Smith 2012).

Figure 1.1: Evolution of email
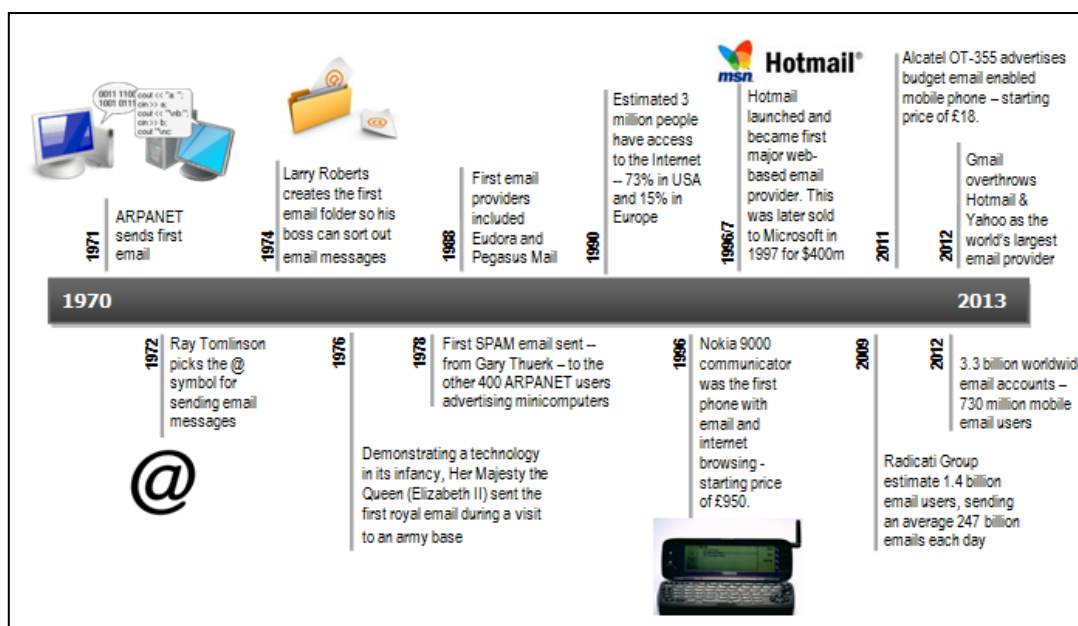
(based on findings from *Beachdog.com* 1997; *NetHistory* 2004; Peter 2004; Hunt 2009; Leiner *et al.* 2009, p.16; Pescovitz 2010; Bishop 2012; *Radicati Group* 2009 & 2012; Smith 2012; *The Independent* 2012; *VCR* 2013; *Efaxhub* [n.d.]; *Worldmapper* [n.d.])

Nevertheless, email has continued to adapt and evolve at the speed of the computer industry to provide new services in real time through powerful affordable computing and communications, i.e. laptop computers, PDAs, and cellular mobile phones (Leiner et al. 2009, p.16). As a result, email has been accused of replacing other forms of communication such as letters and telephone, as well as redefining the way in which we – as a global community – communicate (Wood 1999, p.1; Jackson, Dawson & Wilson 2002; Levin 2002; Derks & Bakker 2010; Burkhart, Werth & Loos 2012).

Current email statistics show there to be approximately 3.3 billion email accounts, which were more than double the 1.4 billion accounts recorded four years earlier in 2009 (*Radicati Group* 2009 & 2012; *Email Marketing Reports* 2010). The same report by *Radicati Group* (2012) continues to anticipate email growth, although a more modest annual rate of 6% over the next four years is predicted, i.e. a total of 4.3 billion email accounts by year-end 2016. Consumer email accounts, which are freely available from large portals and ISPs, make up the majority of existing account holders. In 2012, this represented 75%, while corporate (i.e. business or workplace) email represented 25%, of worldwide mailboxes. The expected increase in overall email is largely expected to occur from corporate email as organisations continue to extend email services to employees who may not have had access to email in the past (*Radicati Group* 2012). For the purpose of this research email use, hereinafter, is only relevant to corporate, business or workplace environments.

1.3 Problem overview

In more recent years the term 'email stress' has been coined in academic and popular research to denote feelings of frustration, overload and strain with a technology that has slowly dominated the workplace environment. Organisations were becoming more dependent on email as a means to transfer and receive information and, as worker's email inboxes filled with demands for attention, users considered themselves to be "drowning in a sea of email" (Schulman 2005). There are a number of reasons why organisations choose to communicate via email, e.g. it is relatively cheap, for no extra cost numerous people can be copied in the same message and messages can be sent and received whenever it is convenient from anywhere in the world. However the increasing use has changed the way in which employees deal with their workload and, where it was once seen to be a relatively affordable and convenient communication tool (Ingham 2003), it was also considered a source of workplace stress (White & Cornu 2002; Whittaker, Bellotti & Moody 2005; Brown 2007; Taylor, Fieldman & Altman 2008; Jackson 2010; Mano & Mesch 2010).

Many academics and researchers (e.g. Selye 1976; Cooper, Liukkonen & Cartwright 1996; Lazarus 1998; Atkins & Harris 2008) have made valuable contributions to understanding workplace stress. Individual stress theory has long been the focus of studies in medicine, psychology and human studies alike. Theoretical contributions to email stress theory on the other hand have been rather mixed and often stemmed from different academic fields, i.e. media, information management, computer science, business, people and organisational management. The problem had often only been framed from a single perspective and, on the whole, the body of research was largely incoherent. So much so, despite the term being well used and recognised, discussions surrounding the root cause of email stress had reached little consensus and, in reality, the concept was not well understood (Dabbish & Kraut 2006). The need to explore email stress further, and collectively bring together theory and practice towards an enhanced understanding, was recognised.

Disparities between research philosophies, methodological design and analysis methods among existing academics and practitioners have led to various assumptions, causes and measures of email stress to be published in the literature. Some researchers claim email stress stems from the volume of email sent and received (e.g. Ingham 2003; Bellotti *et al.* 2005; Orlin 2011), whereas others focused on the mental constraints and abilities of workers to manage a new technology. For example, Gonzalez & Mark (2005) argued the continual switching between different collaborative contexts and tasks throughout a work day led to work fragmentation and email stress. Alternatively, Freeman (2009, p.140) suggests that the workplace culture

surrounding email initiates an uninhibited "desire to be in the know [and] to not be left out" resulting in workers feeling less effective in their quest to remain current and, ultimately, frustrated or stressed.

As researchers were often led by their relevant academic field of study, subsequent methodological decisions encouraged the use of a variety of research methods to understand, evaluate, or probe the problems surrounding email use and stress in the workplace. For the most part, as a human-orientated phenomenon, qualitative methods had dominated the research area, i.e. questionnaires and surveys (e.g. Hair, Renaud & Ramsay 2007), interviews (e.g. Kanungo & Jain 2008), and diaries (e.g. Shirren & Phillips 2011). This overshadowed alternative quantitative experimental techniques offered by Taylor, Fieldman & Lahlou (2005), Taylor, Fieldman & Altman (2008) and Jackson (2010). Furthermore, by its very nature, email stress theory had fallen victim to the academic debate between psychological vs. physiological which, as a result of either choice, limited more progressive research. This research endeavoured to explore this quandary further and, in attempt to bring cohesion between the different perspectives, developed an original design to measure email stress from both viewpoints (Marulanda-Carter, Jackson & Ragsdell 2010).

The demand for further practical and industry-based research became more imperative as problems of email stress continued to stem in popular literature and news which, on the whole, had long since been stinted by criticism and complaints from workers and organisations alike (e.g. *BBC* 2000; Fallows 2002; Fitzgerald 2004; Ogunnaike 2006; Smallwood 2007; Roth 2008; *SG Forums* 2009; *Emailogic* 2010; *BBC News Technology* 2011a; Orlin 2011; *TSI Blog* 2012; Brady [n.d.]). The residual fear was that the little financial cost of sending email would lead workers to continue overusing the resource until it was rendered virtually ineffective (Schulman 2005; *TSI Blog* 2012). These grievances led to a number of reported email stress symptoms to emerge in the workplace such as email addiction and email bankruptcy (i.e. Fitzgerald 2004; Anderson 2008; Egan 2008) to name a few, which fostered a negative perception of an otherwise appreciated technology advancement. Inevitably this caused concern for many organisations by undermining productivity, lowering quality and raising stress levels in workers (Lazar *et al*. 2006; Brown 2007; Mano & Mesch 2010).

In an attempt to counter some of these issues, organisations began investing in an array of different solutions, strategies and styles to better manage their email use. Many of these practical solution-based contributions to the email stress theory were initially devised from the workplace themselves, i.e. Human Resource departments implemented netiquette rules to better deal with the email communication process (e.g. Holtz 2002; *Emailreplies* 2008; Sumecki, Chipulu & Ojiako 2011), Information Technology departments

recommended email filing to improve the flow of workers mailboxes (e.g. Balter & Sidner 2002; Anthes 2006; Koprinska *et al.* 2007; Peric 2009) and senior management led cultural shifts to promote email-free time or technology-free days to improve workplace well-being and enhance the quality of working conditions (e.g. Robinson 2010; *BBC News Technology* 2011b). Whilst many of these email management strategies, at the time, generated some quick successes they all appeared to suffer longevity issues and were not maintained a few months after implementation. In order to improve the current situation, the notion of 'email free time' and the use of other email management strategies needed to be investigated.

1.4 Aims & objectives

In order to achieve some understanding of email stress and email management strategies, the research aims were as follows:

> *To determine whether email communication causes employees physiological and psychological stress and investigate the impact of email management strategies in the workplace.*

The objectives were:

1. To conduct a review of the literature to recognise and understand the general views on email use in the workplace.
2. To develop a research design to measure email stress in the workplace.
3. To conduct a series of detailed case studies to identify and examine the effect of email use on employee stress within the ████ ██████████.
4. To evaluate the use of established email management strategies, such as 'email free time' and email filing, to manage email stress and related stressors effectively within the ████████████████.
5. To develop an epistemology associated with the conceptualisation of email stress in the workplace.
6. To critique the use of an email training intervention to manage email stress and related stressors.

1.5 Research scope and environment

It was accepted that there were many areas of research, specifically those that involve stress and human participants in natural workplace environments, which are often influenced by an array of environmental, intrinsic, organisational and natural factors. Whilst there is no doubt that exploring all forces, variables, avenues of enquiry and so forth, leads to an extensive understanding of a phenomenon, the time this takes to quantify and often renders research interests obsolete or unworkable. For this reason a number of natural chaotic factors (see Figure 1.2) were considered,

although could not be isolated, as part of this research and thus remained outside the scope of this thesis. Although not an exhaustive list, as some have the potential to always remain unknown, Figure 1.2 summarises some of the causative factors relevant to human stress research in the workplace. To ensure the research's desired aims and objectives, outlined in section 1.4, were achievable it was decided that the research would operate within these factors and would not be isolated or explored further. Nevertheless, where appropriate, the thesis would develop and extend some of the context and organisational factors only as and when they became intricately entwined with the research carried out, e.g. global change and workplace culture.

Figure 1.2: Natural chaotic factors relevant to human stress research in the workplace
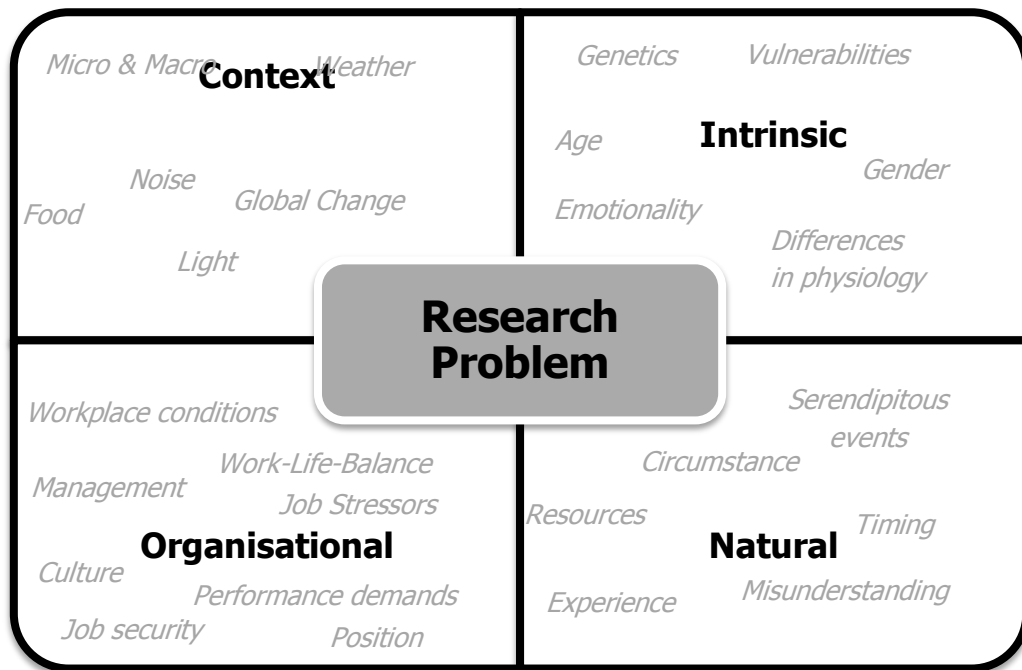
(based on findings from Kendall *et al.* 2001; Ford 2004; Gravetter & Forzano, 2009 pp.82-88; Semmer & Meier 2009; Cooper, Quick & Schabracq 2009; Simon 2013)

It is also worth noting, at the time of this research, the UK was in its sixth recession [measured and understood as a significant decline in a country's gross domestic product (GDP) across two or more consecutive quarters]. The UK first experienced a decline in GDP in quarters 2, 3 & 4 in 2008, and 1 & 2 of 2009. Whilst economic output improved, the UK returned into a recession after shrinking by 0.2% in the first three months of 2012. This was considered the longest recession phase for the UK since World War II and was affected by wide-spread global recession, whereby the economies of virtually all the world's developed and developing nations suffered extreme set-backs (*National Audit Office* 2011; Sibowski 2011; *BBC Business News* 2012; *Investopedia* 2012).

This thesis should be considered in light of the limited opportunities available within a recession. Specifically on the organisations and participants studied and generalised findings and conclusions drawn in this thesis. For instance:-

(i) Period of reduced spending and budget cuts. Historically organisations tend not to thrive at times of a recession, as there is often less money flowing in and between businesses and the uncertainty involved at such a time forces many to consider downsizing, outsourcing or managing an exit strategy. As the importance of company finances rises, and the exceeding need to justify value for money, the focus on additional programs, schemes or activities that would be otherwise valued in normal economic times tends to decrease (*Global Futures and Foresight Limited* 2009). Whilst the need for improved email stress research was recognised within many private and public organisations (as noted in section 1.4), and both would have been more enlightening of a 'workplace' in this research, wide and open access to organisations was limited. Instead opportunities that arose within the public sector were capitalised on.

(ii) Increased redundancy (voluntary and forced) and high unemployment. During the recession many public sector organisations were forced to take severe measures, such as redundancies, while others were able to implement alternative strategies to cut back on labour costs. The impact of these measures largely affected unemployment, which between March 2008 and March 2010 in the UK fell sharply to mirror the fall in GDP (Campos *et al.* 2011). This total peaked to 2.8 million at the beginning of 2010 and the jobless rate was expected to rise to 10.7% by 2016 (*BBC News* 2012). Consequently both public sector organisations involved in this research had to impose redundancies, which led to a smaller than expected population sample being achieved. Exact figures could not be obtained, however reports suggested that the ███████████ experienced a 7.5% cut in funding, which alluded to a job loss toll of 145,000 employees by June 2011 (Evans 2011). Furthermore, feedback from the UK universities union indicated 6,000 lecturers and support staff faced redundancy in 2009 and were preparing for a further 40% spending cut by 2015 (Lipsett 2009; Mount 2013).

(iii) Mental health, increased workload and "stress culture". In the early stages of the recession, *ACAS* (2009), i.e. Advisory, Conciliation and Arbitration Service, urged many UK businesses to anticipate and manage mental health in order to deal with the long term impacts and safeguarding of employees. Despite these warnings, more recent studies of civil servants found an overall increase of 40% in work-related stress, equivalent to one in four workers, in times of recession (Woods 2011; Houdmont, Kerr & Addley 2012). Likewise the Quality of Working Life study found that managers were working longer hours due to larger

workloads, thus more likely to go into the office despite being sick and increasingly suffered from ill health such as stress and depression (*DJS Research* 2012). Any distortion these additional stress factors, and those involved with redundancies as noted above, may have caused on results and findings could not be fully isolated and, for the most part, were reflective of the entire UK workforce at the time of this research.

1.6 Thesis outline

This thesis comprises of eight chapters and provides a background to the research, a review of the available literature, description of the methods employed, a discussion of the data collected and, finally, a summary of conclusions drawn. Figure 1.3 illustrates the thesis structure and the dotted lines represent the relevant links between objectives and chapters for consistent research. The aim of each chapter are summarised below.

Chapter 1: The aim of this chapter was to provide a general background to email in the workplace and an overview of the research problem. This chapter presents the aims and objectives of the research, and summarises the research scope and environment.

Chapter 2: The aim of this chapter was to conduct a review of the literature and understand the general views on email use in the workplace. It reviews the following areas: email in the workplace, problems of email use in the workplace and email management strategies, techniques and tools. The chapter then summarises the gaps in the literature and identifies the prevailing issues of email stress and management strategies, which provide further context and background to the aims and objectives of this research.

Chapter 3: The aim of this chapter was to develop a research design to measure email stress in the workplace. This chapter presents an overview of the research approach, philosophy and methods, together with the research design otherwise coined the 'email stress measuring methodology'. Then the chapter summarises the data collection tools employed and how the data obtained from using the techniques were analysed as part of each study.

Chapter 4: This chapter presents the results of the first ███████████ study. Its aims were to: (i) identify and examine the effect of email use of employee stress, and (ii) evaluate the use of established email management strategies, such as 'email free time' and email filing, to manage email stress and related stressors effectively. The chapter summarises the qualitative and quantitative findings obtained from the different methods employed in this study and also reflects on the methods and research design.

Chapters 5 and 6: The aim of these chapters was to develop an epistemology associated with the conceptualisation of email stress. The aim of Chapter 5 was to consolidate the information gathered to construct an initial conceptual

model of email stress in the workplace. Two independent models, i.e. explanatory model to connect email stressors and their effect, and action model to link descriptors and author's recommendations, are presented. The aim of Chapter 6 was validate the models devised and present results of a follow-up study at the ███████████. An additional study (presented in Chapter 7) was found necessary to finalise the multidimensional model design (presented in Chapter 8).

Chapter 7: This chapter presents results of the ████████ study. The aim of this chapter was to critique the use of an email training intervention to manage email stress and related stressors. The chapter summarises the qualitative and quantitative findings obtained from the different methods employed in this study and reflects on the methods and research design.

Chapter 8: The aim of this chapter was to review the conclusions drawn from this research. The chapter presents the multidimensional model of email stress and management strategies towards the development of an epistemology associated with the conceptualisation of email stress in the workplace. The chapter then explains how the aims and objectives of this research have been achieved and summarises the limitations and advantages, reflections on performing research in industry and recommendations for further work.

Figure 1.3: Thesis structure
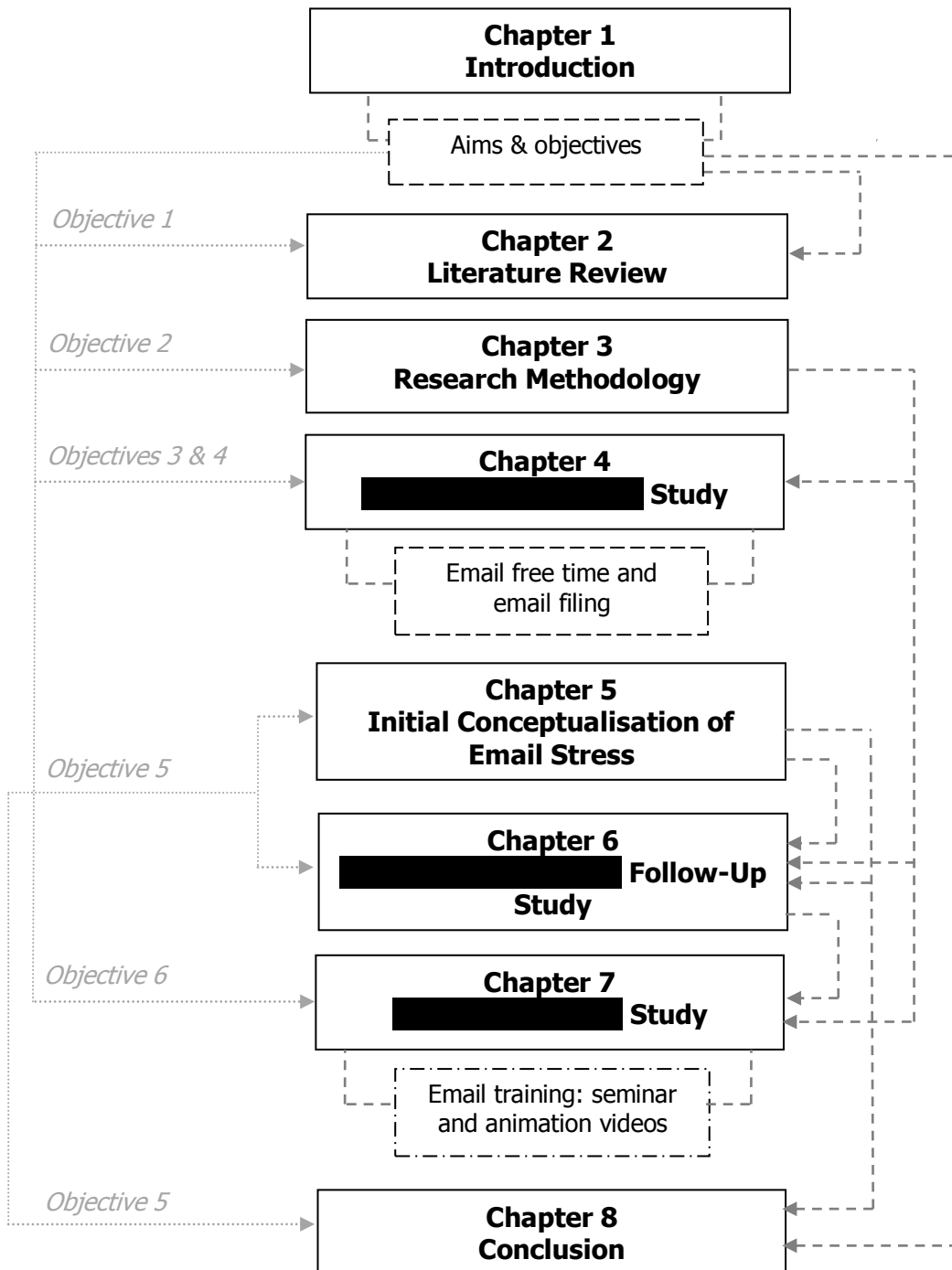
Chapter 2 Literature Review

"The only defence against the world is a thorough knowledge of it"
*** John Locke ***

2.1 Chapter overview

This chapter provides an overview of the relevant email stress literature in order to address Objective 1 (*to conduct a review of the literature to recognise and understand the general views on email use in the workplace).* First this chapter introduces the fundamentals of email, identifies some of the issues that arise with its use and highlights the contrasting views of both supporters as well as critics on how, over time, it has impacted workers and their workloads. The relationship between email and information overload, personality types, performance and well-being is then explored. This is followed by an evaluation of the adverse issues raised with email in the workplace such as overload, addiction, interruptions and bullying. The evolution of email related stress, including agreements and disagreements about its measures, terminology, and emphasis is then discussed. The challenge of how to manage or minimise these adverse issues is also recognised and existing email management approaches are reviewed.

This chapter presents a knowledge foundation from which to learn and to build upon, ensuring the research conducted for this thesis adds to, rather than duplicates, existing or other on-going work. The gaps in the literature and the need for further research is highlighted throughout and, subsequently, summarised at the end of this chapter.

2.2 Email in the workplace: an overview

Email, or electronic mail, is one example of computer-mediated communication (CMC) and another example of an Internet/World Wide Web tool (*Community Arts Network* 2003). In essence it is:

> "The sending of non-spoken information [messages] between individuals over a telecommunications network to a location where it is stored [inbox/outbox] for subsequent retrieval using a computer" (*New Shorter English Dictionary* 1993, p.66).

Email is the most widely used Internet technology to-date with 91% of users actively sending and receiving email (*Radicati* 2012). Research by the *Radicati Group* (2009 & 2012) estimates there are currently 3.3 billion worldwide email users and this is expected to rise to 4.3 billion by year-end 2016. Whilst the Internet has the ability to distribute information, email allows users to keep in touch with one another. It is unsurprising that for almost two decades email has been the undisputed champion of

organisational and workplace communication, both in terms of number of users and applicability (Wood 1999, p.1; Johri 2011).

The great success of email as a communication channel can be related to a number of unique characteristics. These include its ability to be asynchronous (Fallows 2002; Wilson 2002), shared (Powell 2003), instantaneous (Whittaker, Bellotti & Moody 2005), textual (Tyler & Tang 2003) and efficient (Mano & Mesch 2010; Szostek 2011). Burgess (2006) suggests that on some occasions more time spent using email may be an advantage for an organisation and their workers, especially if email conveys useful information and is effectively balanced with other communication mediums. Likewise, email allows for a number of organisational benefits, including the ability to create timely information and information provenance, as well as increasing information accuracy and colleague interaction (O'Kane & Hargie 2007). It has even been attributed to the success of just-in-time knowledge and knowledge integration within everyday work practices (Lichtenstein & Swatman 2003; Fallows 2002). However it is email's capability to quickly and easily distribute a message with an attachment such as documents, links, and objects, to a large dispersed audience, with tracking and audit, which cannot be matched by any other communication technology to date (Anthes 2006; Brown 2007).

However, workers are using email for more than what it was originally intended, e.g. non-urgent and urgent communication, follow-up, audit trails, praise, filtering, one-to-many communications, sending and receiving documents, calendar/diary scheduling, information storage, task manager, to name a few (Venolia *et al.* 2001; Jarrow 2011), and are becoming dependent on email for managing these variety of tasks. Recent research reports that corporate email usage, on average, totals 89 billion messages per day and by the end of 2016 will grow to 143.8 billion messages. In practical terms, this computes to the average corporate worker spending a quarter of his/her work day on various email-related tasks (*Radicati Group* 2012). Coupled with convenience and affordability (Baron 2000, pp.247-259), this inherently versatile nature makes email an ideal channel for information bombardment (Pratt 2006).

The subsequent sections of this chapter examine both academic research findings and popular literature. It identifies how the increasing use of email has changed the way in which users deal with their workload and, where it was once seen to be relatively affordable and convenient communication tool, it is now considered as a source of information overload and contributes to workplace stress (Ingham 2003; Zelikovich 2011; Mano & Mesch 2010).

2.2.1 Email's role in information overload

Bellotti & Smith (2000) observe the central role email also plays in personal information management and the impact of its growing use towards information overload. It appears the problem stems from workers whose perception of being overloaded with information, i.e. escalating emails to read and respond, cause a negative response. Arguably this is very difficult to avoid in the workplace, especially through the quick service of email, which allows for more information to be transferred between workers (Edmunds & Morris 2000). Whilst email overload has been explored in more recent years and is discussed later in this chapter (see section 2.3.2.3), information overload was first examined.

The concept of information overload has seen much debate in both academic research (Biggs 1989; Infield 1996; Edmunds & Morris 2000; Savolainen 2007) and popular literature (McFedries 2003; Friedman & Reed 2007; Weinberger 2010). First coined by Toffler (1970, pp.311-312), he suggested that rational behaviour is dependent upon a ceaseless flow of data from the environment to the individual. Information overload is therefore the consequence of someone's inability to process all the information given to them in a fast and irregularly changing environment. Controversially, Tildine (1999) in Bawden, Holtham & Courtney (1999, p.251) argues that information overload is frequently identified as a problem, yet has not been documented through rigorous investigation, and is, in its simplest form, a myth. A number of published academic studies (e.g. Edmunds & Morris 2000; Savolainen 2007; Eppler & Mengis 2010) have since explored cases of information overload and found it present in the workplace. For the purpose of clarity information overload is understood henceforth as the "experienced feeling of having too much information, which uses up too much time, causing stress" (Edmunds & Morris 2000, p.19).

An encounter with information overload is often characterised by the feeling of being overwhelmed (Wurman 1989). This was later described as the "too much information effect" by Bawden, Holtham & Courtney (1999 p.251). They argued that in an increasingly connected global economy, communications such as email make it possible to work, or at least be accessible, 24 hours a day. It appeared that people depend on information to stay current and make decisions. However, the growing pressure to consume more and more data and to work harder, faster, and better than ever before has developed a dark side (Wojcik 2005). The concern of "what do I have to know and how do I know it?" is increasingly becoming a dilemma among the community of knowledge workers (Siemans 2002; Drucker 2012). As a result, workers are finding it more difficult to stay on top of the mountain of information needed to perform work tasks and data is ever-more widespread as a means of access (Biggs 1989; Flynn 2012; Neubarth 2013).

Empirical studies conducted in work-related contexts suggest that information seekers are typically "satisficers". This means workers draw on diverse criteria to judge when they have obtained information 'good enough' for the needs of a particular task performance or decision (Savolainen 2007, p.614). Savolainen (2007) argues that these criteria may originate from personal preferences (e.g. lack of interest in specific topics like sport, or insufficient credibility of a newspaper due to its political bias), cognitive constraints (e.g. textual overload faced in a poorly designed website) or contextual constraints (e.g. time stress). In any case, the detrimental effect on workers is that they are unable to find information, which has subsequently been shown to cause ineffectiveness and inefficiency at work (Bawden, Holtham & Courtney 1999, p.249; Savolainen 2007; Bawden & Robinson 2009).

Furthermore, some (e.g. Wurman 1989, Tjaden 2007) propose that information overloaded workers, i.e. those exposed to excessive amounts of information, are less productive, prone to making bad decisions and risk suffering serious stress-related diseases (Misra & Stokols 2011). Hallowell (2005, p.55-56) describes these negative neurological effects of information overload as attention deficit traits (ADTs):

> "[There is] a very real but unrecognized neurological phenomenon that I call attention deficit trait, or ADT. Caused by brain overload, ADT is now epidemic in organisations. The core symptoms are distractibility, inner frenzy, and impatience. People with ADT have difficulty staying organised, setting priorities, and managing time."

McFedries (2003 p.15) argues that "the information tsunami has not been helped one bit by the Internet and the worst offender of them all being email". Email users have constructed a new environment that enables them to constantly supply that need to be "plugged in" (Freeman 2009, p.138). Empirical surveys, conducted by Wurman (1989) and Savolainen (2007), have revealed concrete embodiments of information overload and suggest email has aggravated its growth. Similar worries exist with regard to information anxiety, e.g. situations when the worker does not understand or feels overwhelmed by the amount of information available, and the number of emails sent and received. Nonetheless it is important to note that information overload does not seem to exist for every person, where some users have been found to ignore what they do not need or that which they find irrelevant (Wurman 1989).

Alternatively, as recognised by Tjaden (2007), a number of workers believe that "too much information is better than none at all". Likewise, Hemp (2009) suggested that some workers are even stimulated by the torrent of

information received. O'Kane & Hargie's (2007) findings suggest that, when compared with face-to-face communication, information transferred via email was found to be both more accurate and current in its existing form. Nevertheless the same research findings went on to show that the fear of missing important information created a need in people to access emails that, at first glance, may have been deemed irrelevant. Indeed, the term "information entropy" describes email users' experience of incoming messages which have not been sufficiently organised, nor easily recognised as important, as part of the history on a given topic (Soucek & Moser 2010, p.1459). The attention and organisation required to manage the volume of information sent and received by email brings new challenges for workers.

2.2.2 New challenges for the email worker

Media richness theory (MRT) was conceptualised long before the arrival of most electronic communication tools in use today. As the theory suggests, rational individuals predictably favour the use of specific communication media to accomplish certain tasks. For effective communication to occur, the richness of the medium must match the equivocality[1] of the message (Daft & Lengel 1984; Kock 2001). Early researchers (e.g. Markus 1994; Valacich *et al.* 1993) argued that email, as a communication medium, was somewhere in between face-to-face interaction and printed documents. More recent research however has shown a communication shift, where email is perceived, and often used, as a high complexity medium (Baninajarian *et al.* 2011), and the primary tool of choice in the workplace (Jarrow 2011).

Iskold (2007) poignantly reflects that "email not only redefined mail, it created a completely different way of communicating". As email can be shared and accessed remotely in numerous ways, e.g. computer, laptop, mobile phone, there is almost no limit to the ways it can be used to replace, supplement and enrich business information interchange (Stevens & McElhill 2000; Naughton 2012). The challenge for workers today is that managing email is now a standard requirement and principal part of workers day-to-day tasks (Brown 2007; Price 2010; Wasserman 2012). Thus workers are left to independently judge which medium is suitable for a particular communication task (perceived media appropriateness), and the volume at which a communication medium is used (media use patterns) (Markus 1994).

The focus of the next section is to explore the current literature on human behaviour to discover if an association exists with how, or why, workers use email the way they do.

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[1] def: the state or quality of being ambiguous in meaning or capable of double interpretation (Griffin 2003).

2.2.3 Human behaviour and email use

As users engage with email at work, there is a critical need for companies to be aware of how it is used and the effects it has on their organisation. An email inbox acts as its owner's fingerprint, illustrating both an individual's management style and their organisation's culture (Seeley 2004). Hewlett Packard researcher Bernardo Huberman suggests "you can make all sorts of inference about how people work… email patterns show how they work in a different way… you discover leadership roles, such as who's the hub, that you wouldn't identify from the organisational chart" (Anthes 2006, p.32). Schulman (2005) proposed that companies could operate more like a work group or community and, consequently, would naturally evolve their own rules and solutions to email use. Therefore in order to learn and understand how workers interact with email, it must be first understood how workers behave and why.

The theory of human behaviour and its relationship with email use is rather limited in academia (e.g. Whittaker & Sidner 1996; Hair, Renaud & Ramsay 2007). However, existing literature exploring the organisation of information in the workplace is more plentiful (e.g. Malone 1983; Barreau & Nardi 1995; Boardman & Sasse 2004; Jensen *et al.* 2010). Malone (1983) was one of the first academics to investigate, using a series of interviews, how workers organise and store information at their office desk. Based at an industrial research centre, ten workers were asked to give the interviewer a tour of their office - explaining where information was and why it was there. One of the most salient features was the way workers organised their information, i.e. some in files and others in piles. Later research by Whittaker & Sidner (1996) suggested that the same principle can be applied to information generated via email. Their findings showed that email workers could be categorised into one of three filing strategies: (i) 'No Filers' (no use of folders), (ii) 'Frequent filers' (folder users who clean up their inbox daily) and (iii) 'Spring Cleaners' (folder users who clean up their inbox periodically).

Boardman & Sasse (2004) later proposed that a worker's tendency to organise may be directly influenced by their innate personality. From punctuation to email addresses, research has shown that all can reveal aspects of personality with surprising accuracy (Krause 2008). A more recent study by Recupero (2010) concluded that unconstructive email behaviour, e.g. forwarding personal emails to inappropriate recipients, may indicate early signs of a personality disorder. Whilst such a condition can not be confirmed by this study alone, it has been led by other attempts to type email behavior. Table 2.1 presents early works by Seeley (2004) which branded workers into stereotypes. Although these conclusions are based on her experiences in the workplace, and no research or scientific rigour can be provided for her findings, Seeley (2004) offered an interpretation of email

workers personality and identified a significant gap in the academic literature.

Table 2.1: Email personality types by Seeley (2004)

Typology	Personality Type
Pat the Pen	Rarely uses email, partly as he prefers to talk or to write letters, and partly because he is not very good with the technology. Is a liability to those with whom he works as he does not respond to email communications in a timely manner
Julie the Email Junkie	Relies on email and is addicted to it. She prefers technology to people, probably micromanages
Justin Just Online	Adores technology and has all the latest gadgets and logs in whenever he can, works well with people, real thirst is for information, and technology is a way of obtaining it
Ronny the Reliable Email Citizen	Does not rely solely on email, uses email judiciously in conjunction with other media, takes time to make sure her mail is communicating the right message first time

The academic literature on email types was widely revived by Hair, Renaud & Ramsay (2007, pp.2779-2800) who identified key characteristics that workers denoted themselves to be when using email. These three types were:

(i) Relaxed - when email exerts no undue pressure. This type of email worker deals with emails as and when they see fit and refuses to allow anyone to exert long-distance pressure. Email is understood as an asynchronous communication medium.

(ii) Driven - when email exerts pressure. This type of email worker feels the need to reply instantaneously to emails and expects the same in return. Email is understood as a synchronous communication medium.

(iii) Stressed - when email exerts stress. This type of email worker does not find email to be a useful medium, and the pressure to respond is almost always experienced as a negative issue.

Hair, Renaud & Ramsay's (2007) study provided much deeper insight into workers' reactions of email that no other study had reported to date. However the research was limited, as noted by the researchers themselves, and there were several areas of interest which were not addressed in the survey that would have been most relevant to a large scale population. Alternative studies by Phillips & Reddie (2007), combining the Melbourne decision making and Coopersmith self-esteem questionnaires, observed that better educated workers used email more often. However the relationships discovered were moderate to small and further research is required to explore psychological tendencies that might predispose people to use email at work.

It is evident, to date, there is a significant gap in the literature to explore why workers act and behave the way they do with email at work, i.e. why do some workers file their email and why do others not? What type of personality do they have? Does their personality infer they are naturally more likely to file than not file? Future research would benefit from exploring innate personality of workers and the effects this may have on their subsequent approach to email use.

2.3 Problems of email use in the workplace

This section demonstrates the problems of email use in the workplace by first examining the consequences of email on workplace performance and wellbeing, followed by an evaluation of several adverse effects to email use, e.g. email bullying, email interruptions, email overload and email addiction, identified in the literature. Finally, this section carries out an indepth analysis of research relevant to email related stress in the workplace.

2.3.1 Consequences of email on performance and well-being

Email's inherent properties, such as ease of use and technical neutrality, would suggest that potential communication distortions from sending and receiving email messages are rare. However, this has not always been the case, and some researchers (e.g. Ingham 2003; O'Kane & Hargie 2007; Mano & Mesch 2010) have questioned the appropriateness and effectiveness of email on work performance and employee wellbeing.

Derks, Fischer & Bos (2008) argue that information shared by email can be conveyed by text appropriately and accurately. The research concludes that written communication is just as powerful as face-to-face communication, proven by the growing success of online support, email romances and virtual weddings. However, in a workplace setting, the lack of bodily cues when using email leads to intense emotions of an entirely different and often more negative nature (Woollaston 2013). It is not uncommon for emails to be misunderstood as they lack emotional cues, e.g. smiles, frowns, laughter, found in other forms of communication (Adam 2002; Flynn 2012). Furthermore, the tendency for people to write and send an email quickly was found to generate a number of workplace conflicts. Some academics (e.g. O'Kane & Hargie 2007; Taylor, Fieldman & Altman 2008; Sherman [n.d.]) have deduced that these, usually unintentional, conflicts are often the result of workers' unconscious use of text and language. Likewise, they have also been shown to have a detrimental effect on workplace culture.

Findings from O'Kane & Hargie's (2007) study for example showed that email had led to a decrease in discussion between workers, which resulted in weakened relationships and the avoidance of face-to-face interaction between staff. This type of isolation and detachment characteristics in workers can, over time, negatively affect employee motivation and well-

being. Similarly, earlier research by Ducheneaut & Bellotti (2001) warned that as email captures an increasing share of an organisation's total communication volume, workers will permanently associate their email client to their work environment. If that is the case then, in the long term, workers will likely become dependent on email and lose the social skills that once came with interacting in the office and speaking to people over the phone (Pendergast & Hayne 1999; Flynn 2012; Sherman [n.d.]).

In addition, a recent study by Mano & Mesch (2010) based on secondary data collected from a survey of workers in America examined the relationship between email and work performance. Results found a number of occasions when email carried important and critical information relevant to the task at hand. However, where the information proved beneficial in some circumstances, for the most part emails appeared only to disrupt workers. Furthermore, whilst the researchers could not control the nature of tasks carried out or the occupation of users examined, limiting the study's population base and setting, the results did indicate that email can support workplace performance and, at the same time, decrease workers' motivation and workplace satisfaction. More of the adverse effects associated with email use raised in the literature are discussed in the next section.

2.3.2 Adverse effects of email use

Research by Bawden, Holtham & Courtney (1999) suggests there are two sides to the email problem: the human side and the technical side. The human side is mostly about overcoming issues of competency, such as information literacy and handling skills, e.g. time management and stress management. In contrast, the technical side focuses on new Information Communication Technology's responsibility for improving information, e.g. smarter search engines, better email management and RSS feeds (Bawden, Holtham & Courtney 1999; Tjaden 2007). By questioning the adverse effects of email use it also, inadvertently, enquires to the fundamentals of human resource management, i.e. human side, and organisational information perceptions, i.e. technical side. For example, how do companies conduct in view of frequent and increasing use of emails at work? Are companies aware of intrusions and obstructions caused by this conduct? And mainly, are companies attentive and responsive to the different negative impacts and, consequentially, escalating costs related to the way email is used at work? (Zelikovich 2011).

An original model, illustrated in Figure 2.1, has been created from researcher's own literature investigation and extensive reading. Publications/reports were classified into themes, which were represented in four clusters and detail some of the adverse effects associated with email use. These issues were identified and chosen as they have in some way been

considered similar or related to email stress in the workplace. The 'internal' clusters, i.e. email addiction and overload, were considered relevant behaviours of the individual email worker. The 'external' clusters, i.e. email bullying and interruptions, on the other hand were considered relevant to other people's email use and not always within the realms of the individual worker's control. In turn these clusters are examined in more detail within the following sub-sections; with the focus on the former 'internal' clusters for the remainder of this thesis.

Figure 2.1: Four clusters of adverse effects associated with email use
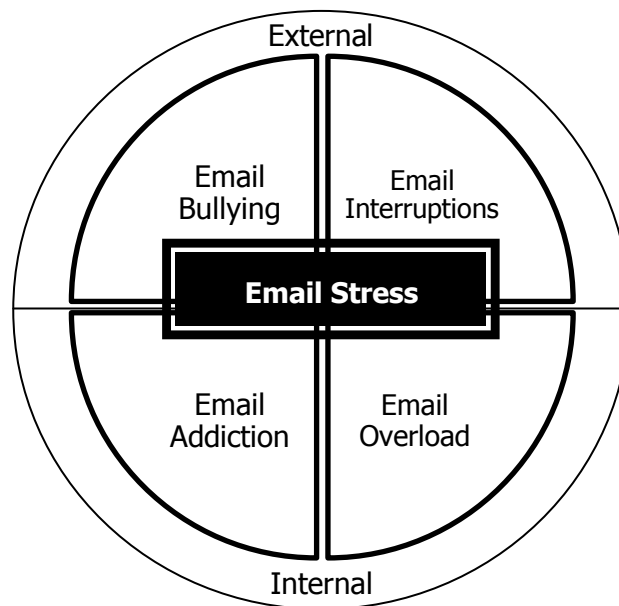
2.3.2.1 Email bullying

Workplace email lacks many of the nonverbal messages so that it can make it difficult to develop a sense of trust between co-workers who never see each other. The less trust co-workers feel, the less cohesive the team will be and the weaker their cooperation. As a result email can become an enabler of vicious behaviour and lead to feelings of isolation of those abused (Baruch 2005; Privitera & Campbell 2009). As discussed in previous sections, this is often exacerbated by the inability to transmit latent elements of communication and social cues, i.e. body language, facial expressions and tone of voice. The absence of such cues can reduce perceptions of status, leadership and power, in the workplace (Lea 1993, p.92-94; Srivastava 2012). Whilst this may be seen as beneficial in some cases, e.g. where workers are encouraged to be polite and break down boundaries of hierarchies in the workplace, in others this social dialogue can lead to uninhibited behaviour (Lea 1993, p.89; Kurland & Cooper 2002; Vinagre 2008; Lim & Teo 2009; Sherman [n.d.]).

An early investigative case study by Romm, Pliskin & Rifkin (1996) found that members of a University learnt to exploit email for deliberate political

manipulation. Email was used to gather support for a rebel group in an attempt to overturn members of power. When the rebellion eventually subsided, email was proved to have a detrimental effect on relationships among members and led to the curtailing of free email use. Similar studies also show how email has influenced hierarchical structures (e.g. Ziv 1996), but more unconstructively facilitated widespread cyberbullying and abuse in the workplace (e.g. Baruch 2005; Privitera & Campbell 2009).

Although cyberbullies may not be physically present, they are able to reach their victim at any time and copies of exchanges can reach a wide audience (Chesney *et al.* 2009). Survey results found that more than 50% of respondents claimed to have received aggressive email messages at work and 25% knew colleagues who had been victims of "flame mail" (Baruch 2005, p.361;), i.e. negative targeted email messages. Consensus among academics and researchers (i.e. Overell 1998; Welch 1997; Baruch 2005; Moreno-Jimenez 2009; Monks & Coyne 2011) was that the side-effects of flame mail were consistent with those found in research into workplace bullying, e.g. loss of confidence, stress related illness and reduced productivity.

Cyber-harassment, another form of obscene hate email, which threatens, frightens, or contains offensive content, is also increasingly being reported in the workplace (e.g. Lim & Teo 2009; McDonald 2011; Srivastava 2012). Reports found that a third of workers claimed they received sexist material, and an eighth received racist material, via email (Whitty & Carr 2006). These researchers propose that the norms and values associated within the computing subculture of email promotes malpractice, as it has its own set of values, norms, language, signs and artefacts. Rational minded thinking however would conclude that email should be free from bullying and malpractice because it is documented and can serve as evidence in case of doubt. Nevertheless, the last decade has seen a number of email-misuse related court cases face legal prosecution, e.g. Chevron, Strauss vs. Microsoft Corporation, Copland vs. United Kingdom (Wen, Schwieger & Gershuny 2007).

Although the literature on cyberbullying identified examples of unacceptable email behaviour in the workplace there has been a historical, as well as methodological, inconsistency across reported prevalence rates (varying dramatically from 4% to 36%). Whilst these rates may have been affected by differing population samples or workplace sectors, the lack of consistent measuring criteria restricts these studies reliability and worth. For example, the majority of studies acknowledge that cyberbullying constitutes "a repeated action by one or more known or unknown perpetrators", yet reports are often based only on a single or the occasional workers' accounts (Monks & Coyne 2011, p.214). As the issue of email bullying is an extremely

sensitive topic there is less admittance by workers and access to reliable information within organisations. Moreover, without workplace volunteers who are willing to openly share their experiences, the growth in future research studies will continue to be limited and produce variable results.

2.3.2.2 Email interruptions

Solingen, Berghout & Latum (1998) defined interrupts in three phases: (i) occurrence [new task], (ii) handling [dealing with new task] and (iii) recovery [return to previous task]. Interruptions are generally considered to be disruptive, a hindrance to task performance and effectiveness, especially when they involve the same sensory channels in working memory (Jackson, Dawson & Wilson 2001). As a result, workers have to leave one task pending in order to follow up on another and, on return to the original task, lose further time to recover concentration (Solingen, Berghout & Latum 1998; Jackson, Dawson & Wilson 2001; Arora, Gonzalez & Payne 2011). From the *BBC* (2000) to the Guardian (Naughton 2012) and Financial Times (Woods 2013), popular news press have reported that office email contributes to the top two sources of workplace stress, the most common of which is attributed to interruptions. To put this into a tangible context, Spira (2005) calculates that unnecessary interruptions typically consume 28% of a worker's day, which translates to 28 billion lost hours to companies at a cost of $588 billion per annum; based on the population of United States of America alone.

Early studies by Jackson, Dawson & Wilson (2001 & 2002) discovered that email interruptions adversely affected workplace performance. Through observation in the workplace, the researchers found that 70% of emails dealt with were viewed within six seconds, which was faster than letting the telephone ring three times. Furthermore it was established that the recovery time from an email interrupt costs a worker, on average, sixty-four seconds; significantly less than recovery times reported for a telephone call. However, when users dealt with email, instead of delaying the response to a more convenient time, they reacted quickly and with little consideration. This showed that workers were using email as a synchronous, instead of asynchronous, communication tool. As described in section 2.3.1, the immediacy for information contained in emails, for the most part, contributed to increased levels of pressure and often distracted workers from other tasks. Later research found evidence to support this within another organisation (Marulanda-Carter & Jackson 2012).

On the contrary, research by Russell, Purvis & Banks (2007) found that email interruptions can have a positive effect on workplace performance. It is recommended that taking regular breaks during the work day to read and deal with emails could reduce, as opposed to contribute to, stress. It is logical to assume that, on some occasions, short (up to ten minute) breaks

allow workers to resume tasks with increased motivation. However, Russell, Purvis & Banks (2007) found that this is not always the case and a flux of email interruptions was likely to cause more disruption than cohesion. Iqbal & Horvitz (2007) found that following an interruption, a number of workers would often spend more than two hours procrastinating on other unproductive activities before resuming their work. Consequently the increased number of email interruptions affects employees' work and causes message fatigue, which ultimately leads to a decrease in quality and increased concentration that leads to strain on the brain (McNay, McCarty & Gold 2001; Jackson & Smith 2006, p.611).

Email interruptions such as these interfere directly with the same sensory channels that workers use to complete their jobs and work tasks. Immediate interruptions burden a worker's cognitive functions thus making them vulnerable to mistakes and delays (Jackson, Dawson & Wilson 2001). Gonzalez & Mark (2004) suggest that it is not only the activity of dealing with interruptions that takes its toll on workers but also the activity of switching, since there is a need to change mental context with every change of activity. Similarly, it has been raised in popular research that constant email interruptions are causing the brain to not operate to full capacity and are lowering workers' intelligence levels (Heussner 2010). A range of research studies have found the negative consequences of email interruptions on workers, including: lower IQ scores (Porter & Perry 2008), difficulties in face-to-face conversation discourse (Robinson 2010), increased expectations of other users availability (Tyler & Tang 2003) and extended project/task deadlines (Burgess, Jackson & Edwards 2005).

Research investigating email interruptions in the workplace has been meticulously explored in academia. Studies have repeatedly shown the related adverse effects, and the lack of solution to the issue will continue to cause problems for workers. Attempts made by academics and practitioners to solve these issues are discussed in later sections of this chapter.

2.3.2.3 Email overload

The general consensus among most modern researchers (e.g. Peric 2009; Soucek & Moser 2010; Weinberger 2010; Sumecki, Chipulu & Ojiako 2011; Szostek 2011; Drucker 2012) is that email overload is "a result of the email volume received and sent that is no longer manageable" (Ingham, 2003 p.166). Likewise, it can be understood as the high ratio of "noise" to "information". In other words when unnecessary email [noise] adds little, or zero, value to the task at hand [information] (Seeley 2004). Broadly speaking, and not too dissimilar to information overload (as previously mentioned in section 2.2.1), email overload has the potential to cause significant harm to the well-being of workers and impairs productivity

(Sumecki, Chipulu & Ojiako 2011; Jerejian, Reid & Rees 2012). Reports by *RescueTime* (2008) suggest that email overload can cost large organisations [of up to 50,000 employees] approximately $1 billion [approximately £660 million] per year in lost employee productivity.

The problems surrounding email overload were originally foreseen nearly three decades ago by Hiltz & Turoff (1985), who recognised that the potential pace and volume of information transferred by communication systems would lead users to feel overloaded. The growth of email overload appears to have stemmed from two key factors: (i) time – the lack of time to deal with email (Ingham 2003; Fitzgerald 2004; Wasserman 2012) and (ii) volume – the high volume of email to attend to (Brown 2007; Taylor, Fieldman & Altman 2008; Neubarth 2013). Studies have also shown that workers are spending most of their time sifting through and deleting email from known sources – typically colleagues within their own organisation (Tjaden 2007; Sumecki, Chipulu & Ojiako 2011; Denton & Richardson 2012).

Iskold (2007) argues that because email is delivered faster, workers send more of it, and instead of sending more information less often, workers send less information more often. Whilst Iskold provided no evidence for his assumptions, results from a number of previous studies (e.g. Hogg 2000; Dabbish & Kraut 2006) support his claims. Research carried out by Ingham (2003 p.169) found email overload was a personal experience and senior management, who "spent the most time dealing with emails", often felt overwhelmed and anxious. Whilst "techno-stress" i.e. feelings of frustration and stress caused by having to deal with the changes brought on by computers, was not a symptom originally identified, it is argued by McFedries (2003 p.15) that it should be a condition associated with email overload.

In an attempt to measure email overload, Hogan & Fisher (2006) present eight defined variables to detect an overloaded email user, as shown in Table 2.2. Although validated using least square regression (R^2 is 0.29), due to the nature and reliability of self-completed surveys (see Phillips & Reddie 2007 for discussion on self-report questionnaires), the results of this scale are largely subjective. Furthermore, the researchers failed to include relevant external variables that set the context of email use, e.g. the number of messages sent, number of lists subscribed to and how frequently email is checked.

Table 2.2: Email overload scale

Email Overload Scale
1. I feel I spend too much time keeping up with my mail
2. Email cuts into the time I wanted to spend on other tasks
3. I have trouble keeping up with email on days I am away from my desk
4. I get too much email
5. I spend too much time getting rid of unimportant messages
6. I am satisfied with the strategy I use to keep up with my mail
7. When I return from vacation / time off, I feel overwhelmed when triaging my mail
8. Sometimes my emails get lost or missed

(as printed in Hogan & Fisher 2006)

Nevertheless, Hogan & Fisher (2006) found users were more likely to suffer from email overload if they were distracted by notifications, e.g. email interruptions (as described in in section 2.3.2.2) or if they try to pick and choose important messages. It was also recognised that users were less likely to suffer email overload if they felt they could keep on "top of their email". This loosely suggests a relationship may exist between email overload and a worker's ability to better manage their inbox. On the contrary, a more recent study by Sumecki, Chipulu & Ojiako (2011) investigated latent users' needs with regard to their email handling skills. The survey results of 710 employees revealed that email overload was due to current email clients' inabilities to facilitate email prioritisation, information structuring and work-flow management. This, instead, implied that overload can only be prevented by improved functionality of the email system itself.

Likewise, there appears to be a growing discrepancy in the workplace between workers' expectations of email and design of the email system. Email applications were originally designed for simple text-based asynchronous communication. Yet email has now evolved to a point where it is frequently being used for additional tasks such as document delivery, task management, and method for personal archiving (Whittaker & Sidner 1996; Szostek 2011). It is unsurprising then that there are users experiencing major problems, such as email overload, as they utilise email for tasks that it was not originally designed for. As a result, some workers have since claimed email bankruptcy, i.e. abandonment of their email accounts in order to start afresh (Rosenblum 2002; Fitzgerald 2004; Drucker 2012).

As previously discussed in section 2.3.2, the two sides of the email problem, i.e. human and technical side (Bawden & Robinson 2009), appear equally apparent in the email overload debate. There is a lack of consensus between academic researchers about which causes the problem of email overload: is it the human side, i.e. workers' inability to manage email? Or is it the technical side, i.e. email clients' inability to meet latent workers needs? In either case, the area for further research is in how to manage the problem.

2.3.2.4 Email addiction

A question that remains largely unanswered is why people attend to certain messages and not others. It is equally unclear how individuals weigh up the information they retrieve in order to prioritise their email. Venolia *et al.* (2000) ranked a number of factors that workers recognised as particularly important of an email message. The most common factors included 'reply to my message', 'from manager', 'high importance flag' and 'from current project member'. However Wainer, Dabbish & Kraut (2011) found, using a think-aloud study examining users' rationale for prioritising, that uncertainty about message content at the inbox level increases the likelihood of attention to a message. Whilst this study only included five participants, these findings suggest that email use is more attractive to workers at times when they were bored or underworked. Although, when workers were busy, it appeared the need for email was less substantial or perceived as necessary.

On the other hand, Ducheneaut & Bellotti (2001) found that the more workers use email, the more it becomes integrated into organisational activities, i.e. organising meetings and documenting activities, and the more frequently email is checked. Incoming email messages are thus perceived to be intriguing as they contain partial information and psychological reinforcements that people are curious to explore further, e.g. "the email environment is a soap opera in which the user is one of the characters" (Adam, 2002 p.90). Although curiosity and intrigue may, in part, engage workers to use email, the subsequent consequence of this has worried theorists (e.g. Turel & Serenko 2010; Waller & Ragsdell 2012) who argue it may lead to continued negative tendencies and dependency of email.

In an interview with Anderson (2008), Dr Tom Stafford from Sheffield University stated that the fundamental learning mechanisms that drive gambling addicts can be also associated with email users. He suggested that the "variable interval reinforcement schedule is in play". Thus rather than reward an action every time it is performed, email users only reward it on some occasions; "... we sometimes check emails and there is nothing interesting, other times we might get something interesting or wonderful". Stafford argues that this is enough to make it difficult for workers to resist checking email, even when they have only just looked (Anderson 2008). Furthermore, Porter & Perry (2008 pp.264-265) found that email use can resemble obsessive compulsive disorder (OCD) behaviour. They conclude that "users can overvalue incoming messages, assigning each one with a sense of urgency that they feel something catastrophic could occur if they do not answer". As a result, the term 'email addiction' has been widely used in both academic (e.g. Turel & Serenko 2010; Marulanda-Carter & Jackson 2012; Waller & Ragsdell 2012) and popular research (e.g. Anderson 2008; Egan 2008; Freeman 2009) to describe these habitually addictive tendencies.

Independent online survey results by Beta Research and AOL in 2008 of 4,000 email users in the top-20 U.S markets, found almost half, 46%, of email users claim to be addicted to email (Begun 2008). However, it was noted by the investigators that the increase in self-diagnosed addiction was in need of professional psychological diagnostics in order to add clinical justification to the level of addiction that email use causes (Begun 2008). In this instance addiction was defined as an "activity that takes over one's life... instead of being an enjoyable addition to their routine, it becomes a way to manage anxiety, stress, loneliness and depression that one feels or that which interferes with daily responsibilities" (Maas 2008, p.6).

Whilst the email addiction literature lacks psychologists' forthcomings in the area, the repercussions of Internet addiction have been raised (Young 1996; Beard & Wolf 2001; Adam 2002; Yellowlees & Marks 2007). Internet addiction, first indicated by Young (1996), found that some on-line users were becoming addicted to the Internet in much the same way that others become addicted to drugs or alcohol (Young, 1996). This clinical study, based on similar questions to those used by DSM-IV (first published by American Psychiatric Association 1993) for pathological gambling, used an adapted questionnaire to test and measure Internet addiction. Although early critics, e.g. Beard & Wolf (2001), argued for a slightly different classification system, Young (1996) opted for a rigorous cut off score where respondents who answered 'yes' to five or more questions, from eight adapted questions, were classified as Internet dependents. Based on this criterion, Young (1996) identified 396 dependent Internet users and 100 non-dependent Internet users. The use of existing, tested and reliable clinical based criteria prompted the American Journal of Psychiatry to consider Internet Addiction a mental disorder (Yellowlees & Marks 2007; Maas 2008).

In an attempt to close the gap in academic literature, in previous research undertakings prior to this thesis, an original criterion was developed to identify email addiction in the workplace. Email addiction was measured using two criteria, clinical characteristics (Criteria 1), i.e. adaption of addiction questions as used by DSM-IV for pathological gambling and Young (1996) for Internet addiction, and behavioural characteristics (Criteria 2), i.e. email addiction symptoms from Egan (2008) and McKinney (2000). The 16-item email addiction questionnaire was administered to a large international car rental company, where a total of seventy-four office based employees responded. The study adopted a similar evaluation criteria framework to that of Young (1996), where any five or more questions responded to with a "Yes" in Criteria 1, or "Most Often" within Criteria 2, identified the participant as an email addict. The results showed that 12.2% of workers were classified email addicts on Criteria 1, and 15% on Criteria 2. It was concluded that both clinical and behavioural characteristics were necessary in classifying

email addiction. However further research is required to determine its construct validity and clinical utility (Marulanda-Carter & Jackson 2012).

2.3.3 Email related stress

This section examines existing literature on the topic of email stress in the workplace by first exploring stress and universal measurements, followed by a brief summary of workplace stress and finally leads to a discussion on the issues involved specifically with email and stress in the workplace.

2.3.3.1 Stress and universal measures

Stress is "the nonspecific response of the body to any demand" (Selye 1976, p.53). In the case of human beings, the executive part of the brain guides decision making, information organisation and planning. When the executive function works smoothly, the survival part of the brain, which governs lower functions such as sleep, heart rate, and basic positive and negative feelings, provides motivation that helps maintain attention and memory. It does so by sending out messages of contentment or even exhilaration. However when faced with one too many conflicting pieces of information, the basic feelings turn negative. This is otherwise understood as the "fight or flight" response (e.g. Cannon 1929 in Snooks 2009, p.174), where the brain reacts with fear and tries to steal itself for attack or escape. This results in stress and often a combination of emotional anger and anxiety (Dorland 2003, p.1772).

Taking the notion of an external force or pressure as a point of departure to the "fight or flight", a stressor is a "condition of threat, demand or structural constraint that by its very occurrence or existence calls into question the operating integrity of the organism", otherwise the implicit "root cause" of stress (Aneshensel & Phelan, 1999 p.281). A large proportion of the medical and health sciences research examines stress and stressors using measurable indicators such as blood pressure (Neus *et al.* 1981), heart rate (Porges 1995) or endocrine samples (Kok *et al.* 1995). However these are not the only measures and additional stress symptoms such as satisfaction, performance and involvement are other hypothesised indicators (Schuler 1980). Stress therefore can be typically measured in one of two ways: psychologically or physiologically.

Psychological stress is based on the concept that stress relates both to an individual's perception of the demands being made on them and their capability to meet those demands. A mismatch will mean that an individual's stress threshold is exceeded, triggering a stress response (Cohen, Kessler & Gordon 1997; McVicar 2003). More commonly, psychological indicators to measure these types of responses are specifically designed to target the stressor using questionnaires or survey tools. Researchers have previously used a wide-range of questionnaires to understand a variety of stressors in the workplace. These include the Daily Stress Inventory (DSI) and Stress

Appraisal Measure to assess the dimensions of primary appraisal (threat, challenge, and centrality) for a specific anticipated stressor; General Health and 'The Measure Yourself Medical Outcome Profile' to show the psychological components of ill health, well-being and perceived quality of life symptoms; and a more commonly used measure, in both mental and physical health, the Perceived Stress Scale (PSS) to measure the degree to which situations in one's life are appraised as stressful (MacArthur & MacArthur 2000; Vrijkotte, van Doornen & de Geus 2000; Atkins & Harris 2008).

On the other hand, physiological stress is best understood as the nature of bodily changes during stress that unfold as organisms encounter, appraise, and respond to situations that pose threat, challenge, loss, or demand. That is, when an event or situation is stressful, a cascade of hormonal changes occurs that appears to work either to motivate or to support coping with the stressor (Cohen, Kessler & Gordon 1997). There are a variety of physiological indicators to measure these changes caused by stress, including blood testing to measure catecholamines and muscle tone, urine samples to measure endocrine systems, saliva samples to measure cortisol or physical monitoring to measure blood pressure, heart rate and galvanic skin response (Cohen, Kessler & Gordon 1997; Eston, Rowlands & Ingledew 1998; Vrijkotte, van Doornen & de Geus 2000; Dorland 2003; McCraty, Atkinson & Tomasino 2003; Scott 2008; Andziulis *et al.* 2009; Lowrance 2009).

Despite their popular use psychological and physiological measures, by which researchers can make an assessment of stress, do have their limitations. In the first instance, due to the nature of physiological indicators, some are considered highly intrusive and could be seen as potential stressors in themselves, i.e. blood testing and urine samples. In order to remove unnecessary stress reactions from the choice of indicators, less invasive stress measures are more appropriate and sought after (Johnston & Wallace 1990). Equally, in terms of psychological measures, there are concerns that questionnaires or surveys often only capture a snap shot of stress at a single point in time, thus results can potentially be unreflective of the norm or natural environment. Nevertheless the majority of these stress instruments are well established, reliable and validated tools for measuring stress (Johnston & Wallace 1990, p.84). It is vital for future research studies to explore the use of both physiological and psychological stress indicators in order to understand and measure email related stress.

2.3.3.2 Workplace stress

Workplace stress, otherwise termed occupational stress or work-related stress by most academics (e.g. McVicar 2003; Cooper, Liukkonen & Cartwright 1996), is the body's reaction to excessive pressure in the work

environment. It arises when individuals perceive that they cannot adequately cope with the demands being made on them. It is worth mentioning that as long as people are able to cope with demands it is termed pressure and when they cannot cope it becomes stress. Workplace stress has grown to be the primary occupational health problem in the UK. Over half a million people experience stress at work to a level they believe is making them ill, which costs organisations around £3.7 billion every year (Atkins & Harris 2008).

The notion of workplace stress has shifted from an earlier perspective of environmental inputs or outputs, to a relational one. Workplace stress is understood as harms, threats and challenges, where the quality and intensity depend on personal agendas, resources, vulnerabilities and environmental conditions (Lazarus 1998, pp.272-273). Lazarus (1998) suggests that stress can be depicted by three kinds of results: (i) no measurable effect, (ii) impairment of performance and (iii) facilitation. Integrated in this view is a cognitive-phenomenological theory of stress that has become the most widely applied theory in the study of occupational stress and stress management. This is described at length elsewhere (see Lazarus 1998 or McVicar 2003). More importantly, it has been well researched and proven that excessive workplace stress over a prolonged period of time, i.e. when the body is exposed to risk without the opportunity to recover, has been found to cause both physiological and psychological problems (Melchior *et al*. 2007; Atkins & Harris 2008). Acute responses include tension, fatigue, nausea and headaches; in addition to chronic, e.g. heart disease and digestive disorders, and mental conditions, e.g. depression and anxiety. A host of research regarding the side-effects of workplace stress can be found in detail at the *Health and Safety Executive* (2009).

A multitude of measures and instruments have been widely recommended to organisations in the literature to deal with the different kinds of workplace stress over the last decade. Several of these measures include: Health and safety inspections (*Health & Safety Executive* 2009), coaching (Gyllensten & Palmer 2005), counselling and training (Cooper, Liukkonen & Cartwright 1996), stress audits[2] (Wojcik 2005), policies (Cartwright & Cooper 1997; Williams & Cooper 2002) and relaxation techniques (Allen *et al*. 2002; Lander & Nahon 2008) to name a few. Wojcik (2005) argues the most effective method, in the long-term, for organisations to reduce or eliminate workplace stress is to establish policies based on the needs of the organisation and its members. Cooper, Liukkonen & Cartwright (1996) propose several benefits in pursuing policy as part of stress prevention activities. These include: productivity improvements, reduced employee health and insurance costs, reduced human resource development and superior organisational image. As workplace stress impacts individual workers and organisational functions in

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[2] Email from Inicio to Laura Marulanda-Carter, 9th October 2009.

different ways, the measures and indicators selected to understand and determine stress should also seek to reflect this diversity.

2.3.3.3 Problems involved with email and stress

Email stress is a paradoxical situation. Even though email is a useful application spending too much time using it can cause stressful situations and low productivity. It is described by some academics as both "a killer app for the Internet" (Ducheneaut & Bellotti 2001; Kanungo & Jain 2008, p.300) and "the electronic medium we love to hate" (Wilson 2002, p.300). The Internet, and email alike, is an extremely important social and communication tool. It is entirely predictable that any major new technology should be associated with a variety of human responses (Yellowlees & Marks 2007, p.1452). The majority of research over the last decade, both in academia (Ingham 2003; Dabbish & Kraut 2006; Taylor, Fieldman & Altman 2008; Freeman 2009; Mano & Mesch 2010) and popular press (McFedries 2003; Seeley 2004; Robinson 2010), however have shown email to be a hindrance rather than a supportive communication tool. This relationship has not been helped by the documented adverse effects of email use in the workplace, such as bullying, interruptions, overload, and addiction (as discussed in preceding sections of this chapter).

These increasing problems associated with email have led organisations to re-examine its use in the workplace, and, revealed in an article from the *Business Information Review* (2007, p.224), there are rising concerns that it is increasingly showing itself to be "unfit for purpose". Likewise, as reported by Adler (2000, pp.10-11):

> "No less telling is the emotional reaction of email users, where almost inevitably the issue of impatience leads to stress, and whilst it is too early to rank email alongside smoking and obesity as a top public health issue, the behaviour email seems to induce clearly isn't helping... and the consistent finding is that it causes stress and depression."

In an attempt to replicate how email is used in the workplace Kanungo & Jain (2008) created a model, with causal loop diagrams, to identify relationships between different email variables including email related stress. The results of their short run model showed that when the rate of incoming emails is low, regardless of the tolerable backlog, stress levels also remained low. In turn, high stress levels were found to occur when the rate of incoming email increased where user attitude subsequently dampened email use and weakened rates of self-efficacy. This is not too dissimilar to the cause-and-effect relationship of email overload, as previously mentioned in section 2.3.2.3, whereby the increase of email caused a negative impact on workers. However, Kanungo & Jain's (2008) what-if-analysis model neglected

a number of relevant variables, e.g. behaviours of email in a natural workplace environment or challenges of incorporating email into workload, which are crucial to providing a more accurate picture of why email causes stress in the workplace (Brown 2007).

In an attempt to focus on one explanation of why email may cause stress, Taylor, Fieldman & Altman (2008) examined the effect of email content on users' blood pressure. They discovered that blood pressure significantly (p<0.01) increased on receipt of a threateningly worded reprimand, and was also affected by a sender's status (equal to or higher than the recipient) when both were in the same department (p<0.05). The results give evidence that the communication style and status of email received can have a direct impact on a recipient's physiological stress response. Although this study was limited to a laboratory setting, unlike any other research to date, it widened the scope of email stress literature and identified the use of stress instruments that had been untried previously. Further investigations, to extend these types of physiological centred studies in a natural workplace environment would likely gain a far superior insight into email related stress.

Furthermore research such as Taylor, Fieldman & Lahlou (2005) paved the way for later studies, e.g. Jackson (2010), which found with the use of heart rate monitoring that email use was causal of stress. In this single-user study increased stress was brought on by receiving email from certain senders, i.e. sender's status, and from keywords within the subject lines. Future studies of email use with a larger population sample would shed more light in understanding email stress from a number of different perspectives. Equally, a wider scope that goes beyond investigating email content would generate more academic literature on email stress that is limited to date.

Existing literature, like those mentioned above, appear to focus solely on the physical responses to email related stress. From a somewhat different psychological perspective, more recent studies by Shirren & Phillips (2011) recorded workers' behaviour upon receiving both personal and work-related emails. In addition to using a five-day communication diary, the researchers also utilised the Melbourne Decision Making Questionnaire and Depression Anxiety Stress Scales to anticipate workplace well-being. The researchers came to conclude that workers experiencing higher levels of "negative affects", e.g. stress, anxiety and depression, received higher numbers of work-related email. The workers went on to report that a delay in opening an email was perceived by their colleagues as "lazy" or "avoiding work", despite having to deal with a high volume that limited their ability to respond quickly. As a consequence, the workers feared their inability to deal with email would go on to hinder future employee performance appraisals. Whilst it is worth noting that self-reports of this nature are often vulnerable to social desirability and limited by memory, they do provide greater insight into the

psychological effects of email stress which is found absent in counterpart physiological based studies. Future email stress research could thus take advantage from combining psychological and physiological measures.

It is also worth mentioning that email, in some circumstances, has been found to reduce workplace stress. Early research studies by White & Cornu (2002) investigating student-teacher relations found the nature of email, together with the potential to maximise learning outcomes, supported users and gave them more control over their work. Nevertheless, this study was fundamentally limited by the actuality that users only had the choice of email available to them. White & Cornu (2002, p.356) had shown that other means of communication, e.g. face-to-face interaction, telephone calls, had decreased in frequency and quality since more students were based off-site and away from their respective recipients, i.e. teachers. Future research would benefit from exploring the impact of email use in organisations with geographically dispersed workforces.

2.4 Email management strategies, techniques and tools

Despite the lack of general understanding from existing literature to define, understand and measure email stress, there have been a number of email management strategies, techniques and tools prescribed in both academic (e.g. Balter & Sidner 2002; Jackson & Culjak 2006; Kenworthy 2007; Wen, Schwieger & Gershuny 2007) and popular literature (e.g. *Emailogic* 2010; Robinson 2010) to date. These have tended to stem from the computer science, information management, communications and organisational research fields of interest. Therefore, whilst some may not have been tried and tested to manage email stress itself, they have been designed for dealing specifically with problems associated with email use.

Email management strategies advocated within the literature have included: email policy and surveillance (Oliver 2002; Wen, Schwieger & Gershuny 2007; O'Donnell 2008), seminar and computer based training (Jackson & Culjak 2006; Kenworthy 2007), filing (Balter & Sidner 2002; Peric 2009), 'email free time' (Robinson 2010), netiquette (Griest *et al*. 2002; Ogunnaike 2006; *Emailogic* 2010) and computer aided software (Shah & Mandal 1999). An original model illustrated in Figure 2.2, which expands on a previously derived model from section 2.3, represents the associated adverse effects of email use and their respective prescribed methods of email management from the literature.

Figure 2.2: Adverse effects associated with email use and respective email management
strategies, techniques and tools
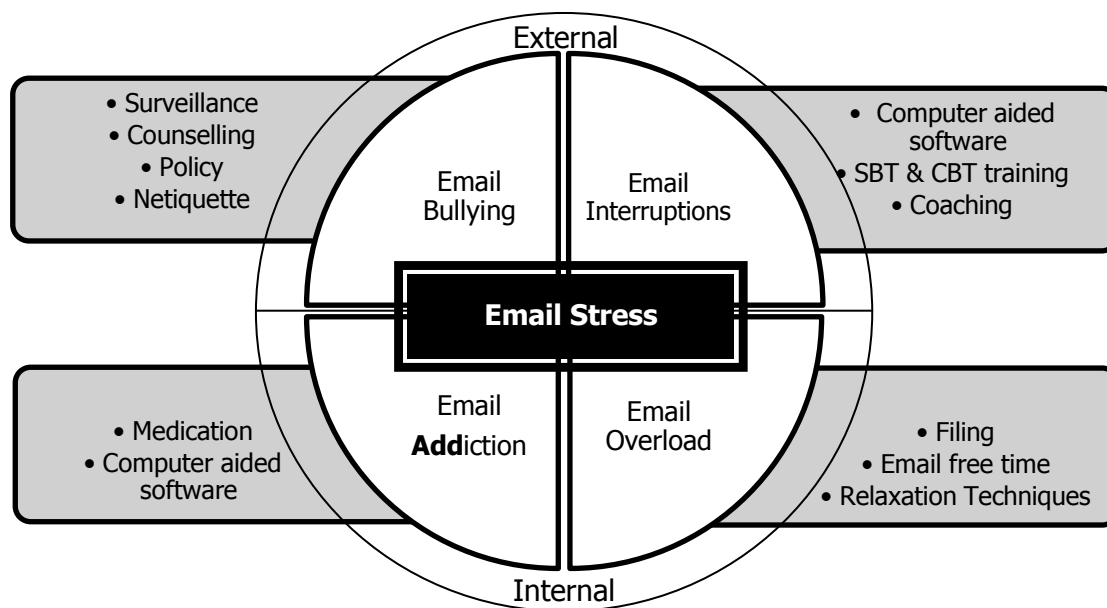
Other management strategies identified from extended literature, although not discussed further in this thesis, included the use of relaxation techniques (Cohen 1997; Eisen *et al*. 2008), coaching (Gyllensten & Palmer 2005), counselling (Cooper, Liukkonen & Cartwright 1996) and approved medication (Shapira *et al.* 2000; Yellowlees & Marks 2007). The following sections summarise and evaluate the aforementioned email management strategies, techniques and tools.

2.4.1 Email policy and surveillance

As first mentioned in section 2.3.3.2, to ensure workers are not misusing email in the workplace, organisations are encouraged to ensure an email policy is put in place to support email use. In general they exist to classify procedures for the identification, collection and preservation, of electronically stored information held in workers' email accounts (Stewart 2007). However more recently, they have been amended to include acceptable and unacceptable email behaviour. Organisations that fail to put into place a policy which governs the use of email run risk of possible law suits and, in the past, have led to organisations' demise in legal cases, e.g. Cliff & Groom v Air New Zealand 2006; Crisp Air v New Zealand Limited 2007; and Wood v Arthur D Riley & Co Limited 2007 (Wilson & Witters 2007).

A prescribed set of rules can at best prevent, or at least attempt to deter, email misuse and often thwarts email problems such as email bullying that may arise. For organisations, although no single policy can provide comprehensive protection against email abuse, its institution can act as a deterrent and gives them the ability to dismiss staff that breach policy. Likewise an adequate policy should set consistent guidelines and standards

across the organisation for employees to follow and, as a result, would allow them to benefit from the improved knowledge to email's risks (MacDonald 2001, pp. 204-205). The objectives to achieving an Acceptable Usage Policy (AUP) are demonstrated in Table 2.3.

Table 2.3: Acceptable usage policy (AUP) objectives

Acceptable Usage Policy (AUP) Objectives
1. State policy regarding the use of email
2. State the organisation's responsibilities with regard to protecting individual
3. State responsibilities of individual with regard to using corporate IT resources
4. Protect organisation against liability
5. Promote security awareness and encourage effective and productive use of IT resources

(O'Donnell 2008, p.56)

Despite their advantages, email policies can often fail for one of three reasons: (i) failure to establish proper policy (ii) failure to enforce it, or (iii) failure to align with the organisational culture. The organisation can minimise the first possible cause by establishing a prudent, and regularly reviewed, email policy tailored to the organisation. Likewise, the latter causes can only be achieved by communicating policy to workers clearly and frequently and by encouraging a corporate culture that promotes good user practices (Smallwood 2007; Wilson & Witters 2007; O'Donnell 2008). Thus, whilst an email policy could be considered necessary within an organisation, it cannot be solely relied upon as an efficient email management strategy. As policy is difficult to follow-up, some organisations have opted to conduct email surveillance in the workplace (Wen, Schwieger & Gershuny 2007).

Electronic surveillance, as an email management tool, is relatively easy for organisations to implement. There is a wide selection of monitoring software for employers to choose, ranging from downloadable freeware to integrated enterprise editions, e.g. Spectorsoft, Exploreanywhere's SpyBuddy, Spytech and PC ACME Pro. In some cases, there may not be a need to actually carry out monitoring. The mere knowledge that email is subject to surveillance should cause employees to limit inappropriate use and unacceptable behaviour as they constantly feel watched (Oliver 2002). However a 2008 workplace survey found that surveillance, generally, does not worry most employees (*Human Resources* 2008). Although this survey population is limited as all respondents were above the age of fifty-five. Nevertheless, before organisations can implement any covert surveillance program, they must ensure that it will be the most appropriate course of action. Specifically with regard to the impact it may have on employee privacy, job satisfaction and the organisation's reputation, which may be enough to cause some level of stress and anxiety in the workplace (Romm & Pliskin 1999; Oliver 2002 Whitty & Carr 2006; O'Rourke, Teicher & Pyman 2011).

The majority of the literature (e.g. Friedman & Reed 2007; Wen, Schwieger & Gershuny 2007; Jarrow 2011; Flynn 2012) commends the use of policy as a means to prevent email abuse, curb employer liability and to implement rules, regulations and standards. However, whilst employers want to be sure their employees are doing a good job, they should avoid disgruntling workers by monitoring every sneeze or trip to the water cooler (*Privacy Rights Clearinghouse* 2014). Email surveillance, on the whole, has been less explored in academia. This is likely to be due to organisations remaining private regarding these measures of monitoring; if only for the purpose of creating or maintaining a positive workplace culture and business reputation. Moreover, without volunteer organisations that have experiences with email surveillance, reliable information and reporting will remain limited.

2.4.2 Seminar and computer based training

Training is any formal or informal activity that contributes to an improved understanding of an employee's knowledge, skill and attitude. Employers are expected to be aware of the driving forces behind the need for training, e.g. change in workplace technology, globalisation or demographic shifts. However, in the majority of cases, email training tends to derive after shifts in new technology, e.g. new email provider software implemented, or from concerned employers and managers (Lucas 1994, pp.3-4). The literature identified two types of training options: (i) netiquette training – to improve email communication (addressed in section 2.4.5) and (ii) seminar and/or computer-based training – to improve general email use and behaviour.

Seminar and computer-based training to develop the effectiveness of workers' email, also in line with improving the negative effects of email interruptions (as mentioned in section 2.3.2.2), was first put into practice by Jackson & Culjak (2006). In collaboration with four UK workplaces, the researchers first developed a seminar based training (SBT) email programme that summarised the common problems with email use in the workplace. Whilst these were tailored for each organisation, the training provided was conducted in a traditional classroom manner and taught by one experienced trainer. In addition, computer-based training (CBT), also known as computer aided instruction and computer assisted learning, was developed using a real time email trainer application to identify and warn potential defects within an email message, e.g. recipient field, the subject line, message body, etc, before it was sent. The advantages and disadvantages to both SBT and CBT are presented in Table 2.4.

Table 2.4: Advantages and disadvantages of seminar based training (SBT) and computer-based training (CBT)

Seminar based training (SBT)	*Computer-based training (CBT)*
Advantages	**Advantages**
• Positive effect on business performance and definite measurable impact on the bottom line • Proved to show increases in employee productivity	• Self-paced, flexible and individualised • Effects of training found to be more long-term (more than one month) and can easily be repeated as a "refresher" session • Can be the catalyst for a paradigm shift to new training approaches within an organisation
Disadvantages	**Disadvantages**
• Employees' time spent away from the actual business • The possibility that the trainers may be sharing incorrect knowledge, or are not at all knowledgeable themselves • Effects of training found to be short-term (as little as a week to one month)	• High initial cost • Impersonal learning environment • Requires computer availability • Can take longer to implement in practice, when compared to SBT • On some occasions can provide low product quality, if programming fails to adopt any learning theory style

(based on findings from Kadiwala 2004; Jackson & Culjak 2006; Bixler [n.d.]; Chappell [n.d.])

The purpose of Jackson & Culjak's (2006) research was to determine if a CBT approach, when used in conjunction with SBT, would be more effective than solely SBT at improving employee email use. The results of the studies indicate that email training can lead to significant improvements in the way that employees use email within the workplace, with CBT showing a greater improvement. Whilst SBT were shown to save substantial costs, in the amount of time employees spent dealing with email after training, the effects of such training were found only to last for a month before employees reverted back to their old habits. Results of CBT on the other hand showed that employees continued to improve their email communication, and this was concluded to be the best way of training (Jackson & Culjak 2006).

The use of SBT however should not be neglected or abandoned in future research studies due to the above results. Custom training seminars have been well proven to successfully elevate education and enlighten workers in both large and small groups and across departments within the same organisation. Similarly they do not have to be expensive and can take place in an office setting (Allen, 2007 pp.97-99). These types of training provide focused and targeted learning, and can quickly be implemented within an organisation compared to other forms of computer-based or web-based training that, in some instances, take longer to prepare and put into practice (*UniSA* [n.d.]). Future studies examining seminar based email training would be favourable to support or oppose claims in existing literature to date.

2.4.3 Filing

Research by Hiltz & Turoff (1985) found that when dealing with email, specifically coping with problems such as email overload (as mentioned in section 2.3.2.3), users tended to focus on filtering and omitting information as a management technique. This process is, otherwise coined under the umbrella term 'personal information management' (PIM), used to describe the collection, storage, organisation and retrieval of digital objects by an individual in their personal computing environment (Boardman & Sasse 2004). Later research by Boardman & Sasse (2004) went on to find that overloaded email users' PIM could be conceptualised within two transition phases: (i) pro-organising transitions, i.e. an increase in email filing tendencies and (ii) anti-organising transitions, i.e. less email filing over time.

Email filing therefore is a paradoxical situation. Even though it is critical to organising and managing email efficiently, if users suffer from email overload or increased workloads they are likely to have less time to file, which results in increased volumes of unorganised email (Balter & Sidner 2002). As previously mentioned in section 2.3.2.3, the result is that some workers have claimed email bankruptcy, i.e. abandonment of their email accounts altogether in order to start afresh (Fitzgerald 2004; Rosenblum 2002). Nevertheless such an exit strategy is not always available for workers in organisations, where they are likely to be assigned one email account and expected by their employer to manage workplace email communications. It is unsurprising then that workers have turned to automated classification tools to filter email messages on their behalf (Rennie 2000; Sweetnam 2006).

A number of prototypes, applications and systems for automated email filing exist on the market, e.g. Bifrost Prototype (Balter & Sidner 2002), IBM Explorer (Anthes 2006) and iFile (Koprinska *et al.* 2007), and are easily downloadable, functional and often a simple add-on to an email inbox. They typically allow workers to construct key-based rules to file email into folders and filter spam messages automatically. Although each of these tools is uniquely built and tailored to different filing processes, they all fall short of keeping up with changes in worker's behaviour. As the nature of users' filing patterns shift over time to match their change in needs, e.g. moving departments or changes in projects, the folders and filters set from automated classification tools remain the same and consequently become redundant (Rennie 2000; Koprinska *et al.* 2007). Furthermore, Balter & Sidner (2002) suggest that users who exploit these automatic systems cause an "out of sight, out of mind" premise with their email. That is, when email is filed in folders they tend to be ignored or become forgotten over time. As a result, these folders are often overlooked, despite additional efforts from the user to optimise meaningful filing structures that continually change in unforeseeable ways.

However, Ducheneaut & Bellotti (2001, p.33) claim that most of their users did not use filters, as some "hadn't figured out how to use them", suggesting that they either need to be made simpler to use or were not found particularly useful to email workers. Despite these concerns, for some researchers (e.g. Whittaker & Sidner 1996; Boardman & Sasse 2004; Jensen *et al.* 2010), email filing will always be considered one of the most fundamental email management techniques available. It is recommended that workers look at each email message once and then do something with it, either filing into folders or remove by deletion (Peric 2009). Studies such as Whittaker & Sidner (1996) have suggested that a user's choice of email filing technique may be linked to relative workplace stress, i.e. filers are likely to be less stressed than those who do not file. Future research studies would benefit from exploring this causal relationship further.

2.4.4 Email free time
Another strategy used to combat the effects of email overload includes email bans, or otherwise referred to as 'email free time'. Several organisations including Deloitte, Intel, Boston Consulting Group, and US Cellular have instigated such a workplace ban for a short-period of time, e.g. several hours in the morning or an entire work day (Robinson 2010; Naughton 2012). More recently Atos, an information technology services company, have proposed a plan to ban all internal email use as part of their global initiative to improve well-being at work by 2014. Chief Executive of Atos, Thierry Breton, implemented the policy on observing that himself, and his colleagues, were spending too much time on internal email and not enough time on management. The strategy has been described by critics as both "bold" and "stupid", with others suggesting success could "herald a turning point for email" or similarly "failure would prove damaging for the company's credibility" (*BBC News Technology* 2011b).

Follow-up reports from previous organisations that have implemented such a ban found that employees were initially more work-effective in the first few hours when all communication media were banned in comparison to normal. However, Deloitte's "no email Wednesday" was abandoned after a month and Intel found that there was a "clear incompatibility" between the need for asynchronous communication and the avoidance of email for an entire day (Robinson 2010). Nevertheless, CEO Breton has continued to defend his internal email ban at Atos, after recommending the preferred use of other technologies, e.g. instant messaging and internal social networks, to communicate internally instead. It could be argued that Breton is merely diverting the problem of information overload (as discussed in section 2.2.1) from one communication medium to another. However such a strategy may in effect innovatively bring new tools to market that offer a much better approach for information sharing in the workplace, e.g. cloud computing

environment, micro blogging, document sharing and knowledge community, to name a few (*BBC News Technology* 2011b).

Future research studies are sought to examine the effects of 'email free time' in the workplace. Little research exists to discover why the operation at Deloitte and Intel, if so successful at the beginning, did not survive in the environment that fashioned its notion. Equally there is little research to confirm or deny that 'email free time' improves workplace well-being or encourages the use of more innovative forms of communications.

2.4.5 Netiquette
The term netiquette has been used sporadically in the literature to describe the "conventions of politeness used on Usenet, such as avoidance of cross-posting to inappropriate groups and refraining from commercial pluggery" to "etiquette guidelines for posting messages to online services" and "etiquette of the Internet" (Holtz, 2002 p.119). Netiquette, therefore, covers not only rules to maintain civility in discussions, but also special guidelines unique to the nature of electronic messages. Fundamentally, netiquette denotes that users should behave in a manner consistent with the accepted standards of behaviour in any given online locale – including email (Holtz 2002).

To reduce the adverse effects of email use, academics (e.g. Brown 2007; Sumecki, Chipulu & Ojiako 2011), practitioners (e.g. Ogunnaike 2006; McCorry 2005) and organisations (e.g. *Emailreplies* 2008; *Emailogic* 2010) have promoted the use of good email netiquette. Although not an exhaustive list, email netiquette rules typically include: keeping email messages to fewer than 25 lines; use of proper spelling, grammar and punctuation; use of proper structure and layout; avoidance of writing in capitals; email proof-read before it is sent; use of a meaningful subject line; limited use of 'Reply to All' feature; and, prevention of the sending or forwarding of emails containing libellous, defamatory, offensive, racist or any other issues of high sensitivity (*Emailreplies* 2008; Guo & Sanchez 2010). Furthermore, many (e.g. McCorry 2005, pp.134-135; Brown 2007; Sumecki, Chipulu & Ojiako 2011) go on to suggest that good netiquette should also be reflective of good email behaviour, such as setting allocated times during the work day to deal with email in order to curb overuse, turning off message notifications to avoid distraction or disruption, and acknowledgement of each email received with a reply clearly stating a reasonable response date.

Likewise, organisations are widely encouraged to promote and implement email netiquette rules for their employees. Initially this would allow workers to maintain a consistent level of professionalism, and, on use of good email netiquette, would maintain their email efficiency and allow them to communicate more clearly and effectively on behalf of the organisation. Consequently this brings about the awareness of email risks, which can be

used to avoid liability issues for employers in future (*Emailreplies* 2008; *Emailogic* 2010). As noted by Simpson (2010) these rules should be updated regularly and organisations need to use their common sense more readily to determine acceptable, or unacceptable, behaviour as opposed to waiting for new best practices to be produced. Organisations such as HSBC, Kier Group, L'Oreal and Thames Valley Police, actively promote training or seminars to improve their workers' email netiquette skills (*Emailogic* 2010).

However email netiquette has been criticised in the past by communications experts. Some have argued that emails' ever increasing use in the workplace makes it progressively difficult for workers to maintain good netiquette (Ogunnaike 2006, p.2). As quoted from the creator of NetManners.com, Judith Kallow, "many people aren't clear communicators". In the days before email, the formalities of a letter were well established, from "sincerely" to "yours truly" to "love". However email is a causal medium, the conventions of which are still evolving. Surprisingly the sign-off 'xoxo', offering hugs and kisses, has become common place in the workplace. Although for some this farewell is appreciated as an attempt to be warm and familiar, many executives have argued that a sign-off of this nature is extremely inappropriate and should be more professional. These differences in opinions trigger much debate in the workplace and as such different standards and cultures surrounding email netiquette exist within different organisations (Ogunnaike 2006).

Despite this, training staff good practice can only improve email management in the workplace (Kenworthy 2007) and has been seen by many (e.g. Adam 2002; Kenworthy 2007; *Emailogic* 2010; Guo & Sanchez 2010) as a solution to poor email practice and behaviour. As noted by Tuffley (2009), although there are no 'official' rules governing email netiquette, the "general rule should involve the same principles as plain old etiquette – basic courtesy, respect and ethics". The key to achieving email netiquette is not too dissimilar to the success of email policy (as previously mentioned in section 2.4.1) and involves communicating standards to workers clearly, and promoting a corporate culture that nurtures good user practices (Smallwood 2007; Wilson & Witters 2007; O'Donnell 2008). Future research would benefit in exploring new, and practical, ways to communicate email netiquette and email policy to users in the workplace.

2.4.6 Computer aided software

A variety of computer aided software tools have been brought to market to target a range of adverse effects of email use, although few have been successfully implemented within organisations. In general, they have been designed and created to solve one specific email problem, e.g. Busy Body, used to deal with email interruptions (Horvitz, Koch & Apacible 2004); Task

Master, used to file and create email rules (Bellotti *et al.* 2005); LIST SERV Management, as a technique to reduce email overload (*L-Soft* 2008); and Google's Email Addict, a tool to moderate the habits associated with email addiction (Roth 2008). The use of computer aided software as an email management strategy is fast moving and a rapidly developing market segment. Driving growth is the amplified realisation that email is causing users problems and the increased significance in regulatory compliance, corporate governance and litigation of electronic information (Smallwood 2007; Pham 2011).

However existing tools are often limited by their generic design, and lack the ability to tailor services to individual workers or organisational needs. The progressive squeeze on costs makes it difficult, if not impossible, to measure return on investment and can take months or years to design, create, develop and finally implement within an organisation. Therefore these types of tools need to be valued higher, or the cost of implementing lower, to encourage organisations to adopt such tools (Shah & Mandal 1999, p.1094). The research area would benefit from evaluating the impact and effectiveness of these tools in the workplace. However it would be necessary to find an organisation that requires such tools and then spend time studying their email needs to ensure those chosen are specifically designed and implemented to suit the organisation's and worker's needs.

2.5 Chapter summary

This chapter introduced the fundamentals of email and exposed the unprecedented impact email had on workers and communications in the workplace. The relationship between email and information overload, personality types, performance and well-being were explored. This was followed by an evaluation on several adverse effects linked to email use, i.e. overload, addiction, interruptions, bullying and more extensively email stress. Further analysis found much of the evidence to date lacked both definition and conceptualisation, where email stress had been unmeasured and advancement was necessary to build on psychological and physiological methods that appreciate users' experiences of the phenomenon within a workplace environment. It appeared existing literature concentrated on email as a communication tool and lacked wider research scope to consider how innate personality and information overload may impact on (i) categorising worker's email behaviour, or (ii) stress, in future. The challenge of how to manage or minimise raised adverse issues was also discussed, and a number of existing management approaches were found to lack any form of critical appraisal in the workplace. Naturally once informed of the impact and degree of email stress, the need for improved practical recommendations and guidelines designed to minimise or manage email and adverse side-effects could be achieved.

The chapter completes Objective 1 (*to conduct a review of the literature to recognise and understand the general views on email use in the workplace*), while also laying some of the foundations for the achievement of Objective 3 (*to develop an epistemology associated with the conceptualisation of email stress in the workplace*). The following chapter focuses specifically on addressing Objective 2 (*to develop a research framework to measure email stress in the workplace*).

Chapter 3 Research Methodology

*"By three methods we may learn wisdom: first, by reflection, which nobles;
second, by imitation, which is easiest; and third by experience, which is the
bitterest"*
*** Confucius ***

3.1 Chapter overview

This chapter explores a variety of research philosophies, methods and data collection tools in order to determine those most suitable for this thesis. The preceding literature review highlighted some of the concerns with current stress theory, specifically the lack of consistency between psychological and physiological measures, and the advancement necessary to build on methods that appreciate the scope of email stress as a phenomenon. As the use of stress measures within the workplace forms the basis of this research, it is important to choose a research methodology that takes into consideration both the research objectives and the particular environment and circumstances in which the research is to be carried out (outlined in Chapter 1). The following chapter returns to the literature to review existing methodological approaches to email stress, before making necessary decisions to achieve Objective 2 (*to develop a research design to measure email stress in the workplace*). The unique research design assembled to measure email stress is presented and, in turn, each of the studies conducted as part of this thesis is summarised.

3.2 Review of current methodological approaches

The literature review, as examined in Chapter 2, identified a number of relevant academic and industry-based studies in line with the research aims (*to determine whether email communication causes employees physiological and psychological stress and investigate the impact of email management strategies in the workplace*) of this thesis. A review of these studies, including details of research philosophy, methods, understanding of email stress, and data collection tools, are identified in Table 3.1.

Table 3.1: Review of methods as identified in the literature

Author (s)	Philosophical Underpinnings or Methodology	Understanding of Email Stress	Data Collection Tools	Population sample
Taylor, Fieldman & Lahlou (2005)	Positivism • Case studies • Quantitative • Experimental	"Reading a threatening email reprimand produced the greatest increase on baseline blood pressure" (p. 48)	Observation & controlled studies – physiological data.	Academics & Students. Total 44 participants.
Hair, Renaud & Ramsay (2007)	Interpretivism • Qualitative	"... stress is self-imposed... caused by their perceptions, which drive them to deal with emails continuously" (p.2792)	Web-based survey - psychological data.	Academics. Total 177 participants.
Kanungo & Jain (2008)	Post-postivism • Qualitative • Conceptual	"Pressure when email use exceeds tolerable usage levels" (p.303).	Interviews - psychological data.	Academics. Total 24 participants.
Mano & Mesch (2010)	*Not explicitly stated* • Case Studies • Qualitative	"... using email made it impossible to get away from work, caused misunderstandings, was distracting and added new sources of stress" (p. 65).	Secondary survey data - psychological data.	Workplace employees & Internet Users. Total 354 participants.
Jackson (2010)	*Not explicitly stated* • Quantitative • Experimental	Email stress is self imposed, where users constantly check their email.	Observation & controlled studies – physiological data.	Academics. Total 2 participants.
Shirren & Phillips (2011)	Post-positivism • Quantitative and qualitative	"... individuals with greater negative affect, such as stress, anxiety or depression, when responding to email"	Diary, questionnaires and survey – psychological data.	Workplace employees. Total 39 participants.

The following conclusions were drawn from this review. Firstly, previous researchers have used a variety of philosophical underpinnings, e.g. positivism, interpretivism, post-positivism, which have limited their scope with regard to the type of research carried out. That is, they have tended to choose between either quantitative or qualitative types of research, which in turn has led to either a psychological or physiological understanding of email stress. The dispute between these latter, and generally opposing stances, has seen great academic debate (e.g. Mordkoff 1964; Beehr & Franz 1987; Lin & Ensel 1989; Lazarus 1998) with regard to their credibility, influence, and general standing, in the stress research discipline. And, where some might argue that the sole use of one research philosophy frames the research problem and best explains the research's logic, such a choice can limit the extent of understanding as a whole. The alternative choice of more applied research philosophies, such as critical theory or pragmatism, which have not been explored by previous research, would add more value to the research problem in future studies by integrating both viewpoints.

Similarly, and of most concern in the research area, is the current literature's lack of understanding regarding the definition of email stress. It is possible that this could largely be put down to the dispute between philosophical underpinnings of previous research that promotes more value in one research method over another, e.g. quantitative research using experiments to prove/disprove, argued by some, is more significant than qualitative research using interviews that gather personal and subjective opinions (Bryman 1984). In spite of which view is held or which argument is followed, the conflict raised as a result of arguments such as this, have filled the literature with a variety of different denotations of the term email stress and there is little consensus as to its discovery or in providing a prescriptive foundation (as identified in Chapter 2). The need to begin conceptualising what it is, how it is understood and how it can be measured, would allow researchers to embrace a more inter-disciplinary approach to the problem.

Equally there is a large body of research (e.g. Onwuegbuzie & Leech 2005; Morgan 2007) that suggests a complementary approach, i.e. triangulation or mixed-methods, is most sought to strengthen the validity of research. Shirren & Phillips (2011) attempted to achieve this with their use of diaries, questionnaires and surveys; however this combination of qualitative data collection tools was limited to the generation of psychological data alone. Alternatively other studies, e.g. Taylor, Fieldman & Lahlou (2005) and Jackson (2010), have tended to focus on the generation of physiological data through the use of quantitative data collection techniques such as experimental design. It would be fair to assume that the next progressive step in the research area would be to explore the use of multiple methods that utilises both quantitative and qualitative data collection tools, which go on to generate deeper insight and a much richer picture of the phenomenon that builds upon all previous research studies to date.

It is also worth remembering that email stress was found to derive from within workplace settings. However existing literature currently lacks insight of the phenomenon within its natural environment. Previous studies have often been restricted by an authors' choice in population sample, e.g. academics or university students. This is relatively unsurprising as these population sets are often more readily accessible to researchers. Nevertheless, even with great investigator efforts, this is by no means reflective of normal settings and, as a consequence, prevents advanced discovery. Future studies that opt for a research method that places primary emphasis on delivering real-life benefits to organisations, which in practice could innovatively break through barriers limiting this area of development, is sought after. Furthermore, the use of workplace employees as participants will generate data directly from the original source, as would observing them in their natural workplace environment. A combination of the above would

shed more light to the relevant conditions of the phenomenon in the real world and would ensure more advanced discovery.

After some considerations were made of the issues raised, a new methodological approach to research was deemed necessary to move the research area forward. This was preferred in order to both build upon lessons learned from previous research and to make an original contribution to knowledge. This would in turn begin to close some of the gaps in existing literature. Several considerations and decisions regarding the research approach were made before developing a tailored research design, as discussed in the following section.

3.3. Research approaches

There is a wide variety of research approaches in the literature that could be used to shape the research carried out for this thesis. The following list has been adapted from Punch (2005) and Kumar (2008):

- Applied versus fundamental
- Conceptual versus empirical
- Quantitative versus qualitative
- Experimental versus non-experimental

The focus of the rest of this section is on the choice of research approach in light of these distinctions, in order to build a foundation for a new methodological research design.

3.3.1 Applied versus fundamental

Research can either be applied (action) research or fundamental (basic or pure) research. Applied research aims at finding a solution for an immediate problem facing a society or an industrial business organisation, whereas fundamental research is largely concerned with generations and the formulation of theory. Applied research customarily uses individual cases to explore a research problem, which works collaboratively with all relevant research discipline's. Alternatively pure research typically studies a research problem with the aim to generalise results within one disciplines stance or view point (Kumar 2008, p.7). The focus of this thesis is best understood as applied (action) research, with the aim of adopting research techniques from the medical profession, social sciences and information management, in order to embrace an inter-disciplinary approach to the research problem.

3.3.2 Conceptual versus empirical

Conceptual research is that which is related to some abstract idea(s) or theory. It is generally used by researchers to develop new concepts or to reinterpret existing ones. On the other hand, empirical research relies on experience or observations alone to verify data and conclusions. It would be

necessary when adopting the latter research approach to acquire facts firsthand, at their source, and actively go about doing certain things to stimulate the production of desired information (Kumar 2008, p.8). This thesis is in line with the conceptual research approach. As the research problem is such a new phenomenon, the lack of starting point or hypothesis required for empirical research is impractical. The need to gather data on the research problem in its natural and uninfluenced state is more sought after for the development of a conceptual understanding to the research problem.

3.3.3 Quantitative versus qualitative

Quantitative research is routinely depicted as an approach to the natural sciences that uses experiments, survey and questionnaires as the preferred instruments for research. Qualitative research on the other hand is deemed to be much more fluid and flexible with emphasis on discovering novel research, typically attributed to phenomenology and symbolic interactionism (Bryman 1984). Quantitative research has typically been more directed at theory verification, while qualitative research has typically focused on theory generation. Whilst this correlation between the two approaches is historically valid, there is no necessary connection between purpose and approach. That is, quantitative research can be used for theory generation (as well as for verification) and qualitative research can be used for theory verification (as well as for generation) (Punch 2005, p.16). A combination of both quantitative and qualitative research methods to support the triangulation of a mixed-method approach is fundamental to this thesis' research.

3.3.4 Experimental versus non-experimental research

Experimental research makes changes to independent variables and studies their effects on dependent variables under controlled conditions. Data generated in this way are typically used to establish cause and affect relationships between two variables. Non-experimental research on the other hand simply measures the present level of the independent variable. Data generated by this type of research can only be used to describe certain relationships without showing their functional interdependence (Kumar 2008, p.9). This thesis advertently adopts a combination of both experimental and non-experimental research. As such a cross-sectional study design that collects data about various variables of the sample, in order to uncover relationships which exist among those variables (Kumar 2008, p. 10), is to be established.

3.4 Chosen research design

As previously mentioned in section 3.2, the research aims (*to determine whether email communication causes employees physiological and psychological stress and investigate the impact of email management strategies in the workplace*) were better explored by developing a new

research design that both builds upon lessons learned from previous research and in turn begins to close some of the gaps in existing literature to make an original contribution to knowledge. With that in mind, it was considered vital to choose a methodological approach to research that value the importance of:

- Bringing together previous research and new research for an improved understanding of the research problem, i.e. email stress;
- Triangulating quantitative and qualitative data collection methods to explore email stress from both physiological and psychological viewpoints;
- Studying organisational employees in their natural workplace environment to gather relevant data and explore conditions surrounding email stress; and
- Finding a solution for email stress that collaboratively and practically can be applied in the workplace.

The research methods chosen for this thesis are highlighted in Figure 3.1 and take into consideration the particular environment and circumstances in which the research is carried out. This mind map is a fusion and adaptation of classifications of research methodologies (e.g. Gephart 1999; Johnson & Ownuegbuzie 2004; Punch 2005; Steenhuis & Bruijn 2006; Walliman 2006; Gray *et al.* 2007; Thorpe & Holt *et al.* 2007; Kumar 2008; Flowers 2009) and each dimension is explained in more detail within the following sections.

Figure 3.1: Mind map of methodologies and chosen research design
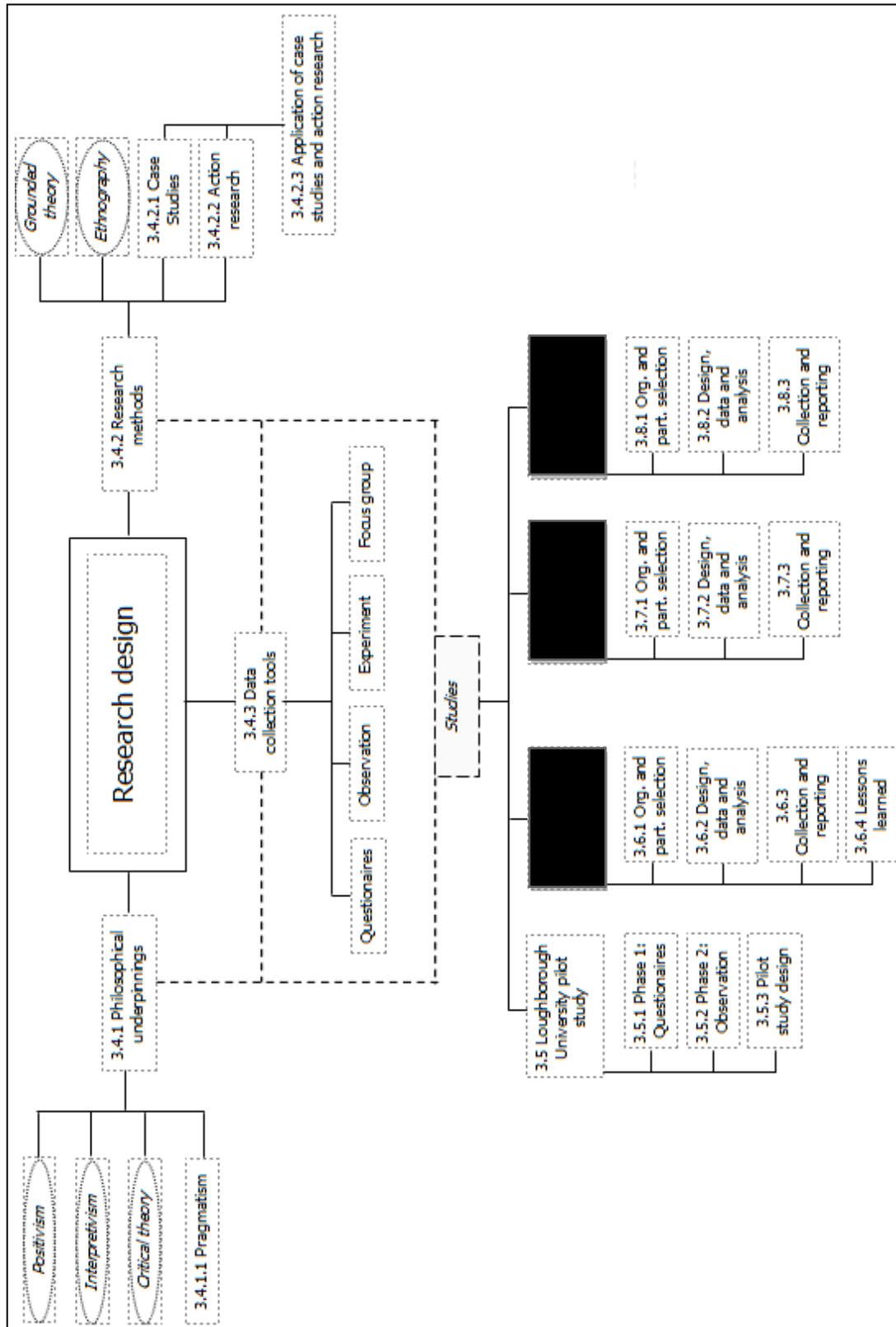
3.4.1 Philosophical underpinnings

Research is a systematic and methodical process of inquiry and investigation that increases knowledge or solves a particular problem (Sekaran 1992). A variety of methodological approaches were explored, which provided an informative look at the different paradigms to base the research; i.e. perceptions, beliefs, assumptions and nature of reality and truth. Equally these parameters influenced the way in which the research was undertaken, from design through to conclusions. It was vital to ensure that approaches were congruent with the nature and aims of the research adopted in order to guarantee that researcher biases were understood, exposed and minimised (Gephart 1999; Steenhuis & Bruijn 2006; Flowers 2009). There are four distinctive research philosophies, i.e. positivism, interpretivism, critical theory and pragmatism, prominent in contemporary research today. Table 3.2 summarises the key differences between these research philosophies.

These prevailing paradigms, i.e. views of the world, have shaped social, organisation and management research. Although there are many important paradigmatic differences between these underlying approaches to research, there are some similarities, e.g. similar data collection methods and safe guards to reduce bias, which are often overlooked (Gephart 1999; Johnson & Ownuegbuzie 2004). The debate between these approaches, termed by Tashakkori & Teddlie (1998 & 2003) as "paradigm wars", has more recently seen a paradigm shift. Some researchers (e.g. Onwuegbuzie & Leech 2005; Morgan 2007; Goldkuhl 2011) have moved towards a mixed-methods approach, which founded the emergence of a relatively new set of beliefs – the pragmatism paradigm (Armitage 2007; Glogowska 2011). This latter paradigm, was identified and chosen to be the most appropriate for providing the philosophical underpinnings for this thesis.

Table 3.2: Key differences between research paradigms: positivism, interpretivism, critical theory & pragmatism

	Positivism	*Interpretivism*	*Critical Theory*	*Pragmatism*
Goal	To have objective and generalised results.	To provide rich descriptions and/or make theoretical generalisations.	To confront injustices in societal structures and ideological patterns.	To address a significant problem within a naturalistic, real-world setting.
Key Theories	Contingency theory; Systems theory; Dustbowl empiricism.	Symbolic interaction; Phenomenology; Hermeneutics.	Critical theory; Radical perspectives.	None.
Unit of Analysis	The variable.	Meaning, symbolic act.	Contradictions, incidents of exploitation.	The problem.
Researchers Role	Independent objective observer.	Actively involved in the data collection process.	Part of the world being studied and affects what is being researched.	Only focus on 'what' and 'how'.
Ontology	Naïve realism – "real" reality but apprehendable.	Relativism – local and specific constructed realities.	Historical realism – virtual reality shaped by social, political, cultural, etc.; crystallized over time.	Any/optional.
Epistemology	Objective – researcher independent of reality.	Subjective – researcher and reality are one.	Neither objective nor subjective.	Any/optional.
Methodology	Experimental/ manipulative; chiefly quantitative methods.	Hermeneutical/ dialectical; principally qualitative methods.	Dialogic/dialectical.	Any/optional.
Data Collection Tools	Experiments; Surveys; Questionnaires.	Ethnography; Biographical; Interviews; Case Studies.	Ideology critique; Action research.	Any/optional.
Types of Analysis	Secondary data analysis; Regressions; Likert scaling.	Conversational analysis; Textual analysis.	Historical analysis; Dialectical analysis.	Any/optional.

(based on findings from Fishman 1991; Guba & Lincoln 1994, p.109; Gephart 1999; Dash 2005; Steenhuis & Bruijn 2006; Ching 2008; *ChangingMinds.org* 2011; Clark [n.d..])

3.4.1.1 Pragmatism

Pragmatism is not committed to any one system of philosophy and reality, and instead places value on the 'what' and 'how' of the research problem. Placing the research aims and objectives as central ensures the pragmatic researcher is in control to choose the most appropriate data collection tools and analysis methods that provide the greatest insight (Mackenzie & Knipe 2006). Alternative philosophical approaches were considered, e.g. positivism and interpretivism, however these were ultimately perceived restrictive in how the research problem could be viewed, e.g. either quantitative/physiological or qualitative/psychological. As discussed in preceding sections, it was decided that the research problem required a

philosophical stance that considered both viewpoints together, which was only achievable using the pragmatic philosophy. Critical theory, although considered as an alternative, was not preferred as it appeared to distort the focus of the research, e.g. on more wider social, cultural and political domination, and equally there was little confidence in achieving the underlying premise of emancipation (Myers 1997; Mack 2010).

The quintessential philosophical assumption of the pragmatic paradigm suggests that the choice should only be determined from the research problem; whereby, the choice of philosophy may vary depending on the research questions. Moreover, if the research question does not suggest unambiguously a philosophy to approach, then it confirms the pragmatist's view that it is perfectly possible to work with variations (Saunders, Thornhill & Lewis 2009, p.109). This continues to mirror the theme that mixed methods are possible, and perhaps highly appropriate, within one study (Saunders, Thornhill & Lewis 2009, p.109). It was thus more logical to choose multiple methods to meet the research needs, i.e. method triangulation (addressed in section 3.4.4).

With the pragmatic paradigm in mind, the research aims were placed at the centre of the decision making process, and, as prescribed, this gave the initial freedom to explore a number of varied research methods. This also allowed for a more natural pragmatic thinking approach, i.e. dynamic homeostatic process of belief, doubt, inquiry, modified belief, new doubt, new inquiry, etc., as part of an infinite loop. Even if the traditional questions of method were secondary to question of epistemology, ontology and axiology (Guba & Lincoln 1994) were accepted, it could be argued that the choice in one position is, in part, unrealistic in practice (Saunders, Thornhill & Lewis 2009, p.109). As supported by Tashakkori & Teddlie (1998, p.26) it was more appropriate to think of the philosophy adopted as a continuum rather than opposite positions. This process, in a way that suited and worked within the research environment, allowed for the continual building and improvement on past understandings (Johnson & Ownuegbuzie 2004).

Critics (e.g. Durkheim 1983; Trinder 1996; Shusterman 2002) on the other hand have argued that such a stance has led to an anti-intellectual trend in research and an "unashamedly empirical approach to research, steering a course between the scientific empiricism of the positivist project and the messier politicized approach to research of critical researchers" (Trinder 1996). It has also been attacked as "anything goes" (Macdonald 1996). However advocates for the pragmatic approach show that, as a consequence of the debate, it has helped to recognise the limitations of the methods associated with each paradigm and with the realisation that qualitative methods are acceptable and can be combined with quantitative methods to present a more comprehensive approximation of reality (Kazi 2000). As such,

the pragmatic approach is "eclectic, not wedded to a single alliance" Cheetham *et al.* (1992) in Kazi (2000, p.755), and because of the diversity allows a new richness of data to be obtained through the use of both empirical and naturalistic approaches to draw more informed inferences.

In reprisal to critics, the pragmatic approach was chosen because (i) no other philosophical paradigm alone met the needs of the research aims and (ii) the researcher wanted to recognise the differences and limitations of other paradigms in order to develop a mixed-method approach to research that is complementary. Thus, whilst the philosophical values behind the overall thesis followed a pragmatic approach, there are elements of data collection tools and analysis methods used from other paradigms. A common feature and benefit of a mixed-method approach is the facilitation of data triangulation (see section 3.8.2.1 for applied data triangulation).

3.4.2 Research methods
This chapter has so far demonstrated that the chosen research methodology is pragmatic in nature, and in order to meet the needs of the thesis' aims had to be both applied and conceptual, utilising a triangulation mixed-method approach and cross-sectional type studies. These combinations of decisions led to a number of relevant research methods to be considered that, to begin with, appeared to fit those needs. These choices, including their advantages and disadvantages with regard to the aims of this thesis, are summarised in Table 3.3.

A variety of methods were initially explored and subsequently discarded. The decision was made not to use grounded theory, as the process to generate theory from minimal priori constructs, appeared to stand in direct contrast to the need for planning and organising of the research design (Leonard & McAdam 2001). The need for preparation was vital to ensure relevance to the phenomenon. That is, the research problem followed a more traditional model whereby a theoretical framework would need to be developed and then applied (McCallin 2003; Laws & McLeod 2004). Ethnography was also considered, and whilst it was found beneficial for 'telling a story' and discovering categories and questions that were most relevant, the involved commitment to 'being there' to conduct research appeared to impede the natural state of the phenomenon being studied and research interests of participants (Van Maanen 1996; Genzuk 1999; LeCompte & Schensul 1999, p.2-5; Belouin 2010). Case studies and action research on the other hand were both identified as suitable research methods for this thesis.

Table 3.3: Advantages and disadvantages of research methods considered

Research Method	Advantages	Disadvantages
Grounded Theory	• Emergence of conceptual categories and theories • Openness between researcher and participants • Study of micro issue in larger reality	• Bottom-up research • High level of experience and acumen of researcher • Requires theoretical sensitivity
Ethnography	• Focus on culture in social groups • Optional roles of researcher • Narrative used to 'tell a story'	• Lack of control, as 'invited guest' • Time consuming and expensive • Irreproducible
Case Studies	• Intensive analysis of a small number of subjects • Useful for early stage research • Adds strength to previous research • Only one investigator necessary to perform observations and interpretation of data	• Narrow field of interest • Limited grounds for establishing reliability and generality • Aptly described as 'mere' case study
Action Research	• Actionable solution to the research problem • No constraints to gathering data or analysis performed • Researcher plays active role to bring about change	• Concerns with regard to rigour and investigator training • Loss of true 'outsider' viewpoint • Potential bias of conclusions

(based on findings from Orum, Feagin & Sjoberg, 1991 p.2; Soy 2006; Denscombe 2007; Gerring, 2007 p.6; Gray *et al.* 2007; Thorpe & Holt 2007; Belouin 2010; Connaway & Powell 2010)

3.4.2.1 Case studies

Case study research consists of a detailed investigation of the phenomenon within its natural environment, often based on a single case (e.g. person, community, social group or organisation) over a period of time (Seale & Barnard 1998, p.21). The aim is to provide an analysis of the situation and processes which illuminate the theoretical issues being studied and understand how these are influenced by context (Cassell & Symon 2004, p.323). It is more commonly used when: (i) large variety of factors and relationships are included; (ii) no basic laws exist to determine which factors and relationships are important; and (iii) factors and relationships can be directly observed (Connaway & Powell 2010, p.80). Case studies were chosen for these reasons, in addition to finding it an appropriate research strategy to conceptualise the phenomenon of email stress (as previously mentioned in section 3.3.2), which as a contemporary phenomenon is still in its early formative stages (Darke, Shanks & Broadbent 1998). As supported by Thorpe & Holt (2007, p.38), case studies are especially effective in approaching that which is little understood; such as when the research problem is ambiguous, fuzzy, or even chaotic; and thus complex and difficult to overview and predict.

Critics of this research method (Seale & Barnard 1998, p.21; Soy 2006; Gerring 2007, p.6), however, go on to argue that the study of one case can offer no grounds for establishing reliability or generality of findings. Indeed the results from one study are too narrow and alone cannot be extrapolated to fit an entire question or be illustrative of an entire population. Therefore the use of several case studies, to understand the phenomenon from multiple sources, provided a much broader and deeper insight to the research problem. Similarly generalisation with the use of case studies becomes possible when they are replicable in research or study design (Seale & Barnard 1998, p.21; Soy 2006). The creation of an email stress measuring methodology, addressed in section 3.5, was therefore vital in providing direct comparisons, e.g. similarities and differences of the phenomena, between case examples and population sets.

Similarly, the basic premise of case studies allows researchers to utilise multiple case designs. This is extremely desirable to separate pieces of information that point to the same conclusion (see section 3.8.2.1 for applied data triangulation). Indeed the use of case studies brought a closer insight to understanding complex issues and added strength to previous research. Furthermore, it also provided an opportunity to challenge assumptions and existing knowledge taken for granted in the literature (Seale & Barnard 1998, p.21; Soy 2006). The choice and rationale of rigorous and validated data collection tools (addressed in section 3.5) were favoured to reduce bias, interpretation and collection of findings between studies. Likewise, action research was identified to complement the use of case studies.

3.4.2.2 Action research

Action research, also known as participatory research, collaborative enquiry and action learning, provides an informed investigation into a real management issue within an organisation. It does not specify constraints by which data should be gathered and indeed seems to borrow a pragmatic approach that allows a wide variety of different data and analyses tools to be performed (Balafas 2009, p.60). Utilising such a method allowed new knowledge to be achieved in order to discover a workable local theory of benefit to the organisation, which in turn informed the research community (Thorpe & Holt 2007, p.17). In essence it is 'learning by doing' – whereby the researcher identifies a problem, does something to resolve it, reflects on how successful their efforts were, and if not satisfied, tries again (O'Brien 1998).

As described by Stringer (1999), action research is rigorous empirical and reflective research resulting in some practical outcome related to the work of the participants. It was vital therefore to ensure the research problem was studied systematically and management strategies were always

collaboratively informed by theoretical considerations and learning (O'Brien 1998). This action approach to research (as previously mentioned in section 3.3.1) places primary emphasis on the applied and actionable solution of the research problem in practice. To its advantage, the result of such a research process is more likely to be put to use (Gray *et al.* 2007, p.366). However it should be noted that action research is not simply a method or a procedure for research but a series of commitments to observe, through practice, principles for conducting social enquiry (Smith 2007).

Action research distinguishes itself from other methods in that the researcher plays an active role with members to bring about change, however small, in the working of that organisation (Thorpe & Holt, 2007 p.17). In the past, organisations involved with action research have widely appreciated the practical and tailored value of such an approach. However it has suffered a decline in favour since the 1960's because of its association with radical political activism (Gray *et al.* 2007, p.366; Smith 2007). It was recognised that there were, and to a degree still are, questions concerning its rigour and training of those undertaking it (Smith 2007). Equally, even when action research is well executed and successful, from the viewpoint of those participating, it is still open to the critique that its conclusions are biased because "the researcher's ideas have become so commingled with those of the participants that an objective viewpoint is impossible" (Gray *et al.* 2007, p.366).

However it was believed, as Bogdan & Biklen (1992) identify, research is a frame of mind and once satisfied that the collection of information is systematic, and that any interpretations made have a proper regard for satisfying truth claims, then much of the criticisms aimed at action research are withdrawn (Smith 2007). In any case, the choice of validated data collection tools was favoured to minimise possible associated investigator influences. Advocates of action research assert that any unintended loss of the true "outsider" viewpoint is more than compensated for by the participants' sense of self-reflection and their respect for the measures of their own performance (Gray *et al.* 2007, p.366).

3.4.2.3 Application of case studies and action research

The choice of case studies and action research methods were two-fold. The first was identified to provide a framework for presenting results on the multiple workplace organisations, on which the research for this thesis would be based. The latter, which placed emphasis on providing an actionable solution, was then used to underpin the entire thesis' research process and author's logic. Consequently, and for these reasons, case studies and action research were chosen to complement one another in order to achieve the research aims (*to determine whether email communication causes*

employees physiological and psychological stress and investigate the impact of email management strategies in the workplace) of this thesis. The steps by which these research methods were applied and used as part of this thesis are illustrated in Table 3.4.

3.4.3 Data collection tools

As discussed in the proceeding sections, the philosophical pragmatism approach places the research problem as central where data collection tools and analysis methods, are those most likely to provide insights into the phenomena (Mackenzie & Knipe 2006). The combined choice of case studies and action research placed no constraints by which data could be gathered, nor did it specify the type of analysis to be performed.

Method triangulation, or mixed methods, advocated previously by several researchers (e.g. Gable 1994; Thurmond 2001; Johnson, Onwuegbuzie & Turner 2007), is broadly defined by Denzin (1978, p.291) as "the combination of methodologies in the study of the same phenomenon". This choice in strategy has long improved researcher accuracy and judgement, where findings can be corroborated and any weaknesses in the data can be compensated for by the strengths of other data; thus increasing validity and reliability of the results. The decision was made to conduct what is often referred to as the "between (or across) method" technique; the most popular of triangulation procedures, as it is largely a vehicle for cross validation when two or more distinct methods are found to be congruent and yield comparative data (Jick 1979, p.602).

In light of these choices, the following data collection tools were chosen: questionnaires, observation, experiment and focus group. A more thorough explanation of rationale and study design are discussed in the subsequent sections of this chapter, as listed below.

- Loughborough University Pilot Study – Questionnaires and Observation, i.e. email stress measuring methodology (addressed in section 3.5)
- ███████████ Study – Questionnaires, Observation and Experiment (addressed in section 3.6)
- ███████████ Follow-up Study – Focus group (addressed in section 3.7)
- ███████████ Study – Questionnaires, Observation and Experiment (addressed in section 3.8).

Table 3.4: Action research and case study steps used as part of this thesis

Action Research Steps	Case Study Steps	Associated chapter/section
Step 1: Review current practice and identify problem or aspect to be improved.	Step 1: Research questions determined and defined.	Chapter 2 Literature Review.
Step 2: Several possible solutions developed, from which a single plan of action emerges. Step 3: Course of action implemented. Data collected and analysed. Step 4: Findings interpreted and evaluated in light of what was found and success of action.	Step 2: Cases, data gathering and analysis techniques selected. Step 3: Preparation to collect data. Step 4: Data collected in the field.	Chapter 3 (section 3.5) Research Methodology, Loughborough University Pilot Study.
Step 1: Review current practice and identify problem or aspect to be improved. Step 2: Several possible solutions developed, from which a single plan of action emerges. Step 3: Course of action implemented. Data collected and analysed.	Step 2: Cases, data gathering and analysis techniques selected. Step 3: Preparation to collect data. Step 4: Data collected in the field.	Chapter 3 (section 3.6) Research Methodology, i.e. ▮▮▮▮▮ Study design.
Step 4: Findings interpreted and evaluated in light of what was found and success of action.	Step 5: Data evaluated and analysed. Step 6: Report prepared.	Chapter 4 ▮▮▮▮ Study.
Step 5: Problem is re-assessed and the process begins another cycle.	_____	Chapter 5 Initial conceptualisation of email stress.
Step 1: Review current practice and identify problem or aspect to be improved. Step 2: Several possible solutions developed, from which a single plan of action emerges. Step 3: Course of action implemented. Data collected and analysed.	Step 2: Cases, data gathering and analysis techniques selected. Step 3: Preparation to collect data. Step 4: Data collected in the field.	Chapter 3 (section 3.7) Research Methodology, i.e. ▮▮▮▮ Follow-up Study design.
Step 4: Findings interpreted and evaluated in light of what was found and success of action. Step 5: Problem is re-assessed and the process begins another cycle.	Step 5: Data evaluated and analysed. Step 6: Report prepared.	Chapter 6 ▮▮▮▮ Follow-up Study.
Step 1: Review current practice and identify problem or aspect to be improved. Step 2: Several possible solutions developed, from which a single plan of action emerges. Step 3: Course of action implemented. Data collected and analysed.	Step 2: Cases, data gathering and analysis techniques selected. Step 3: Preparation to collect data. Step 4: Data collected in the field.	Chapter 3 (section 3.8) Research Methodology, i.e. ▮▮▮▮ Study design.
Step 4: Findings interpreted and evaluated in light of what was found and success of action.	Step 5: Data evaluated and analysed. Step 6: Report prepared.	Chapter 7 ▮▮▮▮ Study.
Step 5: Problem is re-assessed and researcher is satisfied.	_____	Chapter 8 Conclusion.

(adapted from McNiff *et al*. 1996; O'Brien 1998; McNiff & Whitehead 2001; Soy 2006)

3.5 Loughborough University pilot study

As previously mentioned at the start of this chapter, a new methodological approach was explored to further understand and measure email stress in the workplace. In order to achieve Objective 2 (*to develop a research design to measure email stress in the workplace*) the following questions had to be initially considered:

- Which triangulation of methods would provide quantitative and/or qualitative data on email stress?
- Which instruments are to be used to measure stress, and which will provide physiological and/or psychological effects of email stress?
- Which data collection tools and instruments are most practical for gathering data from organisational employees in their workplace environments?

The decision was made to investigate the different themes of email and stress that had been left unexplored by previous literature to date, i.e. psychological and physiological stress, as concluded in Chapter 2. This was favoured to ensure the research design made an original contribution to knowledge. Furthermore to ensure reliability and credibility of the data gathered, especially in natural environments such as real-life workplace settings, preference was given to data collection tools and stress instruments that had already been established in academia.

As a result, the decision was made to create a unique two-phase research design. The first phase used questionnaires to further understand email behaviour, email use, personality type, and well-being, to gather quantitative and qualitative data on the psychological effects of email stress. To complement this, the second phase used observation to monitor stress through blood pressure, heart rate, cortisol secretion and diaries to gather quantitative data on the physiological effects of email stress. Once the research design, as illustrated in Figure 3.2, was identified a pilot study at Loughborough University was undertaken. The subsequent sections outline in more detail each phase of the research design, otherwise coined the 'email stress measuring methodology' (related conference paper presented in Appendix A), before going on to discuss the feedback generated on reflection of the pilot study.

Figure 3.2: Research design [version 1]
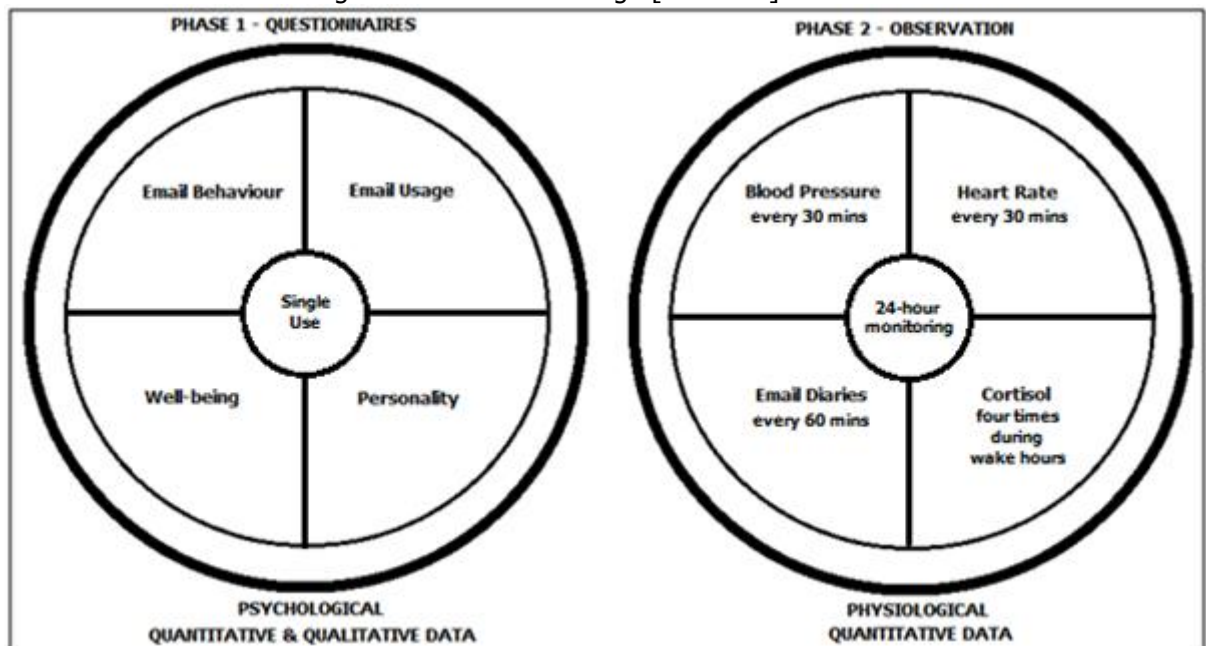
3.5.1 Phase 1: Questionnaires

In essence, the first phase concentrates on examining the psychological view point of email stress. As its name suggests, the generation of psychological data is the extraction of information regarding human behaviour, emotion and mental processes from those being investigated (Bell [n.d.]). Previously mentioned in section 2.3.3.1, the basic concept of psychological stress relates both to an individual's perception of the demands being made on them and perception of their capability to meet those demands. A mismatch will mean that an individual's stress threshold is exceeded, triggering a stress response (Cohen, Kessler & Gordon 1997; McVicar 2003). Previous researchers from the psychology discipline have relied upon questionnaires to identify, and to provide further insights, into the effects of stress (e.g. Atkins & Harris 2008; MacArthur & MacArthur 2000; Vrijkotte, van Doornen & de Geus 2000). In line with the methodology choices, questionnaires, which are commonly associated with both case studies and action research, were used as a realistic strategy to obtain large scale information, to solicit a great deal of rich and reliable information, and to gather both quantitative and qualitative data (Slater 1990, pp.54-76) from participants.

Following the practice of previous researchers, the use of questionnaires were reasoned as a practical and low cost approach to obtain relevant, and more candid if anonymous, data from participants that is quickly and easily quantified (*Evidence Base* 2006; Cohen, Manion & Morrison 2007; Gray *et al.* 2007). Although interviews were considered as an alternative, they would have been time consuming to complete and overall reliability was deemed limited in comparison to questionnaires comprehensiveness in light of the research needs (Cohen, Manion & Morrison 2007, p.352). Despite their

popular use, questionnaires' general limitations when used in research were considered. As a result, anonymous paper-based self-completed questionnaires were used to encourage replies and minimise researcher bias. In addition, the use of established questionnaires, from previous studies examining similar stressors, was preferred to increase reliability and validity (Cohen, Manion & Morrison 2007, p.211; Brace 2008, pp.22-29). In some instances, questionnaires were unavailable for use or unfit for purpose and, on those occasions, tailored questionnaires to meet the research needs were designed.

However, the main concern of using questionnaires is that in most cases they often only capture a snap shot of a situation, event or stressor, at a single point in time (Gray *et al*. 2007). Therefore methodological triangulation, to gather different perspectives from the same source, i.e. questionnaires alongside observation, gives strength to the two-phase research design. The following sections discuss the choice of questionnaires, in detail, for each of the three key areas under observation: email behaviour and use, personality, and well-being.

3.5.1.1 Email behaviour and usage

As examined thoroughly in Chapter 2, several previous research studies have opted to use email questionnaires or survey data to explore email in the workplace. In all cases they were solely designed to inquire on a specific area of email, e.g. email bullying (Baruch 2005), email interruptions (Russell, Purvis & Banks 2007), email features (Mano & Mesch 2010); or to answer a proposed email-related research question, e.g. in which ways do individuals manage their email? (Hair, Renaud & Ramsay 2007); how do employees deal with email they receive whilst at work? (Shirren & Phillips 2011); to name a few. As a result, universal and well-established email questionnaires are uncommon, or were unavailable, for use in research. For this reason, a tailored questionnaire to further examine email behaviour i.e. email usage questionnaire, as developed in previous research undertakings, was created to identify email addiction.

The email behaviour questionnaire (presented in Appendix B) was an adapted version of an interview guide[3] obtained from works related to Russell, Purvis & Banks (2007). The areas of enquiry included general email use, email habits and strategies, and overall impressions of email. As a starting point the questions were re-formatted into a mix of open and closed ended questions. These were then edited, removed and added to any relevant questions to support the areas under investigation, as identified in light of the research problem or left unexplored from previous literature concluded in Chapter 2. The seventeen-item questionnaire, designed to be

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[3] Email from Emma Russell to Laura Marulanda-Carter, 5th November 2009.

complete within twenty-minutes, was then used as the basic premise for understanding participants' opinion of email in the workplace. The results of the closed questions were then quantitatively coded, and for open ended questions qualitatively transcribed.

The latter email usage[4] questionnaire (presented in Appendix C) was originally designed to identify and classify levels of email addiction as part of previous research in the workplace (i.e. Marulanda-Carter & Jackson 2012). Previously mentioned in section 2.3.2.4, the criterion used in the questionnaire were compiled from clinical characteristics based on similar questions used for DSM-IV pathological gambling and Internet addiction (Young 1996); and behavioural characteristics based on email addiction symptoms from online professionals McKinney (2000) and Egan (2008). The unedited sixteen-item questionnaire, which took no longer than five-minutes to complete, was used for identifying the different characteristics participants possess when using email in the workplace. The results were then calculated and used to identify levels of email addiction, i.e. email addict/dependent or non-email dependent.

3.5.1.2 Personality

There is no single definition of personality that would satisfy all psychologists; nevertheless, it has been widely understood as "the set of relatively enduring behavioural and cognitive traits that people take with them to different situations, contexts and interactions with others" (Matsumoto & Juang 2008, p.265). Virtually all modern personality models, measures and instruments, are in questionnaire formats, e.g. Jung Myers-Briggs Type Indicator (MBTI), 16 Personality Factor (16PF), Minesota Multiphasic Personality Inventory (MMPI), just to name a few, and encompass the five factor model, i.e. the "Big Five". Best understood using the acronym OCEAN, i.e. Openness (O), Conscientiousness (C), Extraversion (E), Agreeableness (A) and Neuroticism (N), these traits have previously been established in peer rating scales, self-reports on descriptive adjectives, measures of needs and motives, and personality symptom clusters (Wiggins 1996, pp.159-160). The Big Five was rationalised as the most established, reliable and validated measure to determine trait dimensions of personality (see Digman 1990; Rammstedt & John 2007; Hahn, Gottschling & Spinath 2012).

The decision was made to use John's (1990) forty-five item questionnaire version of the Big Five Inventory (BFI). This was both free to use for research purposes and relatively short in comparison to other measures, e.g.

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[4] It was considered that the term 'addiction' could affect a person's emotional state and potentially subject to some bias (Ovisiankina 1928; Mandler 1984). As a result, and to avoid any pre-empted anxiety or hesitation towards the questionnaire, it was re-titled 'Email Usage'.

completion time of ten minutes for BFI, forty-five to sixty minutes for 16PF, and one to three hours for MMPI (John 1990; John, Naumann & Soto 2008; *Mentor Research Institute* 2010). The online questions were duplicated, in the same order and structure, onto an equivalent paper-based questionnaire (presented in Appendix D) and manually input online to ensure completion and accuracy. An automatic analysis of results were supplied and provided pre-constructed personality trait descriptors for each dimension, e.g. "relaxed" to describe low-Neuroticism, "easy-going, having fun" for high-Extraversion, etc, based on a 10,000+ person research database collected by the Personality Lab of Dr Oliver John's group at UC Berkley (John, Naumann & Soto 2008).

3.5.1.3 Well-being

At the most basic level, psychological well-being (PWB) is quite similar to other terms that refer to positive mental states, such as happiness or satisfaction (*Robertson Cooper* 2011). Generally speaking, definitions have the following three characteristics:

i.   PWB is a subjective experience; people are as high in PWB as to the extent that they believe themselves to be.

ii.   PWB includes both the relative presence of positive emotions and the relative absence of negative emotions; thus capturing both positive and negative emotional states on a single axis.

iii.   PWB is a global judgement, as it refers to one's life as a whole (as opposed to being tied to any one particular situation).

<div align="right">(Diener 1994; Wright & Bonett, 2007 pp.143-144)</div>

Following the footsteps of prior research the use of a self-report questionnaire to understand and measure workers' perception of PWB was chosen. Despite the success of instruments to date, e.g. Daily Stress Inventory (DSI), Stress Appraisal Measure, and Perceived Stress Scale (PSS), self-reports are still widely criticised for their inability to yield a complete picture of respondents emotional lives. Equally, as emotions are responses which vary on a number of dimensions such as intensity, memory retrieval, and mood, it is suggested that mean levels of affect captured by existing measures do not give a complete account of well-being (Diener 1994). Nevertheless, from the instruments available for use, the perceived stress score (PSS) was rationalised as the best instrument to determine PWB in the workplace. The PSS measures the degree to which situations in one's life are appraised as stressful, and is the most widely accepted global judgement of perceived stress (see Cohen, Kamarck & Mermelstein 1983; Cohen 2005; Cohen & Janicki-Deverts 2012).

The decision was made to use Cohen's (2005) ten-item PSS version, since it was well established, proven to have maximum reliability and validated in both psychological well-being and stress-related fields (i.e. Johnston & Wallace 1990, p.84; MacArthur & MacArthur 2000; *Wellbeing* 2010; Lesage, Berjot & Deschamps 2012). Furthermore, the PSS was free to use for research purposes, generically applicable to all types of population samples and short for participants to complete, i.e. estimated to take no longer than five minutes. The questions were duplicated, in the same order and structure, onto an equivalent paper-based questionnaire (employee well-being questionnaire presented in Appendix E). The results were then manually calculated using the devised scoring system by Cohen (2005).

3.5.2 Phase 2: Observation

To complement the first phase of the research design, the second phase focused on observing the physiological view point of email stress. That is, when an event or situation is stressful, a cascade of hormonal-bodily changes occurs that appears to work either to motivate or support coping with the stressor (Cohen, Kessler & Gordon 1997). Early stress research (e.g. Cannon 1929 & 1939 in Snooks 2009, p.174) coined this "fight or flight", which indicates a reflexive integrated physiological response. The use of observation as a means to extend and build upon previous research that had been limited by questionnaire and interview tools alone was chosen. As Kellehear (1993) in Gratton & Jones (2003, p.158) recognises "there is a simple and persistent belief that knowledge about people is available simply by asking... We ask people about themselves and they tell." However the ad hoc heuristic procedure of observation allowed for the triangulation of data, alongside the use of questionnaires in phase 1, to provide far more serendipitous discovery and investigation of unanticipated portions of the research problem, which previous research had left unexplored to date (Nemeth 2004, p. 104).

Despite critics' (e.g. Gratton & Jones 2003, p.163; Cohen, Manion & Morrison 2007, pp.396-39) concerns for the use of observation in research, e.g. misunderstanding, lack of control in natural settings and difficulty in data recording, the advantages were found to far outweigh the disadvantages. Observation allowed for the direct observation of the phenomenon as and when it happened within a natural physical setting, i.e. workplace environment, and human setting, i.e. verbal and non-verbal worker's interaction, to identify behaviours which may or may not have been apparent to those participating (Gratton & Jones 2003, p.163; Cohen, Manion & Morrison 2007, pp.396-397). Furthermore, the decision to adopt unobtrusive observation, i.e. to observe the phenomenon "from outside" with no engagement with either the activity or the participants, minimised any unintentional influence to the behaviour of those under investigation (e.g.

Hawthorne effect recognised by Adair 1984) or potential researcher bias of the data collected (Gratton & Jones 2003, pp.159-161).

As discussed in section 2.3.3.1, researchers have used a variety of physiological stress indicators, all a result of observation, to examine the physical changes caused by stress on the human body. These have included: blood testing to measure catecholamines and muscle tone (Cohen, Kessler & Gordon 1997); urine samples to measure endocrine systems (Jewels & Tillett 2005, pp.4-5); saliva samples to measure cortisol (Scott 2008; Lowrance 2009); machine-aided monitoring to measure blood pressure, heart rate and galvanic skin response (Eston, Rowlands & Ingledew 1998; Vrijkotte, van Doornen & de Geus 2000; Dorland 2003; McCraty, Atkinson & Tomasino 2003; Andziulis *et al*. 2009). Due to the nature of these indicators, some of which are highly intrusive and viewed as potential stressors in themselves, i.e. blood testing and urine samples (Johnston & Wallace 1990), it was determined necessary to choose less invasive measures. As a result, the use observation to monitor blood pressure, heart rate and cortisol were selected. In addition, the use of diaries was chosen to cross-reference activities of participants with these measures. The following sections discuss these choices in more detail.

3.5.2.1 Blood pressure

Blood pressure is a measure of the force that the heart uses to pump blood around the body (*NHS Choices* 2011). Every time the heart beats, blood is pumped out of the heart, which causes the pressure to increase. In between heartbeats, when the heart is at rest, the heart refills with blood and the pressure in the arteries drop (Rhoden & Schein, 2010 p.1). Problems occur when the heart fills up again, and the pressure in the arteries stays at the same level or rises. This creates excess tension in the arteries and stresses arterial walls, otherwise known as 'high blood pressure'. Over time, as the body's blood pressure remains consistently high, the heart has to work harder to pump blood around the body and, as a consequence, weakens (Rhoden & Schein, 2010 p.1). There is considerable evidence to suggest that high blood pressure is linked to persistent and chronic stress, decreased cognitive performance, memory loss, and the loss of healthy brain tissue (McCraty, Atkinson & Tomasino 2003). Subsequently, evidence of work-stress emerge from a number of blood pressure studies (e.g. Steptoe *et al.* 1995; Everson *et al.* 1997; Hjortskov *et al.* 2004), which shows increased levels in employees with high work stress.

The use of ambulatory blood pressure monitoring (ABPM) was selected as one instrument to measure the physiological effects of email stress in the workplace. ABPM uses a small digital blood pressure machine, attached to a belt around the body and connected to a cuff on the upper arm, to measure

blood pressure at regular intervals during a twenty-four hour period. Writing in the British Medical Journal, an Australian team says "giving people a cuff to wear for 24 hours is a better way of checking blood pressure" (*BBC News* 2010). Not only does this method gather multiple measurements, for a better prediction of stress (Tseng *et al.* 1994), it also eliminates the effects of white coat syndrome[5]. It is unsurprising that ABPM is the new "gold" standard for diagnosing blood pressure as it eliminates the possibility of misdiagnosis (*Blood Pressure Association* 2008). A number of ABPM enabled machines exist on the market (see *British Hypertension Society* 2004) and Spacelabs SL90217 model, which is clinically validated and established accurate by both Baumgart & Kamp (1998) and *British Hypertension Society* (2004), was used.

Blood pressure is recorded on two measurements during a single heart beat: systolic i.e. the level of pressure when heart pumps blood through arteries and around the body, and diastolic, i.e. the level of pressure when heart is resting before it pumps again. These are both measured in millimetres of mercury (mmHg), where the systolic reading is first, followed by the diastolic reading; e.g. if systolic is 120mmHg and diastolic is 80mmHg then blood pressure is 120 over 80, more commonly written as 120/80 (*NHS Choices* 2011). The following values, presented in Table 3.5, display the guides for acceptable blood pressure ranges for adults by age group.

Table 3.5: Acceptable blood pressure ranges

Age Groups	Average	Minimum	Maximum
20 – 24	120/79	108/75	132/83
25 – 29	121/80	109/76	133/84
30 – 34	122/81	110/77	134/85
35 – 39	123/82	110/77	134/85
40 – 44	125/83	112/79	137/87
45 – 49	127/84	115/80	139/88
50 – 54	129/85	116/81	142/89
55 – 59	131/86	118/82	144/90
60 – 64	134/87	121/83	147/91

(as printed by NHS 2010[6])

The decision was initially made to monitor blood pressure every thirty minutes, over a twenty-four hour period, to gather a stress response. Amendments to these times were later made as a result of the pilot study (addressed in section 3.5). Collected blood pressure readings were automatically recorded on the Spacelabs ABPM, and downloaded to Spacelabs ABP Software for analysis. Reported readings found to be outside

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[5] White coat syndrome is a result of high blood pressure when taken in a medical setting as oppose to when taken at home. This will often occur when the person is unfamiliar to their surroundings, nervous or anxious about being tested (see Gordan *et al.* 1995; Verdecchia *et al.* 1995; Biaggioni *et al.* 2012 p.356)

[6] NHS UK, 2010. *Blood pressure ranges by age categories.* [Internal unpublished document]

acceptable ranges, as noted above, were not included in the analysis[7]. The mean arterial blood pressure (MAP) were calculated [= [(2 x diastolic) + systolic] / 3] for each reading, and the average for each monitoring period, at *GlobalRPh.com* (1999). The average MAP was used as the baseline measurement for comparison. Subsequent blood pressure readings were cross referenced with the results of heart rate (addressed in section 3.5.2.2), cortisol (addressed in section 3.5.2.3) and diary entries (addressed in section 3.5.2.4), and data were illustrated graphically using Microsoft Excel.

3.5.2.2 Heart rate

Heart rate can be defined simply as the "number of times the heart beats per minute" (Green & Chiaramida, 2009 p.33). Based on the linear relationship between oxygen uptake and heart rate, it is also used as a reflection tool of the relative stress placed on the cardiopulmonary system (Eston, Rowlands & Ingledew 1998; *Heart.com* 2009). It is unsurprising that heart rate has often been associated with blood pressure in evidence for work stress (e.g. Goldstein, Jammer & Shapiro 1992; Vrijkotte, van Doornen & de Geus 2000; Lusk *et al.* 2002). As mentioned in the previous section, the Spacelabs SL90217 model was used to measure blood pressure. This machine also allowed for heart rate measures to be used from the upper arm's brachial artery. In much the same way to blood pressure, heart rate was determined to be a clinically relevant vital sign, important indicator of stress (Eston, Rowlands & Ingledew 1998; *Heart.com* 2009) and complementary instrument to measure the physiological effects of email stress in the workplace.

The decision was made to monitor heart rate every thirty-minutes, over a twenty-four hour period, to gather a stress response. Amendments to these times were later made as a result of pilot study (addressed in section 3.5). Collected heart rate readings were automatically recorded on the Spacelabs ABPM, and downloaded to Spacelabs ABP Software for analysis. Reported readings found to be outside normal ranges, i.e. 60-100 beats per minute, were not included in the analysis[8]. Heart rate readings were cross referenced with the results of blood pressure (discussed in section 3.5.2.1), cortisol (addressed in section 3.5.2.3) and diary entries (addressed in section 3.5.2.4), and data were illustrated graphically using Microsoft Excel.

3.5.2.3 Cortisol

Cortisol, also known as cortisone and hydrocortisone, is a steroid hormone produced in the adrenal glands, often referred to as the "stress hormone"

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[7] On those occasions that results appeared outside normal range participants were informed, paper-based results provided and all were advised to visit their general practitioner (GP) or medical professional.
[8] Ibid

(Talbott, 2007 p.42). It is primarily used by the body to maintain normal physiological processes during times of stress; without cortisol the body would be unable to generate energy and respond effectively to the "fight or flight" situation (Scott 2008). It would be assumed that cortisol is thus a "good" hormone (Talbott, 2007 p.42); as it has been shown, in small increases, to have a positive effect on the body, i.e. quick burst of energy or heightened memory functions. However, high and more prolonged levels of cortisol, like those associated with chronic stress, instead cause impaired cognitive performance, lowered immunity and higher blood pressure (Scott 2008). Previous research have shown that on each occasion the body prepares to deal with the stressor, i.e. fight or flight, it undergoes the same metabolic change even when faced with "benign" stress, such as a project deadline or traffic jam. As a result the endocrine system becomes either overactivated or chronically activated, which leads to gradual and progressive deterioration of general health and worsening of existing conditions (Talbott, 2007 pp.42-44).

Normal cortisol metabolism follows a circadian rhythm, i.e. twenty-four hour cycle, with the highest cortisol levels typically observed in the early morning (6am to 8am) and the lowest levels during the night (midnight to 2am). In general, cortisol levels show a rapid drop between 8am and 11am and then undergo a continued gradual decline throughout the day. After reaching the lowest levels at around 2am, cortisol begins to rise in order to prepare for the following cycle (Talbott, 2007 p.44). The following ranges, shown in Table 3.6, have been reported for salivary cortisol in the morning (AM) and evening (PM).

Table 3.6: Salivary cortisol expected ranges

Group	AM Range (µg/dL)	PM Range (µg/dL)
Adult males, ages 21-30	0.112 - 0.743	ND – 0.259
Adult females, ages 21-30	0.272 - 1.348	ND – 0.359
Adult males, ages 31-50	0.122 - 1.551	ND – 0.359
Adult females, ages 31-50	0.094 - 1.515	ND – 0.181
Adult males, ages 51-80	0.112 - 0.812	ND – 0.228
Adult females, ages 51-80	0.149 - 0.739	0.022-0.254

(ND=No Data. Aardal & Holm 1995)

Despite concerns, the use of adrenal cortisol, as a complementary instrument to blood pressure and heart rate measures, was chosen to determine the physiological effects of email stress in the workplace. Existing medical groups that have studied stress and adrenal-cortisol, i.e. saliva samples, have determined this type of testing to be accurate, less intrusive and more convenient than the alternative blood sampling (Lowrance 2009). Laboratory facilities and equipment available at Loughborough University's School of Sport and Exercise science, was utilised together with *Salimetrics* (2012) salivary enzyme immunoassay kits. Saliva samples were collected four times

per twenty-four hour circadian cycle, as recommended by *Endocrine Awareness Center for Health* (2011). Following the salivary-cortisol assay procedure in the laboratory (presented in Appendix F), cortisol levels were automatically computed using Revelation Quicklink software. Reported readings found to be outside expected ranges, as noted in Table 3.5.2.3, were not included in the analysis[9]. The remaining readings were cross referenced with the results of blood pressure (discussed in section 3.5.2.1), heart rate (discussed in section 3.5.2.2) and diary entries (addressed in section 3.5.2.4), and data were illustrated graphically using Microsoft Excel.

3.5.2.4 Diaries

Email diaries, also known as communication diaries, have been adopted in a number of previous email-related research studies (e.g. Russell 1995; Longmate & Baber 2002; Shirren & Phillips 2011). The structure of diaries can vary; the simplest being a log that contains a record of activities or events, to more complex personal commentary reflecting on roles, activities, relationships and personal feelings (Alaszewski, 2006 pp.1-2). A structured email diary (presented in Appendix G) was created to record participant's actions, in sixty-minute intervals during monitoring, to determine the physiological effects of email stress in the workplace. As supported by Lazar, Feng & Hochheiser (2010 p.132) the diary was intentionally designed to connect with individuals and yield useful data without imposing unreasonable burden on the lives of the diarists. As a result this ensured the diary was short, concise, trouble-free for diarists to complete, and in no way negatively impacted on the diarists' employment, health, or relationships with others (Lazar, Feng & Hochheiser 2010 p.131).

The diary design included a mixture of open-ended (i.e. In brief, please log any activities as completed during each time period), check boxes (e.g. during this time have you been reading, sending, and filing emails?) and counts of email use in the workplace (i.e. how many times have you accessed your inbox to check emails?). Additionally, to gather a perceived perception of stress during activities, a rating scale question was also included (i.e. how stressed have you felt over that time period?). Reported activities were coded into generalised groups, and perceived stress quantitatively valued. These were then cross referenced with the results of blood pressure (discussed in section 3.5.2.1), heart rate (discussed in section 3.5.2.2) and cortisol (discussed in section 3.5.2.3), and illustrated graphically using Microsoft Excel.

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[9] Ibid

3.5.3 Pilot study design

A small-scale single user pilot study was undertaken with a volunteer employee at Loughborough University (LU). The pilot participant was female, between the ages of 30-40, with no known medical conditions. The monitoring period began at 9am on 3rd June and ended at the same time on 4th June 2010. During this period the participant attended work, on-site at the university campus, and carried out normal duties between 9am and 7pm.

It was acknowledged that the testing of instruments, and making any adjustments to design before instigating a major study, ensured the data collection process was feasible and efficient (Monsen & Horn, 2008 p.5; Rubin & Babbie, 2011 p.287). The initial experience, as a result of the pilot, was equally invaluable to resolve unanticipated problems that could occur in later studies. The following sections briefly summarise the data collection process and results, before considering the research design in light of the feedback and comments generated from both the participant and author on reflection of the pilot study.

3.5.3.1 Data Collection and Results

The research design was deployed in two phases (i.e. phase 1 and phase 2); as illustrated in Figure 3.3. In Phase 1 participants were administered one set of self-completed paper-based questionnaires regarding email behaviour and usage, personality, and well-being, at the start of the monitoring period. For Phase 2 the participant's stress responses, i.e. blood pressure, heart rate, cortisol, was observed over a twenty-four hour monitoring period during a work day. At the start of the monitoring session the Spacelabs SL90217 ambulatory machine was attached. This was programmed to record measures of blood pressure and heart rate every thirty minutes during wake hours (7am–11pm) and sixty minutes during rest hours (11.pm–7am); the latter to cause as little disruption during sleep. The recommended (by *Endocrine Awareness Center for Health,* 2011) minimum of four adrenal-cortisol samples was collected at regular intervals during wake hours, i.e. first thing in the morning, before lunch, after work and before bed. Alongside these, paper-based diaries were administered. The monitoring period was conducted without the researcher present; the participant was therefore responsible for storing saliva samples in thermos flask and refrigerator. At the end of the monitoring session all questionnaires, equipment and samples were collected.

3.5.3.2 Lessons learned: feedback and reflection

The following sub-sections, based on participants' feedback and author's comments, reflect on the experiences of the pilot study and validate the research design's use in the workplace. The researcher's role and each phase of the research design are considered, before going on to discuss natural

chaotic factors and variables that inadvertently affect the nature of this research. Subsequent issues were considered in light of the research design for the ▮▮▮▮▮▮▮▮ study (addressed in section 3.6).

Figure 3.3: Loughborough University study design
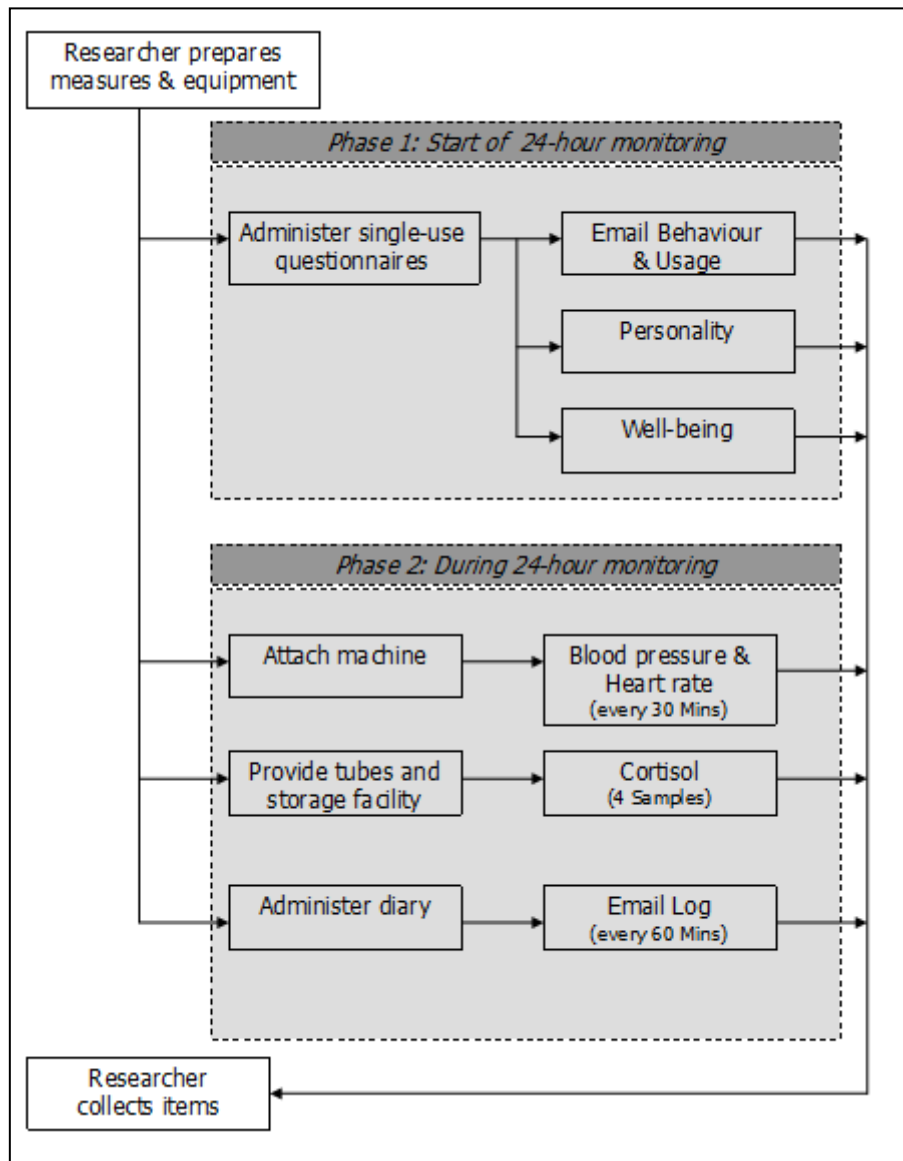
Researcher's role

The study design was purposively designed to preserve an independent objective researcher role. The use of self-completed questionnaires and unobtrusive observation (as mentioned in sections 3.5.1 and 3.5.2) were thus employed. As a result of this choice, the ability to probe or verify responses was sacrificed. Nevertheless, as acknowledged by Selye (1976 p.53), the very nature of stress is a "nonspecific response of the body to any demand". As such the role and actions of the researcher must not interfere with the demands of participants under investigation, as this may lead to inconclusive findings, e.g. a similar problem has already been established with regard to blood pressure and white coat syndrome (as described in

section 3.5.2.1). The benefits of an absent researcher role appeared to far outweigh the limitations. This approach has been advocated in previous stress research studies (e.g. Evans, Palsane & Carrere 1987; Kelsey *et al.* 2000; Ishijima 2007) and is neither intrusive or inconveniencing, and participants have been shown to more willingly involve them self in the studies (Bouchard 1976).

Reflection: Phase 1

A psychological perspective of email stress was, as expected, generated from the mix of quantitative and qualitative data gathered as part of Phase 1. The choice of questionnaires as a data collection tool provided adequate and relevant detail to further understand email behaviour and use, personality, and well-being in the workplace. The time required to complete each of the four questionnaires were corroborated; originally expected to take a combined total of twenty minutes. However, based on suggestions made from the participant, it was fair to assume that some questions, i.e. those included in the email behaviour questionnaire that allowed more writing space to elaborate, required additional time to complete. A period of twenty to thirty minutes was determined more accurate and realistic time frame for participants. The pilot study found no problems or side-effects with the instruments used, or in how they were administered and completed. Consequently the decision was not to edit the questionnaires designed and retain their use in the research design.

Reflection: Phase 2

Similarly, as expected, quantitative data gathered a physiological perspective of email stress as part of Phase 2. Surprisingly the pilot study showed that observation and the combination of blood pressure, heart rate, cortisol and diaries, generated more data than was originally required from the research design; specifically with regard to the different work activities and tasks, e.g. paperwork, meetings, travel, identified from the diary. Although unexpected this additional, and above all relevant, data was later used in study designs (addressed in sections 3.6 and 3.8) to compare with email use and consequently provided a more realistic overview of email stress in the workplace. To capture this data it was necessary to provide more white space on the email diaries for participants to elaborate on workplace activities and tasks.

Furthermore, as a result of the pilot study, a more realistic estimate of the time frames required from participants were acquired. An additional ten minutes were added at the start of the monitoring period to prepare and administer each of the instruments, i.e. Spacelabs SL90217 ambulatory machine, adrenal-cortisol test tubes and diaries. Participants would then be required to spend ten minutes to collect and record saliva samples, and thirty minutes to complete email diaries, for each monitoring session. The pilot

study found no problems with regard to how the instruments were administered and completed. However a number of side-effects, from the use of instruments, were raised.

Firstly, the ambulatory machine cuff caused arm ache on more than one occasion. Although this is not unheard of (recognised in studies by Taylor, Freeman & North 2001 and Viera, Lingley & Hinderliter 2011), it requires some consideration on the effects it will have on participants and subsequent results. Despite the fact that arm ache has not been found detrimental to participants health, it can inadvertently alter results, e.g. if it puts any stress on the participant, or their willingness to co-operate. Consequently, the number of times the machine inflated during monitoring periods or the length of time under investigation had to be reduced. Whilst rest periods, i.e. sleep hours, are critical in the medical science, as they are used comparatively to detect health conditions or ailments (Hoffman [n.d.]), it was considered irrelevant for the purpose of this research. Therefore by limiting the monitoring period of the research design to work-hours only, relevant data could be gathered, participants would be less likely to suffer from adverse side-effects and more likely to volunteer in future studies.

Another issue raised from the pilot study was the level of accuracy recorded from the instruments used. Although the ambulatory machine had been previously validated, by Baumgart & Kamp (1998) and the *British Hypertension Society* (2004), there were instances when the machine produced error codes or invalid results. In the majority of cases these were caused by too much movement of the arm, cuff inappropriately fitted or insufficient battery power. Similarly, the pilot study showed human error when the pilot participant consumed coffee before providing a saliva sample; eating food or drinking coffee has been shown to invalidate results (*Salimetrics* 2012); or had forgotten to take samples at the appropriate times. In order to minimise these issues, a participant information sheet was prepared to cover the key steps involved in the study, potential risk factors of instruments used and monitoring schedule. Despite the concerns raised from the pilot study, the decision was made to retain the use of observation, with some minor amendments, as part of the research design.

Reality of natural chaotic factors and variables

There are many research environments where questionnaires and observation could be carried out, e.g. laboratory or naturalistic settings, and those taken from the latter natural situations shed more light to the conditions of the phenomenon in the real world. However the need for greater insight is often substituted for control, as independent variables cannot always be isolated in external environments (Walliman 2006). For this reason the use of the research design to explore email stress, on reflection of the pilot study, was found to be, and likely to remain, limited by natural

chaotic factors in the workplace (as previously mentioned in section 1.5). It was acknowledged that the initial settings of the pilot study, and future studies, using the research design would be virtually impossible to model. This however would not be due to lack of order but because they were beyond the researcher's control and, in essence, unpredictable within the workplace environment (Walliman 2001, p.251). Nevertheless, the natural workplace environment to measure and understand email stress provided greater insight that previous research had been limited by to date.

Research design: re-visited & updated

Overall the research design, with some minor amendments as illustrated in Figure 3.4, was found to be a realistic, practical and feasible strategy to further understand email stress in the workplace. This research design formed the foundation of the first study reported in this thesis (▉▉▉▉ ▉▉▉▉▉▉ study design addressed in section 3.6).

Figure 3.4: Research design [version 2]
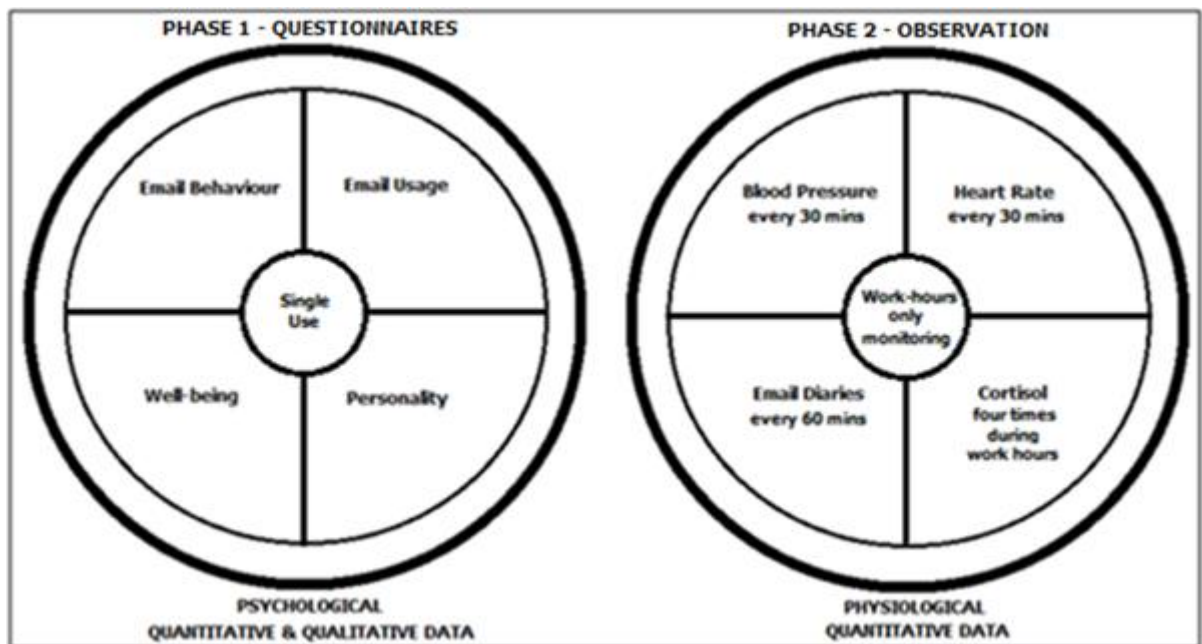
3.6 ▉▉▉▉▉▉▉▉▉▉▉ study design

The first case study conducted was to address Objective 3 (*to conduct a series of detailed case studies to identify and examine the effect of email use on employee stress within the ▉▉▉▉▉▉▉▉▉*) and to achieve Objective 4 (*to evaluate the use of established email management strategies, such as 'email free time' and email filing, to manage email stress and related stressors effectively within the ▉▉▉▉▉▉▉▉▉*). The following sections discuss the case study organisation and participant selection, before going on to summarise the methodological choices in study design and data analyses. It is important to note that the focus of the study was limited to understanding email stress, without exploring in detail other workplace stressors. It was acknowledged that due to the research design and nature

of this study, despite all efforts made, the reality of natural chaotic factors within the workplace environment (as previously mentioned in section 1.5) are considered in light of the results presented in Chapter 4.

3.6.1 Organisation and participant selection

The ████████████' (2011) is the devolved Government for Wales, responsible for most of the day-to-day public issues such as health, education and local government. It is responsible for proposing and implementing policy and laws which aim to improve the lives of everyone living in Wales. The Cabinet is the main decision-making body, supported by civil servants who work across the devolved areas. There are approximately 5,889 employees housed across 72 locations in Wales, and 14 locations abroad. The ████████████ on average received over 1 million, and sent over 400,000, emails each month between July and October 2010[10].

On a request made to Records Service, a total of thirty participants, housed at Cathays Park and Neptune Point locations in Cardiff Wales, volunteered to take part in the research study. Participants across the organisation were recruited following an in-house email advertisement. Given the estimated time frame for the researcher to complete each participant, only a fraction from the total number of employees could be included in the study. However a range of ages, gender, job roles and divisions across the organisation were targeted to provide scope on the relevant issues. The common factors between participants were that they were all employed by the ████ ████████, used email daily as a communication medium in the workplace, and were willing to take a period of 'email free time'.

3.6.2 Study design, gathering of data and analyses

In accordance with rules and regulations of new research conducted at Loughborough University an ethical clearance was received before data collection began at the ████████████ (endorsement in Appendix H). The same research design and data collection tools, i.e. questionnaires and observation (as previously mentioned in sections 3.5.1 and 3.5.2) was utilised for this study. In addition, a one-shot experimental design was adopted for Phase 2, whereby monitoring period [1] observed the dependent variable, i.e. normal email use, and the monitoring period [2] observed 'email free time', i.e. independent variable. Participants were advised to take a period of 'email free time', i.e. minimum three consecutive hours of no email use, from their work day. The study design and data analyses process are illustrated in Figure 3.5, and summarised in the following sections.

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[10] Email from Robert Edwards on behalf of ████████████ IT Services to Laura Marulanda-Carter, 28th April 2011.

3.6.2.1 Descriptive and statistical analysis

Descriptive analysis was chosen to generalise participants' responses to each of the questionnaires, i.e. email behaviour and usage, personality and well-being, as part of data analyses for Phase 1. Data were initially coded using PASW Statistics and statistical analysis was then performed to make inferences between results from case profiles. It is important to note that intentions to conduct more complex statistical procedures, e.g. t-tests, chi-squared, existed but were not achievable. Following recommendations from Howitt & Cramer (2001, p.161) any cell found to fall lower than five had been shown to produce inaccurate results. Alternative investigators (e.g. Deacon [n.d.]), whom are considered to be more generous, suggest one-fifth of values should be no lower than five. Consequently the collective data failed to meet either of the above numerical requirements. Therefore descriptive statistical analysis (as illustrated with red dotted lines on Figure 3.5) such as percentages and frequency distributions, were used to illustrate findings. Results from Phase 1 are presented in Chapter 4, section 4.4, of this thesis.

3.6.2.2 Comparative analysis

Comparative analysis, i.e. to explain how something is like or unlike something else (Withen 2002), was carried out as part of data analyses for Phase 2 (as illustrated with blue dotted lines on Figure 3.5). Specifically it was used to evaluate the differences between email and 'email free time' for each case profile. Initially trends were visually examined between blood pressure, heart rate and cortisol during email activities and non-email activities. These results were illustrated graphically using Microsoft Excel (as previously mentioned in sections 3.5.2.1 – 3.5.2.4). The raw results were then coded and input on PASW Statistics and mean values were evaluated. Reported findings from Phase 2 are presented in Chapter 4, section 4.5, of this thesis.

Figure 3.5: ██████████████ study design and data analyses process
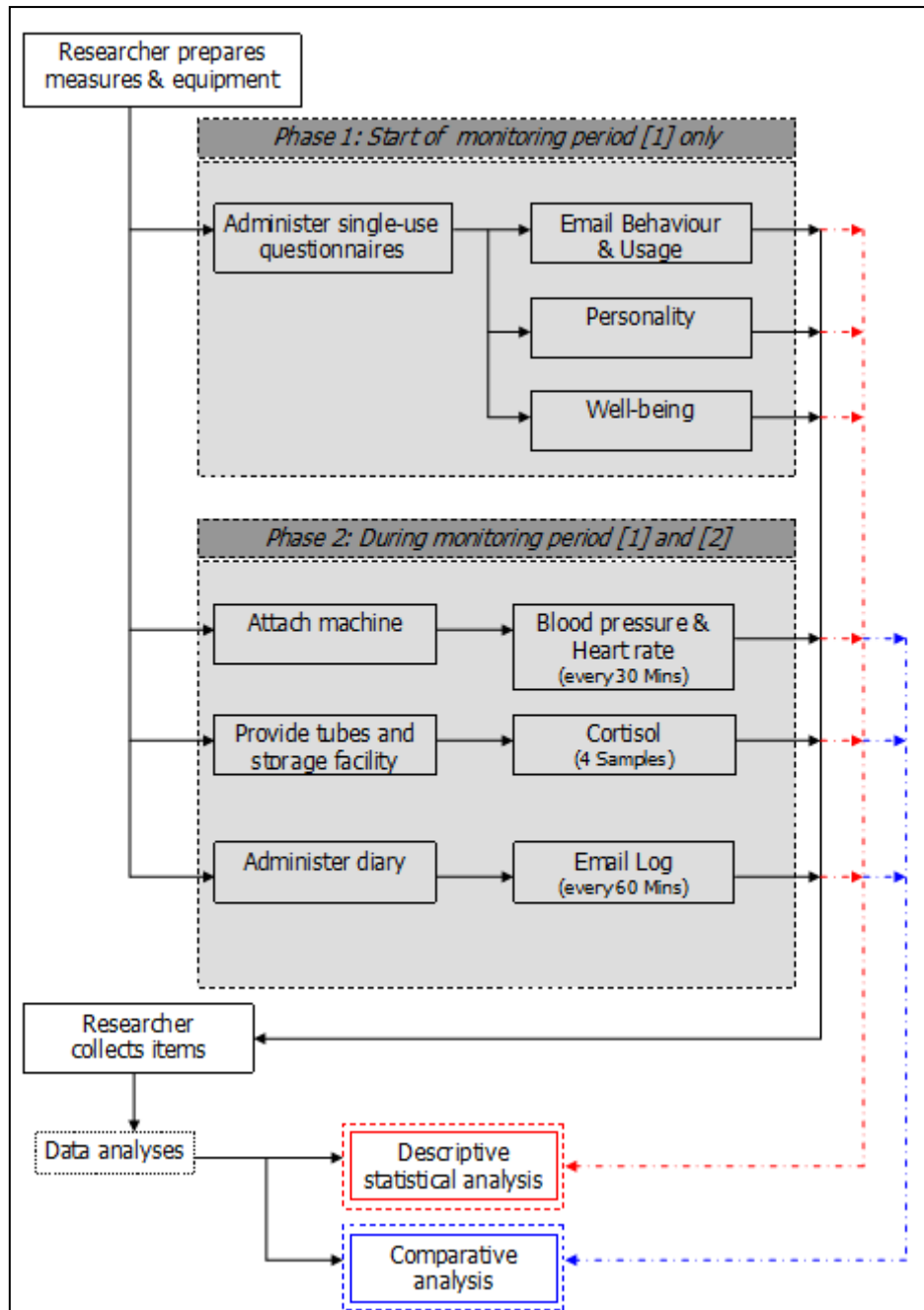
3.6.3 Collection and reporting of data

The data collection period for the ██████████████ study began in July 2010 and ended in October of the same year. The researcher during this time relocated to Cardiff, Wales, to ensure the research was undertaken on-site and that participants were studied within their natural workplace environment. Participants were assigned monitoring periods at random and thus results did not place any added/reduced value for variations between days of the week or times of the month during data collection. A presentation of the preliminary results was performed in May 2011, and a final report was submitted in June of the same year.

3.6.4 Lessons learned: comments and reflection

Several issues were raised by both participants and the researcher after the data was collected from the ████████████ study (addressed in section 4.7.1). As a result a number of issues were considered relevant to the research design and delivery for improvement in future research.

Researcher's role

A more involved researcher role was considered, as opposed to the absent researcher role first chosen, to better observe participants and ensure the monitoring was conducted most accurately. However, the benefits of an absent researcher role continued to far outweigh any limitations. Whilst inaccuracies would likely remain in future data collection, this strategy ensures the phenomenon is studied in its real world environment. Furthermore, as described in section 3.5.3.2, stress by its very nature is non-specific and the obtrusiveness involved in an active researcher role may inadvertently affect the stressors under study. Likewise the need to maintain openness towards the study, to ensure participants remained willing to involve themselves in all aspects of the design was of more importance.

Experimental design

A one-shot experimental design was adopted for the ████████████ study; whereby monitoring period [1] observed the dependent variable, i.e. normal email use, and monitoring period [2] observed 'email free time', i.e. independent variable. Whilst this was a logical design choice in light of the email management strategies and researcher's first study, the need for other experimental designs to improve test effectiveness in future research were considered. Alternative pre-experimental design choices included: cross-sectional, which collects data on one occasion at the same time on relevant variables from a variety of people, subjects or phenomena; or one group pre-testing vs. post-testing. The latter design choice provided more opportunity for data to be monitored and evaluated to answer questions such as how many? how much? how adequate?; unlike a cross-sectional design that is limited to measuring change or differences.

Rigour and reliability of data collection tools

Results found some issues arose with regard to the rigour and reliability of data collection tools used as part of the research design. These were the same issues, as first mentioned in section 3.5.3.2 after the pilot study, anticipated before data collection, e.g. ABP machine cuff causing arm ache and error codes, human error when participants consumed food/drink before providing a saliva sample, and continued to occur despite providing all participants with an information sheet. It was evident that the types of methods chosen, in practice, were not free from human and subsequently data inconsistencies. In an attempt to minimise these concerns, supplementary procedures were considered for future research studies, e.g.

creation of control groups, randomisation and blinding, the repetition of methods/studies and member validation (Taylor, Gibbs & Lewins 2005; *SAMW* 2009).

Whilst the fundamental principles of the research design remained the same (as described in section 3.5.3.2 and Figure 3.4), improvements, which were deemed viable and relevant, were made to future research studies (███████████ study design addressed in section 3.8).

3.7 ███████████████ follow-up study design

A follow-up study was carried out in contribution towards Objective 5 (*to develop an epistemology associated with the conceptualisation of email stress in the workplace*). The following sections discuss the case study organisation and participant selection, before going on to summarise the methodological choice of study design and data analyses. The subsequent results of this study are presented in Chapter 6 and should be considered in light of natural chaotic factors within the workplace environment (as previously mentioned in section 1.5).

3.7.1 Organisation and participant selection

The ███████████████, for a second time, volunteered to take part in the research study. An email invitation was sent to all previous participants involved in the first ███████████ Study (as described in section 3.6.1). However, since the time of the initial research conducted in July 2010, a number of employees had left the organisation or been made redundant in the time passing. Although accurate statistics could not be acquired, online reports claim that there had been a 7.5% cut in funding to the ████ ████████ and a local government job loss toll of 145,000 employees in the year to June 2011 (Evans 2011). Due to these external circumstances, only a fraction of the thirty participants that had previously taken part remained with the organisation. In total four participants, housed at Cathays Park, volunteered for this study. Whilst the sample size was considered small, it was concluded the benefits of generating discussion and exploring the research area further (Stewart, Shamdasa & Rook 2007, p.42) would far outweigh any disadvantages of sample size, e.g. minimal statistical testing, inconclusive results and generalisation (Lunsford & Lunsford 1995). The common factors between participants were that they were all employed by the ███████████████, used email daily as a communication medium in the workplace, and were willing to take a period of time from one working day to contribute in a focus group.

3.7.2 Study design, gathering of data and analysis

A focus group was conducted with the aim of validating the conceptual models devised (as presented in Chapter 5). The design choice was two-fold.

Firstly the focus group was aimed at addressing the topic in a manner that participants could impart their views, experiences, motivations and values, to critically evaluate the performance of the conceptual models devised in effectively understanding and managing email stress. Likewise the researcher also wanted to be in a position to prompt, probe and extend the scope of answers to generate additional data left undiscovered in the original research study (as previously mentioned in Chapter 4).

Focus groups provide a wealth of information for researchers and decision makers. The responses of participants tend to be more creative in this setting as the environment of group dynamics are closer to the real-life processes of sense-making and acquiring understanding. Likewise, comments made by one participant often evoke insights, thoughts or ideas among others (Walliman 2006, p.98; Neelankavil 2007, pp.113-114). Furthermore, as noted by Webster & Mertova (2007, p.173), "focus groups are invaluable in research to refine other instruments and to enquire further interpretation to results from earlier studies". Nevertheless, active participants and unsolicited comments are important for a successful focus group, although not always achievable. Thus the decision was made to keep questions broad and to a minimum; as a result the following three questions led the focus group discussions:

(i)   What are your thoughts on the explanatory models?
(ii)   What are your thoughts on the action model and author's recommendations?
(iii)   How do you understand email stress in the workplace?

To ensure the focus group nurtured a facilitating environment, and information generated was relevant, the role of facilitator was carried out by the researcher and followed the Center for Development Information and Evaluation (at *USAID* 1996) stages for conducting a focus group; as outlined in Table 3.7. Based on lessons learnt from previous research (as discussed in section 3.6.4) a member validation was conducted to provide more rigour and reliability of the data collected. Likewise, to minimise research bias, the focus group transcript was sent to participants before the data analysis to ensure the interpretation of responses were fair, reflective and representative of all participants.

Table 3.7: Stages for conducting ███████████████ focus group

Facilitator's Actions	
Stage 1 **Select participants**	The first step was to select participants, i.e. participants selected based on their participation in the previous study.
Stage 2 **Decide on timing and location**	The focus group was scheduled at the most convenient time for participants in a neutral location, i.e. a private meeting room in the ███████████'s Cathays Park building.
Stage 3 **Prepare the discussion guide**	An interview guide (presented in Appendix I) was prepared in advance that covered the relevant topics and issues for discussion. This provided a suitable framework for the facilitator to explore, probe, and ask questions to prevent researcher bias.
Stage 4 **Conduct the interview**	The facilitator established a rapport with participants, phrased questions carefully and used probing questions to control the discussion and minimise group pressure.
Stage 5 **Record the discussion**	Tape recordings, written notes, and nonverbal behaviour were recorded to reflect the content and discussion.
Stage 6 **Transcribe the results**	After the session, the facilitator's notes and transcripts were assembled (presented in Appendix I).

(adapted from *USAID* 1996)

The raw data gathered from the focus group were then explored using a framework analysis, detailed in Table 3.8, as prescribed by Ritchie & Spencer (1994). The distinctive aspect of this data analysis technique is that although it uses a thematic approach, it also allowed for themes to develop from both the research questions and narratives of participants (Rabiee 2004). Results are presented in Chapter 6 (member validation addressed in section 6.3.1, framework analysis results addressed in section 6.3.2, and focus group findings addressed in section 6.3.3-6.3.6).

Table 3.8: Stages of focus group data analysis

Researcher's Actions	
Stage 1 **Familiarisation**	The first step was for the researcher to become familiarized with the data. This was achieved by listening to the recording, reading the transcription and the observational notes in its entirety. The intention was to get a sense of the data as a whole before breaking it into parts. During this process the major themes began to emerge.
Stage 2 **Identifying Thematic Framework**	The next stage involved identifying a thematic framework by writing memos in the margin of the text, i.e. in the form of short phrases, ideas or concepts arising from the texts, to develop initial categories. At this stage an analysis was carried out on the data under the questioning route and descriptive statements formed.
Stage 3 **Indexing**	The indexing stage comprised of the researcher sifting the data, highlighting and sorting out quotes and making comparisons both within and between responses.
Stage 4 **Charting**	The fourth stage, charting, involved lifting the quotes from their original context and re-arranging them under the newly-developed thematic content. One of the most important aspects of this task was data reduction, which was achieved by comparing and contrasting data and cutting and pasting similar quotes together.
Stage 5 **Mapping and Interpretation**	The data was then ready for the final stage of analysis, i.e. mapping and interpreting. The researchers' task was to make sense of individual quotes, critically evaluate the relationship between the quotes and identify the links from the data as a whole.

(adapted from Ritchie & Spencer 1994)

3.7.3 Collection and reporting of data

The data collection was conducted in November 2011. The researcher visited the Cathays Park office in Cardiff, Wales, to ensure the research was undertaken on-site and that participants could be studied within their natural workplace environment. A transcript of the focus group was submitted to all participants in December of the same year.

3.8 ██████████████ study design

The final case study conducted was to complete Objective 6 (*to critique the use of an email training intervention to manage email stress and related stressors*). The following sections discuss the case study organisation and participant selection, before going on to summarise the methodological choice of study design and data analyses. It is important to reiterate that the focus of the study was limited to improving email stress, without exploring in detail other workplace stressors. It was acknowledged that due to the research design and nature of this study, despite all efforts made, the reality of natural chaotic factors within the workplace environment (as previously mentioned in section 1.5) are considered in light of the results presented in Chapter 7.

3.8.1 Organisation and participant selection

Staff Development at Loughborough University, who oversaw the research project, volunteered the ███████████ to take part in the research study. The ███████████' (2012) is the forefront department in supporting enterprising academics and research staff. It is responsible for identifying and exploiting the commercial and social value of research, mainly protecting and commercialising ideas, collaborating with external organisations, starting up new business and creating business networks. The department operates with approximately 36 employees, housed on campus.

In total, seven participants, housed at Rutland and Holywell Park locations in Loughborough University, volunteered for the study. Participants were recruited following an in-house email advertisement by the Deputy Pro-Vice Chancellor of Enterprise. Given the estimated time frame for the researcher to complete each participant, only a fraction from the total number of employees could be included in the study. However a range of ages, gender, job roles and divisions across the organisation were targeted to provide scope on the relevant issues. The common factors between participants were that they were all employed by the ███████████ at Loughborough University, used email daily as a communication medium in the workplace, and were offered a series of email interventions, i.e. single seminar workshop and three computer video animations.

3.8.2 Study design, gathering of data and analyses

In accordance with rules and regulations of new research conducted at Loughborough University an ethical clearance was received before data collection began at the ██████████ (endorsement in Appendix J). A similar research design and data collection tools, i.e. questionnaires and observation (as mentioned in sections 3.5.1 and 3.5.2) were utilised for this study. However, some minor changes were made to provide more rigour and reliability of data gathered (as discussed in section 3.6.4).

Firstly, the decision was made to repeat measures and include more monitoring periods in this study, i.e. two sets of questionnaires, two periods monitoring dependent variable, and likewise two monitoring independent variables. As a result, a pre-test vs. post-test experimental design was adopted, whereby monitoring period [1] & [2] observed the dependent variable, i.e. email use prior to intervention, and the monitoring period [3] & [4] observed email use after the intervention, i.e. independent variable. The study design and data analyses process are illustrated in Figure 3.6. Previously used analysis procedures, i.e. descriptive & statistical analysis (described in section 3.6.2.1) and comparative analysis (described in section 3.6.2.2), remained the same and reported results presented in Chapter 7 (phases 1 and 2 addressed in section 7.5 and 7.6 respectively). In addition, the use of case profiles and data triangulation, as detailed in the following sub-section, was also performed.

3.8.2.1 Case profiles & data triangulation

Results from each phase of the research design, alongside the researcher's own observations, were transcribed and individual case profiles created to bring together the variety of data sources, i.e. data triangulation, collected for each participant (as illustrated with green dotted lines on Figure 3.5). Findings could thus be corroborated and any weakness in the data compensated for by the strengths of other data thereby increasing validity and reliability and reducing the risk of false interpretations (Colwell & Richardson 2002; *UNAIDS* 2010). The case profiles were anonymised and sent confidentially via email to each participant. Summary of participant profiles are presented in Chapter 7, section 7.7, of this thesis.

Figure 3.6: ██████████ study design and data analyses process
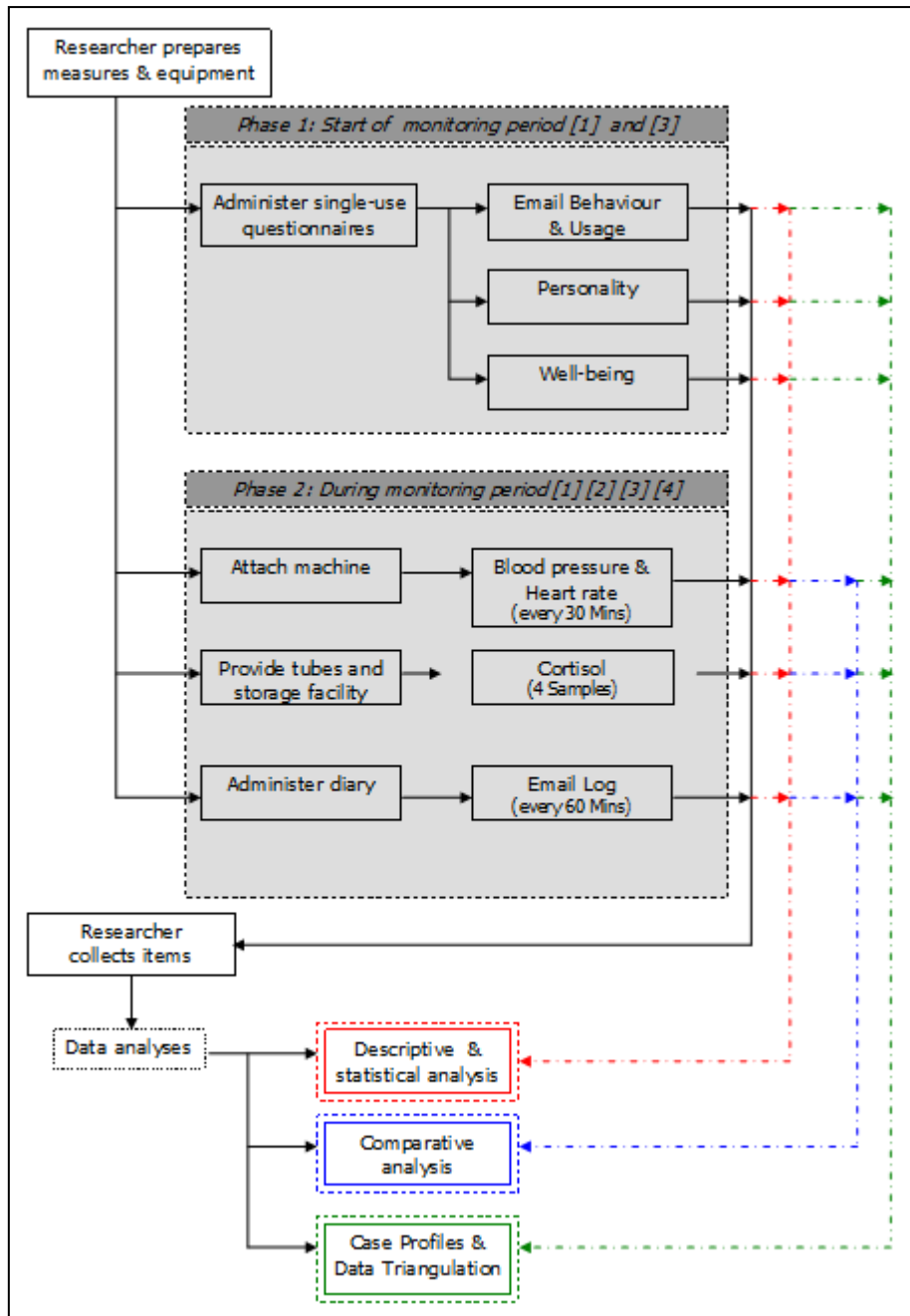
3.8.3 Collection and reporting of data

The data collection period for the ██████████ study began in January 2012 and ended in March of the same year. The researcher during this time relocated to Loughborough, Leicestershire, to ensure the research was undertaken on-site and that participants were studied within their natural workplace environment. Participants were assigned monitoring periods at random and thus results did not place any added/reduced value for variations between days of the week or times of the month during data collection. An electronic copy of individual's case profiles were delivered in June 2012.

3.9 Chapter summary

This chapter has presented a review of choices for following an appropriate research methodology, and those chosen as part of this thesis. The research approach was considered: (i) applied, embracing an inter-disciplinary and collaborative research style; (ii) conceptual, in view of a natural understanding to the phenomenon; (iii) combination of quantitative and qualitative to support the triangulation of methods; and (iv) experimental and non-experimental, to uncover relationships among variables from multiple perspectives. The research philosophy thus followed a pragmatic approach, which placed the research problem as central and valued the differences between paradigms, unlike others, to promote a mixed-method approach to research. The decision to pair both case studies and action research methods ensured a framework for presenting results and an actionable solution was achieved. A variety of data collection tools were also considered; and evidently, offering a new approach to existing literature, a unique email stress measuring methodology was presented. Finally, the research design for studies at ██████████████ and ███████████ were summarised and lessons learned, based on both researcher and participant feedback, to improve subsequent studies respectively.

The chapter completes Objective 2 (*to develop a research design to measure email stress in the workplace*). The following chapter focuses specifically on addressing Objective 3 (*to conduct a series of detailed case studies to identify and examine the effect of email use on employee stress within the* ██████████████) and achieving Objective 4 (*to evaluate the use of established email management strategies, such as 'email free time' and email filing, to manage email stress and related stressors effectively within the* ██████████████).

Chapter 4 ██████████████ Study

"The knowledge of anything, since all things have causes, is not acquired or complete unless it is known by its causes"
*** Avicenna ***

4.1 Introduction

The literature review (Chapter 2) as well as the pilot study at Loughborough University (Chapter 3) revealed the need for further research into email stress and existing email management approaches, as many lacked any form of critical appraisal, in the workplace. At the time of this study, 'email free time' had received much media attention and was shown to be a growing trend in organisations such as Deloitte, Intel, US Cellular, Atos, to combat the adverse effects of email use. The basic premise is that workers are given a temporary ban on email, e.g. several hours in the morning/afternoon or for an entire work day. Despite 'email free time''s use in the workplace there was little research to confirm, or deny, its capacity to improve email communication, stress or workplace well-being. This chapter, using the research design outlined in section 3.6, presents the results of the first ████████████████ study. This study endeavoured to address Objective 3 (*to conduct a series of detailed case studies to identify and examine the effect of email use on employee stress within the* ████████████) and achieve Objective 4 (*to evaluate the use of established email management strategies, such as 'email free time' and email filing, to manage email stress and related stressors effectively within the* ████████████).

4.2 Participant demographics

Thirty participants from the ████████████ volunteered in the study and a range of ages, gender, job roles and divisions were targeted to provide scope on the relevant issues. The participant age range varied between 27 years to 61 years, with a mean age of 46 years. On this occasion thirteen participants were male and seventeen were female. Participants varied in civil service grade[11] as shown in Figure 4.1, and from one of four divisions, shown in Figure 4.2, within the organisation (see ████████████ organisational structure illustrated in Appendix K).

Participants across the organisation were recruited following an in-house email advertisement and were a sample of workplace email users. That is, all participants used their work-provided email account on a daily basis to communicate both internally and externally on behalf of the organisation[12].

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[11] Official civil service grade structure as reported in January 2011

[12] Due to the sensitive nature of information transferred between parties, all communications (including email) at the ████████████ are protected under the Data Protection Act 1998

Figure 4.1: Distribution of civil service grades (data based on thirty participants)
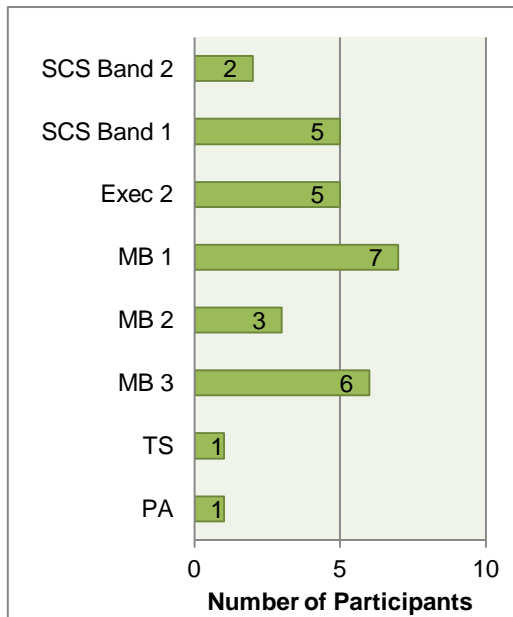
Figure 4.2: Distribution of division (data based on thirty participants)
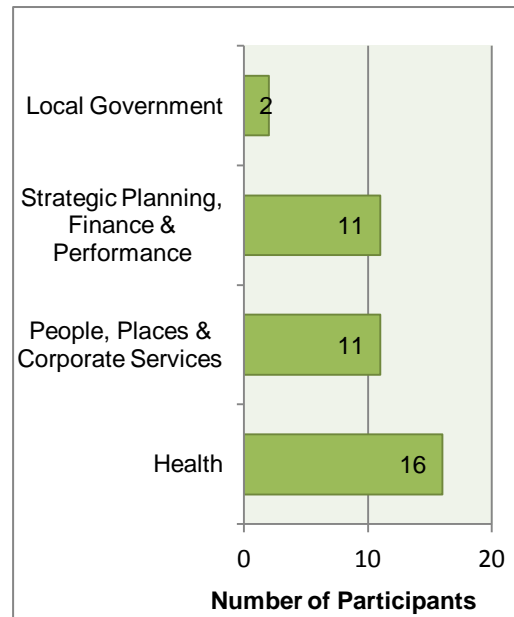
Email was typically used internally to communicate between management and staff, departments and for disseminating generic ▆▆▆▆▆▆▆▆▆ business. External email communications often varied, although the majority of which involved contacting local business and responding to general public in Wales[13]. Participants largely used the Microsoft Outlook email application for access, enabled via the government secure intranet (GSi), and proficiency levels ranged from novice to expert.

4.3 Reporting of results

The reported results of the study are illustrated in Figure 4.3 and take into consideration each phase of the study design (as described in section 3.6.2). It is worth noting that participants were first administered questionnaires (Phase 1), followed by a one-shot experimental design whereby monitoring period [1] observed the dependent variable, i.e. normal email use, and the monitoring period [2] observed 'email free time', i.e. independent variable (Phase 2). Each part of the mind map is discussed sequentially in more detail throughout this chapter, under the following sections: Results of phase 1, Results of phase 2 and Discussion.

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and Privacy & Electronic Communications Regulations. This included reference to and all particulars of content shared.

[13] Email from Robert Edwards on behalf of ▆▆▆▆▆▆▆▆▆ IT Services to Laura Marulanda-Carter, 28th April 2011.

Figure 4.3: Mind map of ████████████ study results
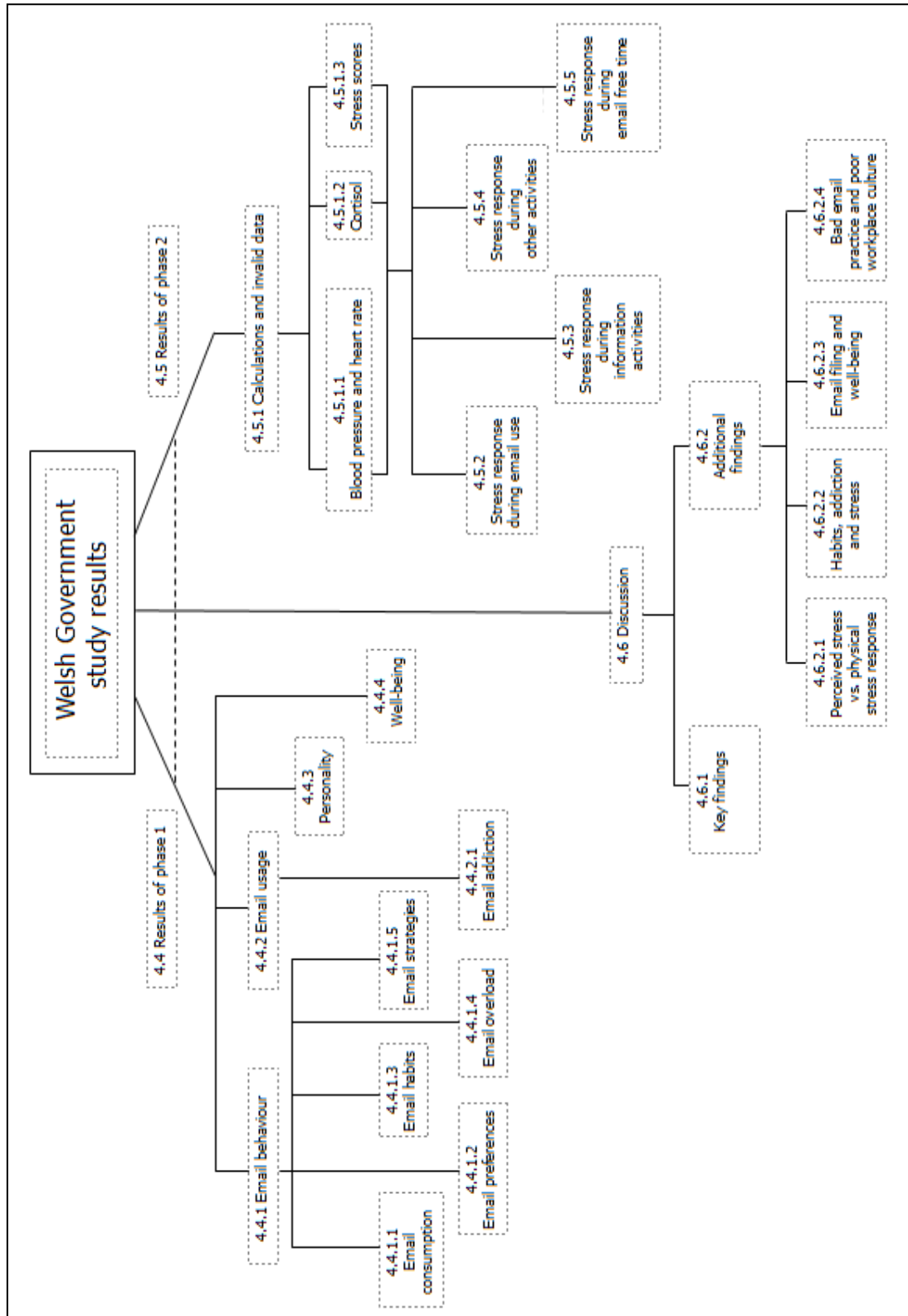
4.4 Results of phase 1

This section reports generalised findings from Phase 1 of the research design and explores the psychological view point of email stress with email behaviour, usage, personality and well-being questionnaires. Results from the email-related questionnaires were separated by the areas of enquiry.

4.4.1 Email behaviour

Participants were administered with an email behaviour questionnaire (see Appendix B). The list of responses was extensive; therefore the most common were selected, i.e. greater than 10% of all participants, for inclusion. Attitudinal questions were grouped according to subject themes and, in some cases, included more than one response. Frequency distribution graphs were used to present results. Incomplete questions were treated as invalid and not included in the findings. A total of thirty participants responded to the email behaviour questionnaire. These results are presented in the following sub-sections.

4.4.1.1 Email consumption

Participants were asked to estimate the volume of email they received and sent. These values gave an indication of how heavily email was perceived to be used within the organisation. Taken as a whole, participants claimed to have received and sent anywhere between twenty emails to more than eighty emails per day. This showed, on average, that an employee read up to forty emails, and likewise sent forty emails per day. This provided some insights into employee's perception of email consumption, as actual overall figures at the ███████████ [14] reported an average number of emails received and sent per employee were closer to forty-two and seventeen emails, respectively, per week.

Participants were then asked to describe how they would typically use their email inbox during the work day. The results found that the majority of participants (twenty-nine from thirty) would leave their email inbox open on their desktop throughout the work day, and over a third (eleven from thirty) set an email alert for new mail. These alert systems were often in the form of on-screen pop ups, noises or use of the envelope icon on their desktop taskbar. Similarly eleven participants claimed to check their inbox at regular intervals; and, for the majority of these participants (ten from eleven) this was found to be as frequent as every hour of the work day.

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[14] Email from Robert Edwards on behalf of ███████████ IT Services to Laura Marulanda-Carter, 28th April 2011.

4.4.1.2 Email preferences

Participants were asked on what occasions they were glad to receive new email, and to recall when they were annoyed to receive new email. This gained further insight into how important employees thought their emails received were. The most common responses are shown in Figure 4.4 – 'When are you glad to received new email?' and Figure 4.5 – 'When are you annoyed to receive new email?'.

Figure 4.4: Frequency of responses to 'When are you glad to receive new email?' (data based on thirty participants)
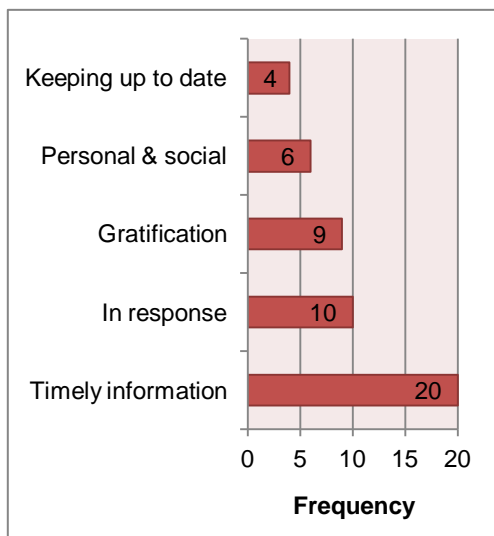
Figure 4.5: Frequency of responses to 'When are you annoyed to receive new email?' (data based on thirty participants)
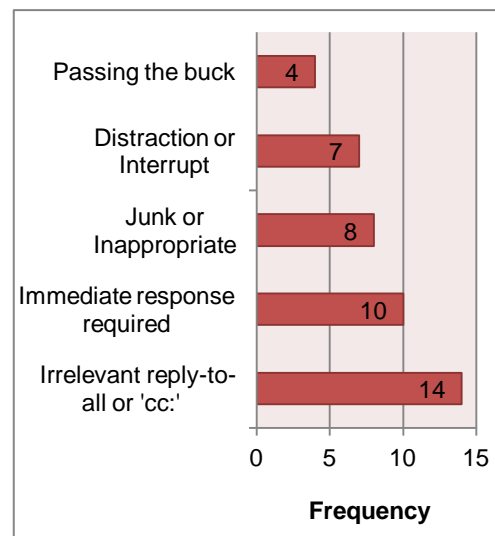
Two thirds (twenty from thirty participants) were glad to receive new email for timely information; specifically when it was relevant to a piece of work or in direct response to a previous email sent. Four participants were also found to use email as a means of keeping up to date or "*in the loop*". Information contained in emails was therefore vital in improving task performance and increasing participants' knowledge.

Gratification, as identified in Figure 4.4, refers to the notion that email can be used to obtain or achieve personal satisfaction (Dimmick 1993 & 2000). The results indicated that almost a third of participants (nine from thirty) appreciated rewarding email, such as "*well done*" and "*thank you*", in reply to work or information sent. As recognised by O'Sullivan (1996), gratification opportunities provided by email play a prominent role in the decision to use that medium as a means to communicate, and to build relationships (Stafford, Kline & Dimmick 1999). Likewise, six participants were glad to receive personal emails from friends, family and social emails from colleagues. The ███████████████ however, in the Information Security

Handbook[15], proposes a strict policy on how employees should deal with personal and social email, i.e. *"keep the number of personal emails you send to a reasonable limit (no more than a handful of messages a week) and unless urgent, avoid sending them during working hours."*

Participants also recognised a number of instances when they were annoyed to receive new email. Almost half (fourteen from thirty participants) agreed that they were carbon copied ('cc:') in irrelevant email messages unnecessarily; and many commented that *"being cc'd with useless info"* or *"emails that don't concern me"* was irritating or aggravating. Particular reference was also made to the misuse of the 'reply to all' feature, which appeared only to increase the volume of email received, e.g. it only *"duplicates another one [email]"* and is *"unnecessary"*. General email etiquette guidelines (e.g. *Emailreplies.com* 2008) advise the sparing use of 'cc:' and 'reply to all' features; and, where appropriate, should first ask the receivers' permission before sending messages (Pirillo 1999). It appears that this is not the current practice within the ██████████████, and, as such, the feature is not being used efficiently or effectively within the organisation.

Of similar concern a third of participants (ten from thirty) recognised the increased expectation for immediate email responses. Participants described feeling *"overburdened"*, *"not given enough time to process and respond"* and *"dancing to someone else's timescale"*. These difficulties had arisen after follow-up reminders were sent to the recipient requesting immediate response, otherwise coined *"chasing"* emails. In almost all cases participants felt the sender's reply expectations exceeded their capacity to meet demands e.g. *"within the hour"*, and, as expected, messages of this nature caused frustration and annoyance. The general rule is that follow-up email should not be sent earlier than 24-hours from when the first message was sent; and, if information is required urgently, i.e. within 24-hours, it should not be communicated via email and an alternative choice of medium should be used for such requests (*Business Email Etiquette* 2009).

The results also showed that a large proportion of the email received by eight participants was irrelevant or untargeted. Unsolicited email (SPAM), or junk, has been shown in previous research studies (e.g. Grimes, Hough & Signorella 2004; Rose 2004; McCusker 2005) to cost employees both time and money. The time-consuming process of deleting unsolicited emails is compounded by the time taken to retrieve spam. It is also not unheard of for organisations to be billed based on the amount of data that they download, and subsequently pay to receive spam (Gratton 2004). Whilst unsolicited email is often produced from external sources, participants identified SPAM as internal email generated by the ██████████████. In most cases these

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[15] ██████████████ Official Information Security Handbook reported in April 2011, pg. 28

were *"of no interest – weekly corporate new email – advertising spam or form filling exercises"*. Gratton (2004) suggests organisations encourage an 'opt-out' mechanism, or equally obtain consent before sending corporate email to employees.

Seven participants also indicated that email often distracts them from more important work activities, e.g. "*when in the middle of a complex task*" or "*when drafting/editing documents*", and interrupts their flow when "*arrival is untimely or disruptive*". These findings support the research undertaken by Jackson, Dawson & Wilson (2001), which identified email as a distraction in the workplace. Similarly authors (e.g. Jackson, Dawson & Wilson 2001 & 2002; Jackson & Smith 2006), as first mentioned in section 2.3.2.2, have shown that email causes interruptions to employees' work patterns and thought processes as their attention is sidetracked. It is also shown to cost workers, on average, sixty-four seconds to recover and return to normal work tasks after an email interruption, which is significantly less than recovery times reported for a telephone call (Jackson, Dawson & Wilson 2001 & 2002).

Four participants also acknowledged email would, on some occasions, be used as a means to blame others for one's mistakes or as a way to "*pass the buck*", e.g. when *"people try to transfer work which is really for them"* or *"emails passing work which is not normal duty – i.e. passing the buck by email"*. It is unsurprising that results found participants often preferred to use more traditional means of communication such as telephone or face-to-face meetings instead of email. Nevertheless, due to email's ease of use, it remains the more favoured communication medium of choice by participants, e.g. *"I prefer to talk face to face but [it is] often faster to email"; "Whenever possible I pick up the phone but the need to multi task doesn't always allow for this"; "I much prefer to meet in person but am often asked to confirm discussion by email"*

4.4.1.3 Email habits

Participants were asked to give their opinion on what they thought were the good and bad things about having email in the workplace. This was used to gain further insights into why employees routinely use email and the patterns that exist in the organisation with regard to its use. The most common responses are shown in Figure 4.6 – 'What are the good things about having email at work?' and Figure 4.7 – 'What are the bad things about having email at work?'.

Figure 4.6 Frequency of responses to 'What are the good things about having email at work?' (data based on thirty participants)
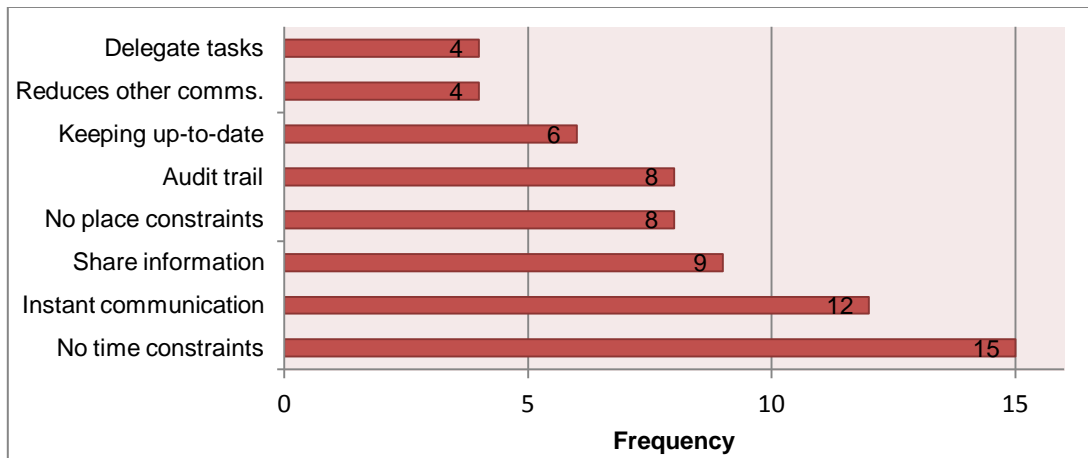
Figure 4.7 Frequency of responses to 'What are the bad things about having email at work?' (data based on thirty participants)
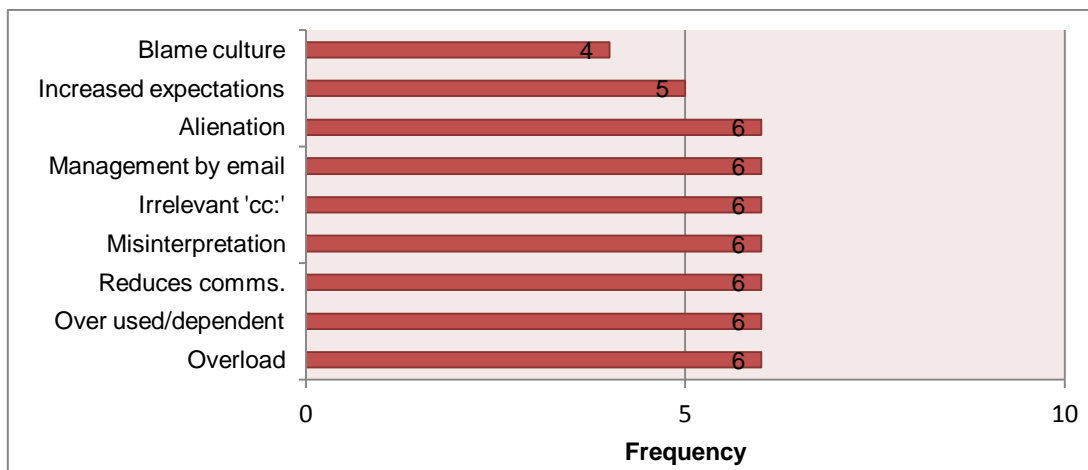
Participants recognised a number of benefits, many of which matched those raised regarding email in the literature (previously discussed in section 2.2), e.g. not limited by time (fifteen participants) or place constraints (eight participants), an instant communication medium (twelve participants) to share information (nine participants) and for keeping up-to-date (six participants). In addition to those, four participants recognised that email was used to replace other forms of communication, e.g. *"reduces need for phone calls [and] face to face meetings"*. Furthermore, the same number of participants acknowledged that email allowed them to delegate tasks to others in their team with ease, e.g. *"It's a useful tool for our work: sharing information, passing on docs, delegating, communicating"*.

Over a quarter of participants (eight from thirty) were found to benefit from email's ability to generate an audit trail, and this was often used within the ▮▮▮▮▮▮▮▮▮▮ as evidence of work sent and received. Audit trails are

the easiest and most efficient method to record, track and log all actions that have been taken on an email message, and should be applied to all computer-based electronic evidence to ensure its creation and preservation (*MailFrontier* 2005; *Metropolitan Police* 2007). As a communication medium, with the ability to exchange information, it is unsurprising that email has been used as electronic evidence and is increasingly being accepted as evidence in the court of law (*Out-Law News* 2003).

Participants also recognised a number of adverse effects of email use in the workplace. These included issues of email overload (six participants), overused/dependent, e.g. addicted to email (six participants), irrelevant carbon copying (six participants), and increased expectations of immediate response (five participants). The former support previous research findings identified in Chapter 2 and the latter is addressed in section 4.6.2.2. However, contrary to those participants who recognised that email was useful for reducing alternative communication mediums, e.g. *"reduces need for phone calls [and] face to face meetings"*, six participants documented the same feature as an undesirable effect of email in the workplace. It was raised on a number of occasions that email was often used when *"a phone call or visit would be a more appropriate communication channel"*. This discrepancy suggests that the expectations and realistic use of email vary within the ███████████ depending on employees' preference; thus what may be seen by some as useful or constructive, for others causes annoyance or acts as a hindrance.

The results also showed that six participants often found email to be easily misinterpreted. This was often contributed to by "*people's styles of writing emails - e.g. use of 'wooly' language – that cause unnecessary confusion which leads to extra time spent trying to interpret them*". Additionally it was also recognised that "*you miss out on body language, voice, etc. and once sent they [email] are difficult to take back*". Email misinterpretation was found to stem from unread email, sending email to the wrong person and, misspelling or sending incorrect content. Etchells (2008) proposes that whilst these practices are not going to bring the organisation to a grinding halt, they are considered small, irksome things which, in their totality, do impair efficacy and reduce the value email delivers to the organisation.

Participants also raised a number of email-related concerns that gave great insights into the workplace culture at the ███████████. The following responses suggest that some managers had a tendency to manage their staff via email, e.g. *"email is used as workflow"* and "*it [email] promotes lazy management"*. In all cases this behaviour infuriated colleagues, e.g. "*I hate being managed via email which seems to be a standard practice in the office environment"*. Furthermore six participants were, or witnessed cases of others, alienating themselves in the workplace. One participant reported that

"people can hide behind email and it encourages solo working", and in another case, a participant was found to enjoy the fact that they could *"avoid human contact if [I] don't wish to speak with anybody"*. It was also evident, for some participants, that the wealth of information contained in email was sometimes used by more senior employees as a way to gain or retain power over others, e.g. *"information is frequently not copied or cascaded, but kept to those in the senior team"*.

In much the same way, a small number (four participants) identified that email nurtured a "cover your back" culture; e.g. *"[email] perpetuates the blame culture"* and *"too many people hide behind email – culture of covering backs!"* This informal, although popular, phrase has been used to describe situations where someone makes sure they cannot be blamed or criticised later for something they have done. Participants, in this case, observed situations where others felt the need or pressure to send email to ensure workers were kept informed, and likewise could not blame them if problems emerged in future. This type of behaviour often perpetuates the number of emails sent and increases time spent dealing with emails received as participants copy *"just in case"*. Research by Woodcock (1989) suggests that employees who are encouraged to be open and are not punished for what they do, think or feel, will cultivate a 'no-blame' culture in the workplace.

4.4.1.4 Email overload

Participants were asked to identify if they had previously suffered email overload in the workplace, and the approach they adopted to relieve overload or, if appropriate, an explanation as to why they did not feel overloaded. This was used to distinguish between employees' perception of email overload, and discover existing techniques used to manage these issues. The distribution of participants whom claimed to have suffered email overload is shown in Figure 4.8.

Figure 4.8: Distribution of participants who suffered email overload (data based on thirty participants)
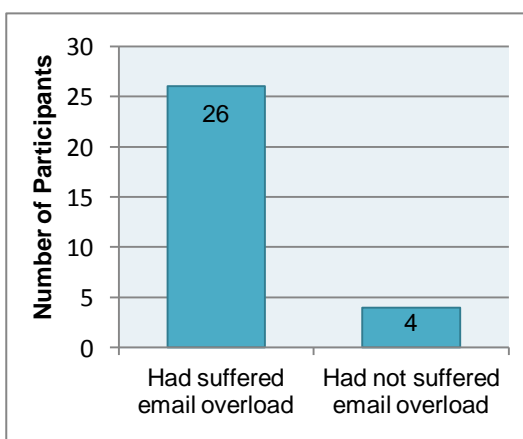
Figure 4.9: Frequency of responses to 'How to relieve overload of email?' (data based on twenty-six participants)
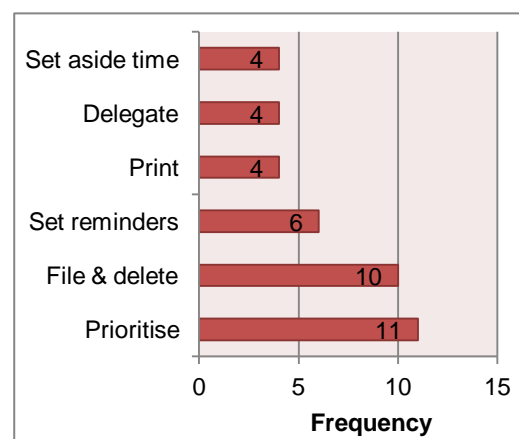
As previously mentioned in section 2.3.2.3, email overload occurs when the volume of email received and sent is no longer manageable, i.e. problems in reading and replying within a timely manner, backlogs of unanswered email and unable to retrieve information from email systems (Whittaker & Sidner 1996). Twenty-six participants who self-reported to have suffered email overload also adopted some type of strategy to relieve overload; see responses shown in Figure 4.9.

Participants attempted to combat email overload in a number of ways, e.g. filing and deleting email (ten participants), printing email in order to reduce the volume of email in the inbox (four participants), and/or set reminders for more important emails to deal with at a later date (six participants). For eleven participants email overload had been managed through the organising of incoming emails into high-low priorities. In most instances the focus for participants was to deal with, and manage, the volume of email received. However, it was noted by one participant that in some cases it was *"not the volume of email [but] the content of the emails that dictates workload"*.

Furthermore, the results showed that four participants set aside a period of time to deal with emails. However, for all of these participants this was found to be in their own personal time, i.e. out of work-hours, to *"catch up"* or *"clear as many as possible"*. In other instances four participants delegated emails to colleagues or subordinates whenever possible. These latter comments, more often than not, derived from senior management that had personal assistants, either part-time or full-time, who typically managed email on their behalf. Despite participants' efforts to relieve overload, some commented that they *"cannot relieve overload of email"* and it was not unheard of for them to adopt an *"if it's urgent, I'll hear about it again"* approach. It would be fair to assume that employees with this attitude often generated *"chasing"* emails (as mentioned in section 4.4.1.2).

Nevertheless, a small group (four participants) had never suffered from email overload in the workplace. In one case a participant suggested they received *"too little rather than too much"* email. Another participant acknowledged that in the past they had received high volumes of email however had *"learned to focus on the job in hand so as not to get distracted"*. Similarly, another participant advocated the need for *"regular meetings to discuss work rather than using email excessively"*. Alternative means to communicate, such as telephone and face-to-face meetings, were often sought to reduce email traffic and prevent overload. However email remains the more favoured communication medium of choice by these participants.

4.4.1.5 Email strategies

Participants were asked to identify their preferred choice of email filing; based on the filing classification of Whittaker & Sidner (1996). The

distribution of participants filing strategies is shown in Figure 4.10. Participants were categorised into one of three groupings:

(i) No Filers (no use of folders)
(ii) Frequent Filers (folder users who   try and clean up their inbox daily)
(iii) Spring Cleaners (folder users who clean up their inbox periodically).

Results found the majority of participants (twenty-six from thirty) adopted some kind of filing strategy when managing email. On this occasion, over half of participants (fourteen from thirty) filed email as and when necessary, whereas others (twelve participants) filed their email inbox every day. In all cases, emails were filed manually and without the use of automated classification tools (as identified in section 2.4.3). The results revealed only a small number (four participants) did not file their email inbox whatsoever.

Figure 4.10: Distribution of participants' choice in email filing strategy (data based on thirty participants)
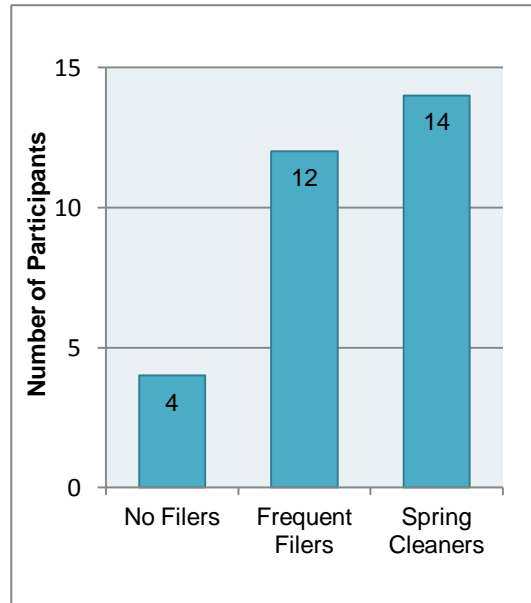
4.4.2 Email usage

Participants were administered with an email usage questionnaire (see Appendix C) to identify levels of email addition from a combination of clinical and behavioural characteristics. As a result, participants' responses yielded two relations: (i) email addict, i.e. email dependent, and (ii) non-email dependent. Email addiction was classified with five or more positive responses to eight questions from each criterion, i.e. 'yes' in criteria 1 and 'most often' in criteria 2; hence participants could conceivably have a low subscale score in one criterion and high subscale score in another. From the thirty participants sampled, a total of twenty-eight participants responded.

4.4.2.1 Email addiction

Based on the twenty-eight participants who responded, the distribution of those classified with email addiction are shown in Figure 4.11. Results revealed the majority (eighteen from twenty-eight participants) were not dependent upon email. Nevertheless, ten participants were classified as an email addict. Of this total, nine participants were dependent based on criteria 1 and three based on criteria 2. Taken as a whole, only two participants were classified email addict on both criterion.

Figure 4.11: Distribution of participants classified with email addiction (data based on twenty-eight participants)
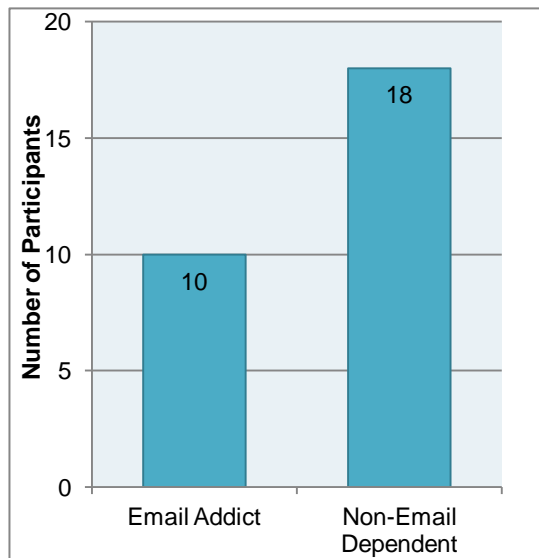
The frequency distribution, for each criterion (ranked most common to least common) in Table 4.1, showed that for the most part participants, even though not classified as an email addict, associated themselves with a range of addictive habits and practices with email at work. The most common clinical characteristics identified were feeling preoccupied with email (twenty-one participants), staying on email account longer than originally intended (nineteen participants), and feeling restless, moody, depressed, or irritable when attempting to cut down or stop email use (fifteen participants). Furthermore, the most common behavioural characteristics identified were the need to open email first (twenty-three participants), keeping more than 100 items within inbox at any one time (seventeen participants), and leaving email program open on desktop between sessions (seventeen participants).

4.4.3 Personality

Participants were administered with a personality questionnaire (see Appendix D), based on the Big Five Inventory (BFI) scale by John, Naumann & Soto (2008), to identify five fundamental personality traits; including openness/closed minded, conscientious/disorganised,extraverted/introverted, agreeable/disagreeable, and relaxed/neurotic (Digman 1990). The data for each participant was input online (at Oliver 2000) and relevant feedback and scores extracted accordingly. Thirty participants responded to the questionnaire and all results were valid. The frequency distribution for each of the five personality traits are shown in Table 4.2.

Table 4.1: Frequency distribution of most common email addiction characteristics from participants with email addiction and non-dependent classifications (data based on twenty-eight)

Email Addiction Responses	Frequency		
	Email Addicts	Non-dependents	Total
Criteria 1: Clinical Characteristics			
Felt preoccupied with email	10	11	21
Stayed on email account longer than intended	8	11	19
Felt restless, moody, depressed or irritable when attempting to cut down or stop	9	6	15
Felt the need for more time to read emails	7	6	13
Repeated unsuccessful efforts to control, cut back or stop email use	8	4	12
Jeopardised or risked the loss of relationship, job, education or career opportunity	4	1	5
Used email as a way of escaping problems or relieving dysphoric mood	3	1	4
Lied to work members, friends or others to conceal email use	1	1	2
Criteria 2: Behavioural Characteristics			
Opened email first before doing anything else	9	14	23
Keeps more than 100 items in inbox at all times	6	11	17
Leaves email program open on screen between sessions	8	9	17
Checks for new emails on an hourly basis or less	7	3	10
Stops task, irrelevant of importance, to answer email	4	1	5
Looks up every time computer announces new email	3	2	5

Table 4.2: Frequency distribution of personality traits (data based on thirty participants)

	Personality Trait	Description of Trait	Frequency
Big Five Scale 1	Openness	Open to new experiences	13
	Closed Minded	Conventional, Traditional	17
Big Five Scale 2	Conscientious	Reliable, Well organised	23
	Disorganised	Haphazard, Messy	7
Big Five Scale 3	Extraverted	Social, Enjoys company of others	19
	Introverted	Reserved, Enjoys alone time	11
Big Five Scale 4	Agreeable	Forgiving, Considers the feelings of others	22
	Disagreeable	Irritable, Easy to express irritation in others	8
Big Five Scale 5	Relaxed	Calm, Composed in situations	25
	Neurotic	Nervous, Anxious	5

Previous research by Sheldon *et al*. (1997) suggested a dynamic relationship exists between the big-five traits and the degree of authenticity a person feels within a particular job role. That is, the more genuine and self-expressive employees feel within a given role, the more times they scored highly in OCEAR personality traits, i.e. open to new experience, conscientiousness, extraverted, agreeable and relaxed. Participants' responses revealed that one sixth (five from thirty participants) had a combination of traits associated to high authenticity. Later research by Sheldon *et al*. (1997) reported that greater feelings of authenticity were negatively correlated with anxiety, stress and depression, and positively correlated with self-esteem. In main stream psychology, authenticity is considered as the most fundamental aspect of well-being. Many researchers (e.g. Horney 1951; Rogers 1961; Winnicott 1965; Yalom 1980) suggest authenticity is not simply an aspect or precursor but rather the very essence of healthy functioning (Wood *et al.* 2008, p.386).

4.4.4 Well-being

Participants were administered with a Likert-type scale well-being questionnaire (see Appendix E), designed to value how unpredictable, uncontrollable and overloaded employees found their lives. This was used to measure the degree to which participants appraised their life as stressful and to give an indication of their psychological stress levels within the workplace. A Perceived Stress Scale (PSS) score of 0 to 40 could be achieved, and on this occasion categorised into low (less than 15), neutral (16-24) and high (greater than 25) stress categories. Thirty participants responded to the questionnaire and all results were valid. The distribution of perceived stress scores are shown in Figure 4.12.

Figure 4.12: Distribution of perceived stress scores (data based on thirty participants)
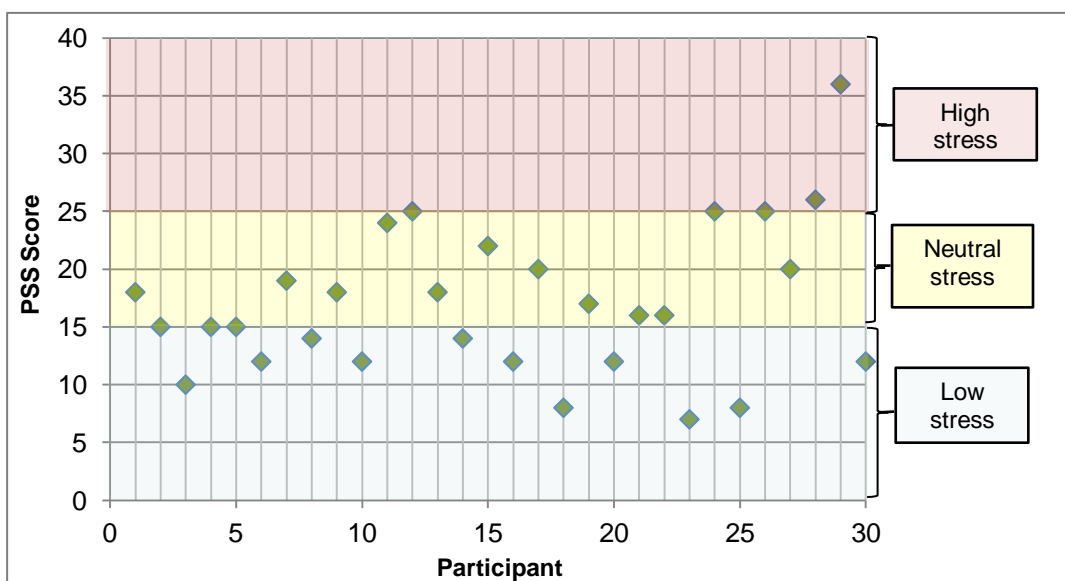
The data reported ranged from scores of 7 to 36, and were found to be not normally distributed, i.e. skewed. This was supported with differences between overall mean (17.03) and median (16) values. The results revealed that the majority of participants (twenty-five from thirty) perceived themselves to have relatively low or neutral stress; with only five participants reporting high stress, in the workplace.

4.5 Results of phase 2

This section reports the generalised findings from Phase 2 of the research design and explores the physiological view point of email stress observed through blood pressure, heart rate, cortisol, and email diaries. Results from the former observations were combined to create a stress response and cross-referenced with diary entries separated by activities.

4.5.1 Calculations and invalid data

Participants were provided with Spacelabs ABP machine to measure blood pressure and heart rate, test tubes to collect saliva-samples for cortisol testing and administered email diaries to record activities, across two monitoring periods. The first monitoring period collected data during normal email use, and the second after the introduction of 'email free time', i.e. minimum three hours of no email use. As such, the results from each of the monitoring periods are based on either Day 1 (Email Use) or Day 2 (Email Free Time). Despite these labels, some participants used email during Day 2; these activities were not deemed 'typical', due to the 'email free time', and excluded from the aforementioned 'email use' results. However, where appropriate, extracted results from Day 2 to be solely reflective of 'email free time', i.e. Day 2 (Email Free Time only), were used for comparison.

Participants generated the following data:
- Day 1 (Email Use) and Day 2 (Email Free Time) blood pressure readings
- Day 1 (Email Use) and Day 2 (Email Free Time) heart rate readings
- Day 1 (Email Use) and Day 2 (Email Free Time) cortisol readings
- Day 1 (Email Use) and Day 2 (Email Free Time) diary entries, including email activities and stress scores.

For the purpose of clarity, the adjective 'stress response' was defined as an increased or decreased response observed from blood pressure, heart rate, cortisol or stress scores during a recorded activity. The calculations used to form the basis of a stress response are detailed in the next sections.

4.5.1.1 Blood pressure and heart rate

For the purpose of this study the baseline was the computed blood pressure, i.e. mean arterial pressure (MAP) [= [(2 x diastolic) + systolic] / 3], and heart rate averages across Day 1 and Day 2, separately, for each participant. Participants thus acted as their own baseline for each monitoring period

whereby an increase above baseline indicated elevated stress or, likewise, decrease below baseline indicated reduced stress, during recorded activities. From the sixty monitoring periods possible from this study, i.e. thirty participants during two monitoring periods, one tenth of blood pressure and heart rate recordings were missing. Participants on these occasions had either failed to attach/remove machine according to instructions or were unable to wear the machine during the allocated period. In addition, little over one tenth of blood pressure, and a small group of heart rate, readings were considered invalid. Readings on these occasions appeared outside normal range and were not included in the analysis or results[16]. Phase 2 results were thus based on a total of forty-seven blood pressure, and fifty-one heart rate, monitoring periods.

4.5.1.2 Cortisol

Mean cortisol values were computed for each interval during Day 1 and Day 2 respectively, i.e. at the start of the monitoring period (Sample 1 AM), before lunch (Sample 2 AM), in the afternoon (Sample 3 PM) and at the end of the day (Sample 4 PM), from all valid samples collected. For the purpose of this study, these mean values were considered the baseline for each monitoring period and used for within group comparison. From the two hundred and forty saliva samples possible, i.e. thirty participants during two days completing four samples, almost one quarter were missing. On these occasions participants either failed to remember or only partial saliva samples were collected. In addition, a small group of samples were considered invalid. Readings on these occasions appeared outside normal range and were not included in the analysis or results[17]. Phase 2 results were thus based on a total of one-hundred and seventy-six saliva samples.

4.5.1.3 Stress scores

As noted in section 3.5.2.4, a rating scale question (i.e. how stressed have you felt over that time period?) was used in the email diaries to gather a perceived perception of stress during recorded activities. An equidistant presentation of scales, i.e. 1 to 10 (1=Low, 10=High), were used. The mean stress scores were calculated and used as the baseline for each monitoring period whereby an increase above the baseline indicated elevated stress or, likewise, decrease below baseline indicated reduced stress. Participants thus acted as their own baseline for each monitoring period. From the sixty email diaries collected, i.e. thirty participants completing two email diaries, a sixth were missing. On these occasions participants' either failed to remember, or

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[16] On those occasions that results appeared outside normal range participants were informed, paper-based results provided and all were advised to visit their general practitioner (GP) or medical professional.
[17] Ibid

chose not, to record responses. Phase 2 results were thus based on a total of fifty monitoring periods.

4.5.2 Stress response during email use

Participants' blood pressure, heart rate and cortisol were monitored to discover if employees experienced a stress response when using email in the workplace. Based on data collected from Day 1 (Email Use), a total of eighteen participants recorded using email exclusively, i.e. not alongside other activities, during the work day. A tally of the number of instances each of these participant's blood pressure and heart rate increased during email use were recorded. Results found the majority (sixteen from eighteen participants) displayed an increased stress response, with many recording increased blood pressure (total of forty-four instances) and heart rate (total of thirty-two instances). Figure 4.13 illustrates one example of increased blood pressure, and increased heart rate, during email use.

Figure 4.13: Snapshot of Participant #11 showing increased blood pressure and heart rate during email use
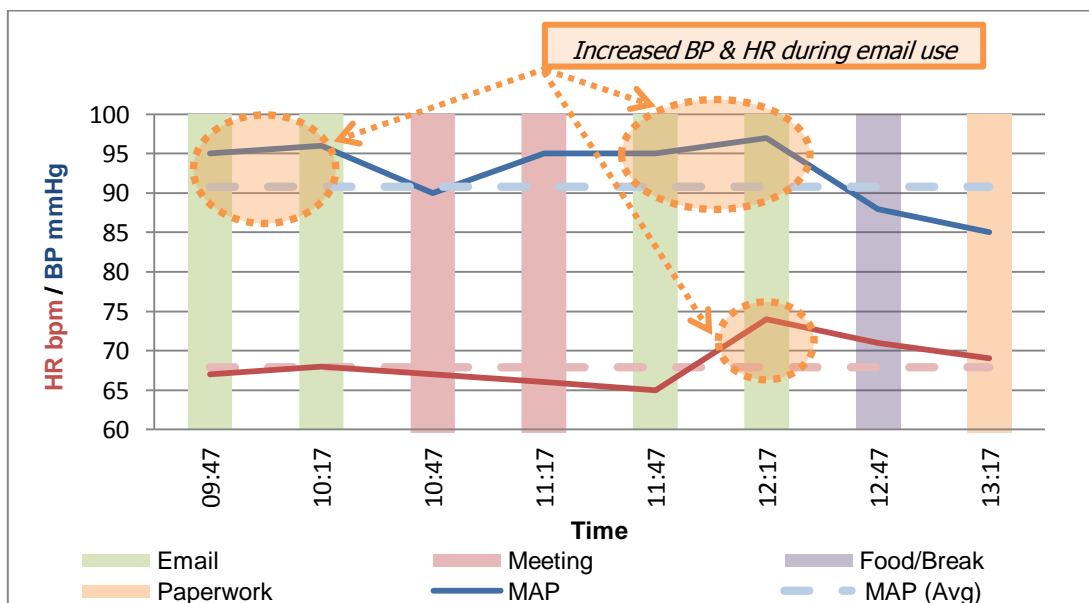
As illustrated in Figure 4.14, the mean cortisol recorded from all thirty participants, i.e. ninety samples collected in Day 1 (as indicated with the red line on Figure 4.14), demonstrated a normal cortisol metabolism curve and diurnal rhythm; with highest levels observed in the early morning followed by continued gradual decline and lowest levels reported at the end of the day (Talbott, 2007 p.44). However, the aforementioned sixteen participants who showed increased blood pressure and heart rate during email use (as indicated with the green line on Figure 4.14) were instead found to release constant cortisol concentration levels in the body between Sample 2 (mean nmol/l = 0.709) and Sample 3 (mean nmol/l = 0.7). This indicated a heightened cortisol response occurred for those participants during email

use, which both supports blood pressure and heart rate readings, and is a key display of participants' sustained or raised levels of stress.

Figure 4.14: Mean cortisol levels recorded during Day 1 (Email Use) and participants with increased blood pressure and heart rate during email use

	S1 (AM)	S2 (AM)	S3 (PM)	S4 (PM)
Mean cortisol during Day 1 Email Use (thirty participants)	0.804	0.744	0.669	0.571
Mean cortisol of participants with high blood pressure and heart rate during email use (sixteen participants)	0.806	0.709	0.7	0.606
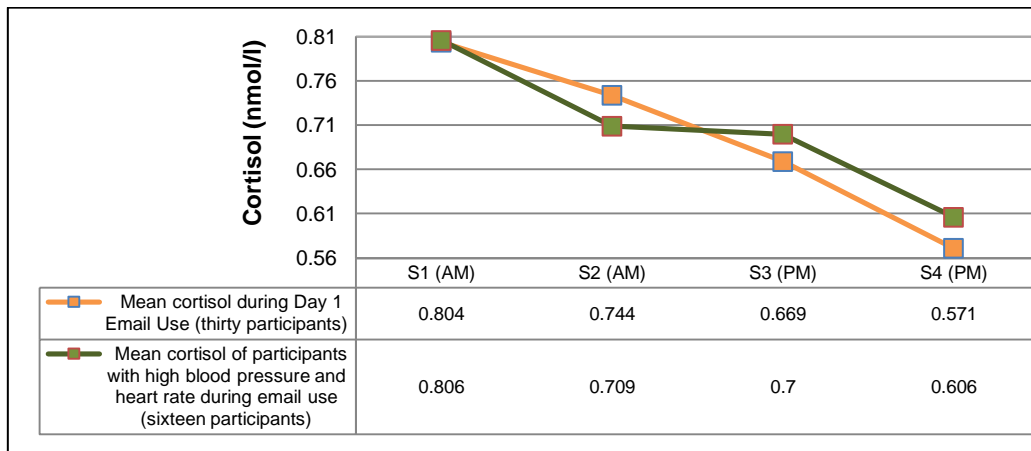
Based on data collected from Day 1 (Email Use), a total of fourteen participants recorded perceived stress scores during email use. Results found only a handful of participants (two from fourteen) recorded high perceived stress, whereas the majority recorded either low (five participants) or the same (seven participants) stress scores during email use. This somewhat contradicts earlier reported findings from collective blood pressure, heart rate and cortisol readings, which suggest that email induced an increased level of stress during the same periods. Figure 4.15 illustrates an example of one participant recording low perceived stress despite showing high blood pressure readings during email use. Discrepancies between perceived and physiological stress are addressed in section 4.8.2.1.

Figure 4.15: Snapshot of Participant #5 showing low perceived stress score and increased blood pressure during email use
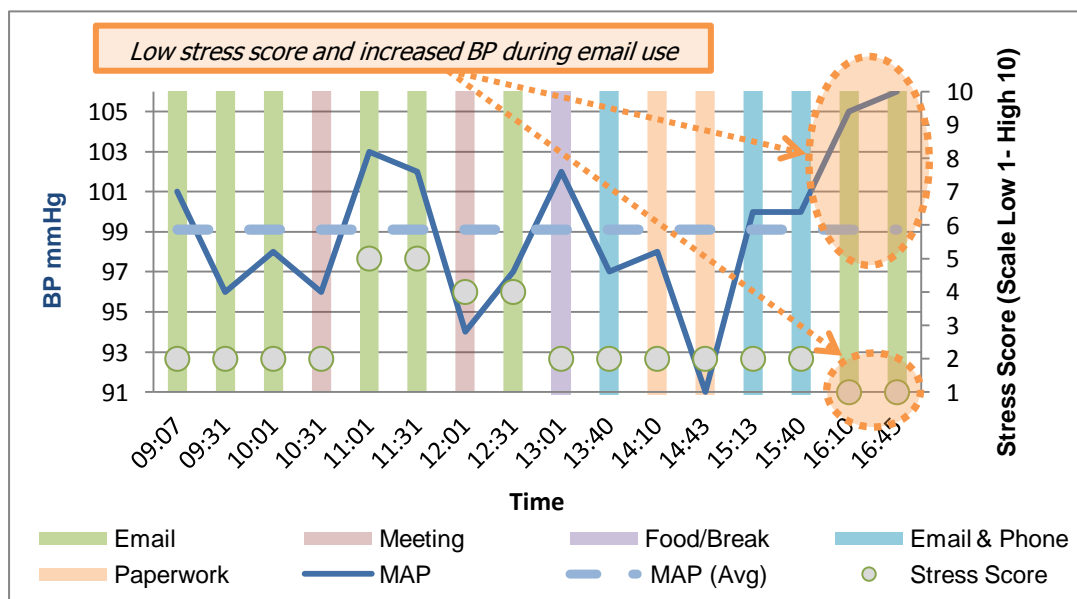
4.5.3 Stress response during information activities

A total of twenty-six participants recorded the email tasks they carried out, e.g. reading, sending, filing and finding email, during Day 1 (Email Use). These tasks were categorised into relevant activities, i.e. information gathering (IG), information sharing (IS), information management (IM) and information retrieval (IR), to discover if employees experienced a stress response in the workplace. The need to generate an overall picture of what activities email was being used for in the workplace were considered necessary. The most common email tasks and information activities carried out by participants are shown in Table 4.3. A tally of the number of instances each participant's blood pressure, heart rate and stress scores increased during these tasks were recorded.

Table 4.3: Information activities recorded during Day 1 (Email Use) and tally of increased blood pressure, heart rate and stress score instances (data based on twenty-six participants)

Email Task	Information Activities	Number of participants	Number of instances		
			BP	HR	SS
Reading and sending	IG & IS	19	37	31	11
Reading, sending and filing	IG, IS & IM	8	12	3	6
Reading, sending and finding	IG, IS & IR	7	6	7	1
Reading, sending, filing and finding	IG, IS, IM & IR	6	16	12	2
Reading	IG	5	2	3	2
Reading and filing	IG & IM	3	4	4	2
Sending	IS	2	2	0	0
Reading, filing and finding	IG, IM & IR	1	1	0	0
Finding	IR	1	0	0	1
Filing and finding	IM & IR	1	0	0	0

Despite the results not showing the volume or content of email received and sent during the monitoring period[18]; based on data collected from Day 1 (Email Use) nineteen participants most frequently recorded tasks involving reading and sending email, i.e. gathering and sharing information. During this activity participants often showed an increased stress response and, on the whole, recorded the majority of increased blood pressure, heart rate and stress score instances. On the other hand, the results also revealed that filing and finding email, i.e. managing and retrieving information, were generally the least frequently recorded tasks and caused few instances of negative stress. The results thus indicate that employees were more prone to increased stress during information gathering and sharing activities, and less susceptible during information management and retrieval activities.

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[18] Due to the sensitive nature of information transferred between parties, all communications (including email) at the ▮▮▮▮▮▮▮▮ are protected under the Data Protection Act 1998 and Privacy & Electronic Communications Regulations. This included reference to and all particulars of content shared.

It was also observed that participants frequently multitasked over two or three different activities at the same time; as opposed to processing tasks and activities consecutively. The impact of multitasking in the workplace is extended in the next section of this chapter.

4.5.4 Stress response during other activities

Participants' blood pressure, heart rate and cortisol were monitored to discover if employees' stress response varied when multitasking email alongside other workplace activities. The need to generate an overall picture of how email is used in the workplace was considered necessary. Based on data collected from Day 1 (Email Use), thirteen participants recorded using email & phone, seven participants recorded email & meetings and six participants recorded email & paperwork.

Results showed the majority of participants (twelve from thirteen) displayed an increased stress response during email and phone use, with many recording increased blood pressure (total of twenty-three instances) and heart rate (total of fourteen instances); example illustrated in Figure 4.16.

Figure 4.16: Snapshot of Participant #10 showing increased blood pressure and heart rate during email & phone use
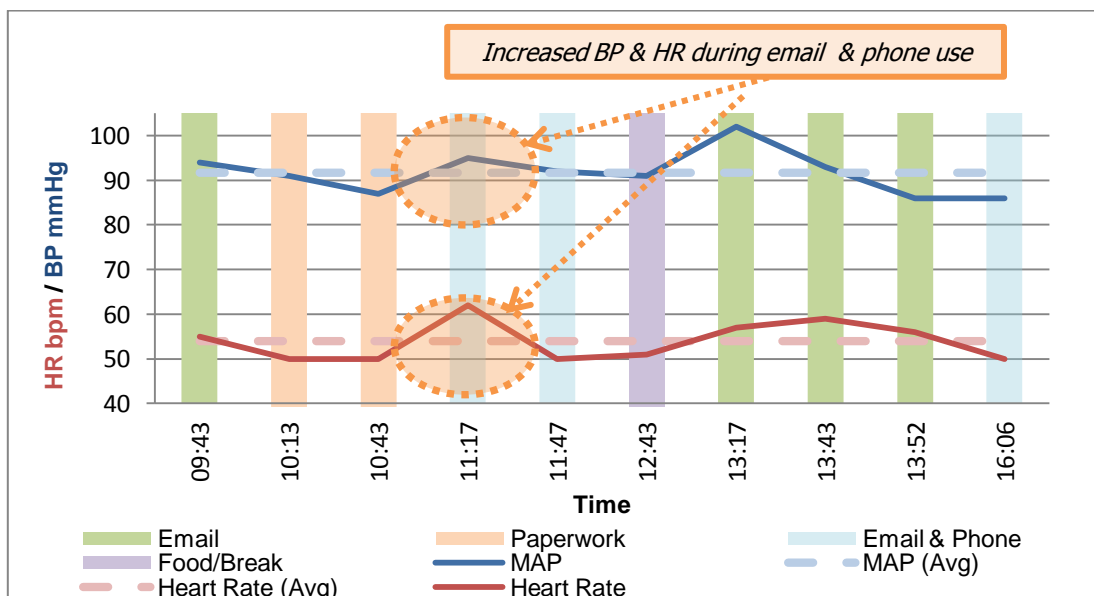
Likewise, all seven participants who recorded using email alongside meetings displayed an increased stress response, example illustrated in Figure 4.17, and overall showed instances of increased blood pressure (total of thirteen instances) and heart rate (total of ten instances). Together, these results indicate that email & phone, and email & meeting activities, generally, generated increased stress among employees.

Figure 4.17: Snapshot of Participant #25 showing increased blood pressure during email & meeting
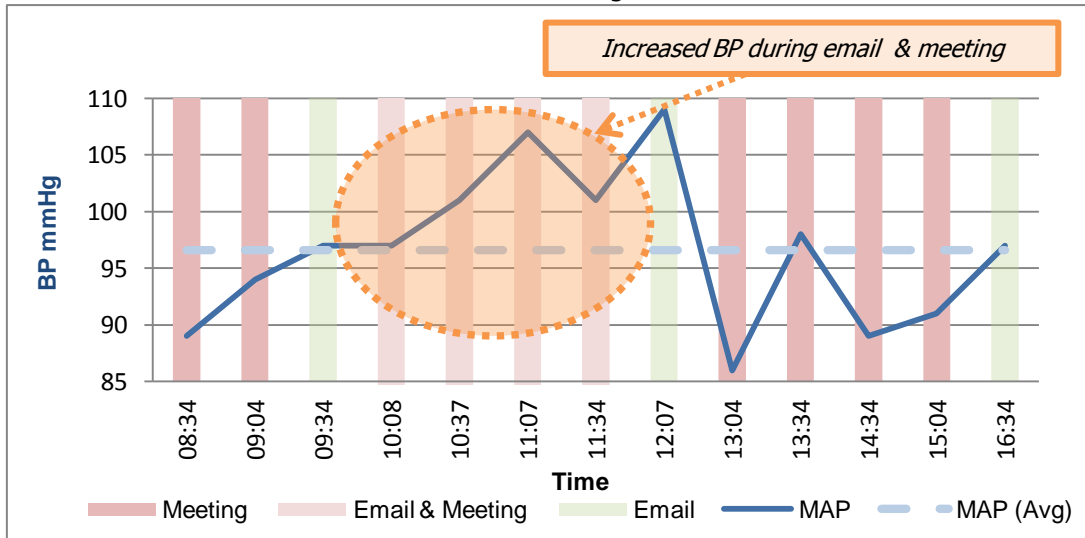
In contrast, when participants recorded using email alongside paperwork, as illustrated in Figure 4.18, results showed the majority (five from eight participants) experienced a decreased stress response, i.e. lowered stress, and repeatedly showed instances of decreased blood pressure (total of seventeen instances) and heart rate (total of sixteen instances) .

Figure 4.18: Snapshot of Participant #20 showing decreased blood pressure and heart rate during email & paperwork
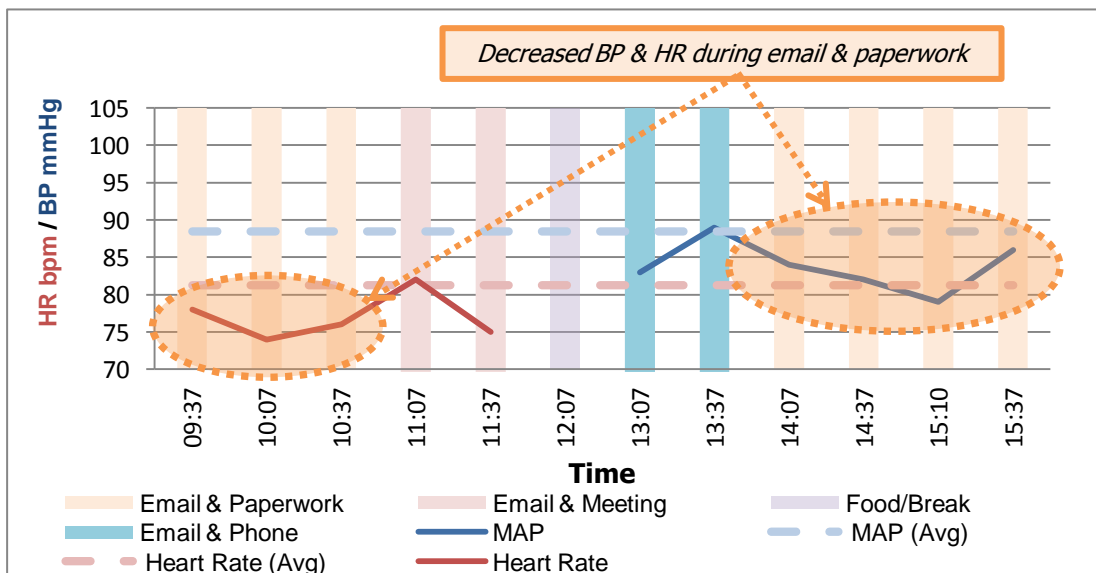
Participants' perceived stress scores on the hand during these email tasks recorded fewer instances of increased stress during email and phone (total of seven instances), email and meetings (total of four instances) and, decreased scores during email and paperwork (total of two instances) from the same number of people. Thus indicating perceived stress is only loosely supportive of collective findings from corresponding physical stress findings, i.e. blood pressure and heart rate readings.

The overall results nonetheless indicate employees that multi-task email alongside other communication media, such as phone and face-to-face meetings, generally suffered more stress. This was compared to non-communication based tasks, such as paperwork, which alongside email appeared to induce less stress among employees in the workplace. Associated email volume, content and conditions surrounding the activities carried out by participants were however not examined[19].

4.5.5 Stress response during email free time

Participants' blood pressure, heart rate and cortisol were monitored to discover if employees' stress response varied during 'email free time'. Table 4.4 summarises the differences in blood pressure and heart rate during Day 1 (Email Use) and Day 2 (Email free time only) for all thirty participants. The results revealed higher blood pressure (eleven participants), heart rate (thirteen participants) and a combination of the two (six participants) during Day 1 (Email Use) when compared to Day 2 (Email free time only). This suggests that 'email free time', i.e. ban on email use for a consecutive period of three hours or more, generated on the whole a more decreased stress response, i.e. decreased stress, within the ███████████████.

However, based on the total number of cortisol values recorded during Day 1 (Email Use) and Day 2 (Email free time only), ninety and fifty-two samples respectively, a comparison found both periods to be of similar concentration and followed a normal metabolism curve and diurnal rhythm. Therefore, as illustrated in Figure 4.19, the cortisol results suggest there is no difference between email use and 'email free time'.

Figure 4.19: Mean cortisol levels recorded during Day 1 (Email use) and Day 2 (Email free time only)

	S1 (AM)	S2 (AM)	S3 (PM)	S4 (PM)
Mean cortisol during Day 1 (Email Use)	0.804	0.744	0.669	0.571
Mean cortisol during Day 2 (Email free time only)	0.828	0.736	0.644	0.557

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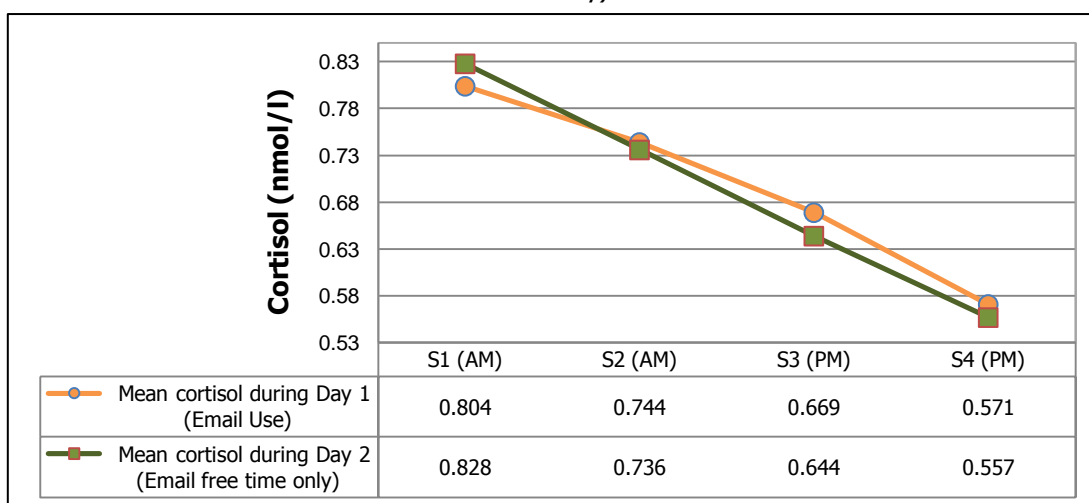
[19] Ibid

Table 4.4: Blood pressure and heart rate during Day 1 (Email Use) and Day 2 (Email free time only)

Participant ref#	Mean during Email Use	Mean during Email Free	± dif	Participant ref#	Mean during Email Use	Mean during Email Free	± dif
1	MAP: 99.6	MAP: 99.7	+0.1	16	MAP: 96.8	*O.N.R*	---
	HR: 69.7	HR: 65.2	- 4.5		*O.N.R*	HR: 99.3	---
2	MAP: 106.3	*O.N.R*	---	17	*O.N.R*	*O.N.R*	---
	HR: 65.7	HR: 76	+10.3		HR: 74	HR: 85.8	+11.8
3	MAP: 93.9	MAP: 95	+1.1	18	*N.D.*	*N.D.*	---
	HR: 78.1	HR: 61.6	-16.5				
4	MAP: 106.2	MAP: 105	-1.2	19	MAP: 97.6	MAP: 100	+2.4
	HR: 78.4	HR: 73.8	-4.6		HR: 84.6	HR: 85.8	+1.2
5	MAP: 99.1	MAP: 93.3	-5.8	20	MAP: 88.5	MAP: 88.7	+0.2
	O.N.R	*O.N.R*	---		HR: 81.3	HR: 64.6	-16.7
6	*O.N.R*	MAP: 106.9	---	21	MAP: 81.2	MAP: 89	+7.8
	HR: 85.8	HR: 83.3	-2.5		HR: 70.7	HR: 62.7	-8
7	MAP: 95.9	MAP: 99.7	+3.8	22	*N.D.*	*N.D.*	---
	HR: 74	HR: 76.5	+2.5				
8	MAP: 105.2	MAP: 106.7	+1.5	23	MAP: 96.2	MAP: 87.1	-9.1
	HR: 71.3	HR: 80.3	+9		HR: 68.1	HR: 60.7	-7.4
9	MAP: 94	MAP: 92.9	-1.1	24	*O.N.R*	MAP: 107.5	---
	HR: 66	HR: 65.7	-0.3		HR: 67.6	HR: 68.3	+0.7
10	MAP: 91.7	MAP: 83.3	-8.4	25	MAP: 96.6	MAP: 96.6	0
	HR: 54	HR: 54.2	+0.2		HR: 67.3	HR: 61.6	-5.7
11	MAP: 90.8	MAP: 92.8	+2.0	26	MAP: 94.6	MAP: 90.6	-4
	HR: 67.9	HR: 69.8	+1.9		HR: 76.5	HR: 78.7	+2.3
12	MAP: 93.1	MAP: 96	+2.9	27	MAP: 98	MAP: 90	-8
	HR: 81.2	HR: 63.7	-17.5		HR: 96.4	HR: 86.4	-10
13	*N.D.*	*N.D.*	---	28	MAP: 89.8	MAP: 88.3	-1.5
					HR: 85.5	HR: 58	-27.8
14	MAP: 96.1	MAP: 91	-5.1	29	*O.N.R*	MAP: 112.8	---
	HR: 72.1	HR: 72.6	+0.5		HR: 77.6	HR: 85	+7.4
15	MAP: 99.4	MAP: 97.1	-2.3	30	MAP: 96.8	MAP: 82.5	-14.3
	HR: 75.1	HR: 68.4	-6.7		HR: 75.3	HR: 77.7	+2.4
Note: MAP = Mean arterial blood pressure, millimetres of mercury (mmhg) ; HR = heart rate, beats per minute (bmp); *N.D.* = No data; *O.N.R* = Outside Normal Range							

After further investigation it was observed that half of participants (fifteen from thirty) returned to email after the 'email free time' period ended, of which thirteen participants indicated an increased stress response during this period of email use. These participants blood pressure (total of sixteen instances), heart rate (total of twenty-one instances) and perceived stress scores (total of nine instances) almost immediately increased on return; example illustrated in Figure 4.20. This could have been caused from participants either using email more intensively after a period of no email use or, equally, returning to a backlog of email messages that they had to deal with. The impact of these results on 'email free time' within the ███████ ███████████ is addressed in section 4.9.3.

Figure 4.20: Snapshot of Participant #12 showing increased blood pressure, heart rate and stress scores after email free time
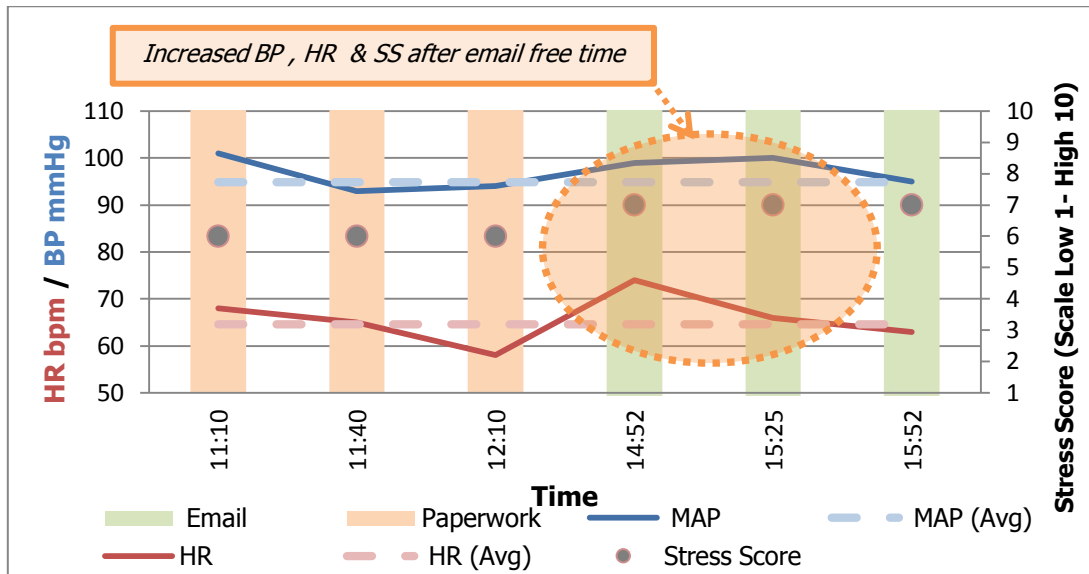
4.6 Discussion

This section presents the research findings with wider contextual references to academic literature. It first highlights the main findings of the study before going on to identify the additional relationships found between perceived and physical stress; habits, addiction and stress; email filing and well-being; and, bad email practice and poor workplace culture.

4.6.1 Key findings

The main findings of the ▇▇▇▇▇▇▇▇▇▇ study showed that:

- Employees seem to have excessively overestimated their email consumption (when compared with organisational average);
- Employees were glad to receive new email for timely information, in response and gratification for work complete. However they were particularly annoyed to receive new email when irrelevantly copied, an immediate response was required or when it interrupted and distracted them from their work tasks;
- A number of adverse effects, not established in previous literature, as a result of email use were raised by employees, e.g. managing staff via email, social detachment, blame and cover-your-back culture;
- The majority of employees had suffered from email overload, and over a third were classified with email addiction;
- Email as a work activity was found to induce an increased stress response, i.e. caused employees' increased blood pressure, heart rate and cortisol;
- The most common reported email tasks were reading & sending email, i.e. information gathering and sharing, which in turn caused increased blood pressure and heart rate among employees;

- Some employees showed increased levels of stress when using email alongside other communication mediums, i.e. phone and face-to-face meetings, whereas decreased stress was observed when email was used alongside non-communication activities, i.e. paperwork;

- Initially employees showed a decreased stress response, i.e. decreased stress, during periods of 'email free time'. Nevertheless after further observation, it was found that those who returned to email directly after the 'email free time' showed an increased stress response as a consequence.

4.6.2 Additional findings

The bringing together of results, from the various methods used in the ▮▮▮▮▮▮▮▮ study, led to the discovery of several additional findings, including: inconsistencies between perceived and physical stress responses; relationship between users' habits, addiction and subsequent effect this has on stress; impact of email filing on employee well-being; and the effect of bad email practices on workplace culture. These are explored in more depth in the following sub-sections.

4.6.2.1 Perceived stress vs. physical stress response

The results of the study found a number of discrepancies arose between recorded physical and perceived stress response measures. For example, some employees displayed increased blood pressure and heart rate during email use however recorded low perceived stress during the same period; and vice versa. These discrepancies occurred on more than one occasion with ten different participant's results. Several possible causes for these occurrences were considered.

Firstly, the self-reported measures could have been flawed due to simple recording error, e.g. participants failing to record perceived stress accurately to a given time on the diary. However, due to the rather large number of employees this affected, i.e. ten from thirty participants, this is highly unlikely to have occurred on every occasion. Alternatively, as noted in previous email studies (e.g. Shirren & Phillips 2011), inaccuracies in the discussion of sensitive topics, such as stress, can be answered in a more socially desirable direction than they typically would under other conditions (Fisher 1993; Richman *et al.* 1999). Social desirability bias is not a new concern in research design and its influence on the ultimate usefulness of qualitative and quantitative research has been the focus of attention for some time (e.g. Richman *et al.* 1999; Roller 2012). If social desirability is used to explain these differences then there is a possibility that results reported are subject to some inadvertent bias. Despite these concerns there is no way of showing social desirability exists or ways to minimise its effect.

Instead it was believed that the inconsistency between perceived and physical stress responses was largely due to the choice of research design and methodological triangulation strategy. The choices of stress measures, by their very nature, were not homogenous. As described by Marshall & Cooper (1979), there is no generally agreed way of measuring stress manifestations. It was for these reasons that the mix of quantitative-qualitative, questionnaire-observation, psychological-physiological approaches to ensure the research provided a more comprehensive investigation of the phenomenon was carried out. As a consequence however, the triangulation strategy yielded both parallel and overlapping results; in addition to highlighting the contradictions and variations between the measures chosen. The impact of this on understanding the phenomenon of email stress is addressed in section 4.6.3.

4.6.2.2 Habits, addiction and stress

The findings from the ███████████ study found that over a third of employees were classified with email addiction. As first mentioned in section 2.3.2.4, a large body of academics, psychologists and other health care professionals (e.g. McKinney 2000; Adam 2002; Anderson 2008; Egan 2008; Freeman 2009) have recognised the psychological dependency caused by email. This leads to the same feelings of guilt, shame, hopelessness, despair, failure, rejection or anxiety as other addictions such as alcohol, tobacco and the internet. It is an assumption now that when a person is addicted to something they cannot control how they use it and become dependent on it to cope with daily life (*MediLexicon International* 2012).

However, at what point does a habit turn into an addiction? Historically there has been a definitive difference in meaning of both habit, i.e. a choice whereby the person with a habit can decide to stop and will subsequently stop successfully if they want to, and addiction, i.e. a psychological or physical component that the person is unable to control the aspects of the addiction without help because of the mental or physical conditions involved. Nevertheless there are those such as Adamson (2002, p.102) and Whitbourne (2012) who suggest habit will eventually lead to an addiction (*MediLexicon International* 2012).

For the purpose of the ███████████ study, email addiction was classified as five or more positive responses from eight questions within each criterion, i.e. 'yes' in criteria 1 and 'most often' in criteria 2. The breakdown of participants' positive responses for each criterion is shown in Table 4.5.

Table 4.5: Breakdown of positive responses on email addiction criterion (data based on twenty-eight participants)

Positive responses	Criteria 1	Criteria 2
Eight (8/8)	0	0
Seven (7/8)	1	0
Six (6/8)	2	1
Five (5/8)	6	2
Four (4/8)	4	6
Three (3/8)	5	7
Two (2/8)	3	6
One (1/8)	5	4
Zero (0/8)	2	2
Total	28	28

Email addiction

Non-dependent

"At risk" group

The results indicate that participants classified with email addiction generally recorded five, six or seven positive responses from criteria 1 and 2. However the results also found a notable number of employees, in response to Criteria 1 (nine participants) and Criteria 2 (thirteen participants), answered three to four of the criterion. It was recommended that these participants be placed in the "at risk group" of employees who could potentially develop an addiction to email. Furthermore, as suggested by Brady ([n.d.]), addiction and stress are as equally intertwined as addiction and habit. However, as illustrated in Figure 4.21 there appeared to be no clear indication of a relationship between classified email addiction and perceived stress scores, with evidence of addicted employees ranging from highest to lowest perceived stress categories.

Figure 4.21: Distribution of perceived stress scores for email addicts and non-dependents (data based on thirty participants)
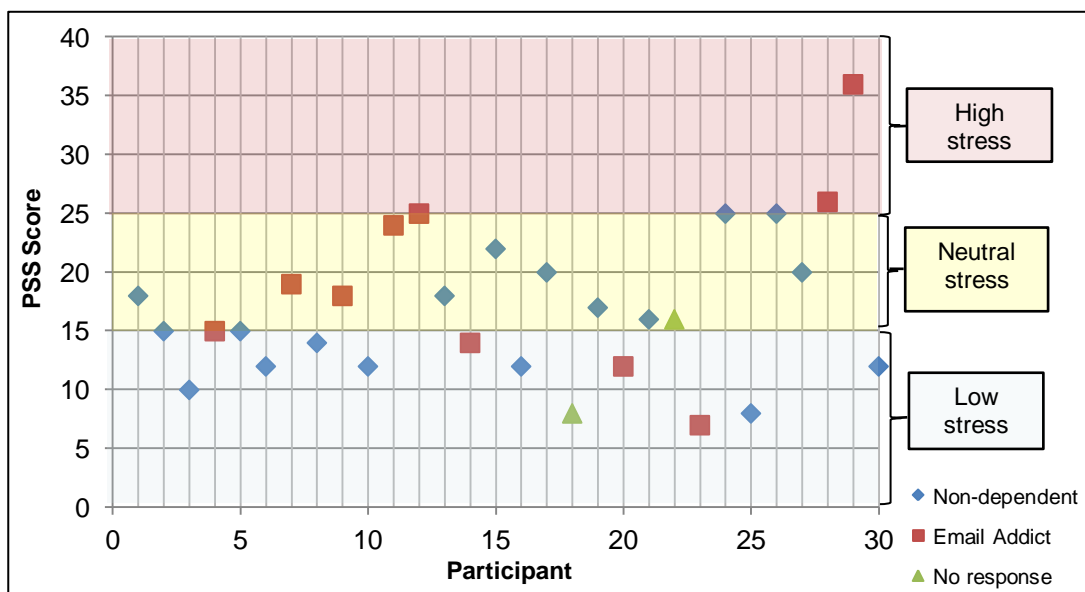
Nevertheless, the mean cortisol values from nine participants with email addiction, sample, (as indicated with the purple line on Figure 4.22), were examined and compared with those values from all thirty participants, i.e. ninety samples collected in Day 1 (as indicated with the orange line on Figure 4.22). Participants classified with email addiction were found to release constant cortisol concentration levels in the body during email use between Sample 2 (mean nmol/l=0.743), Sample 3 (mean nmol/l=0.736) and Sample 4 (mean nmol/l=0.646). This indicated that employees with email addiction were more likely to suffer from sustained or increased levels of stress when using email in the workplace.

Figure 4.22: Mean cortisol levels recorded during Day 1 and participants classified with email addiction

	S1 (AM)	S2 (AM)	S3 (PM)	S4 (PM)
Mean cortisol during Day 1 (thirty participants)	0.804	0.744	0.669	0.571
Mean cortisol of participants with email addiction (nine participants)	0.834	0.743	0.736	0.646
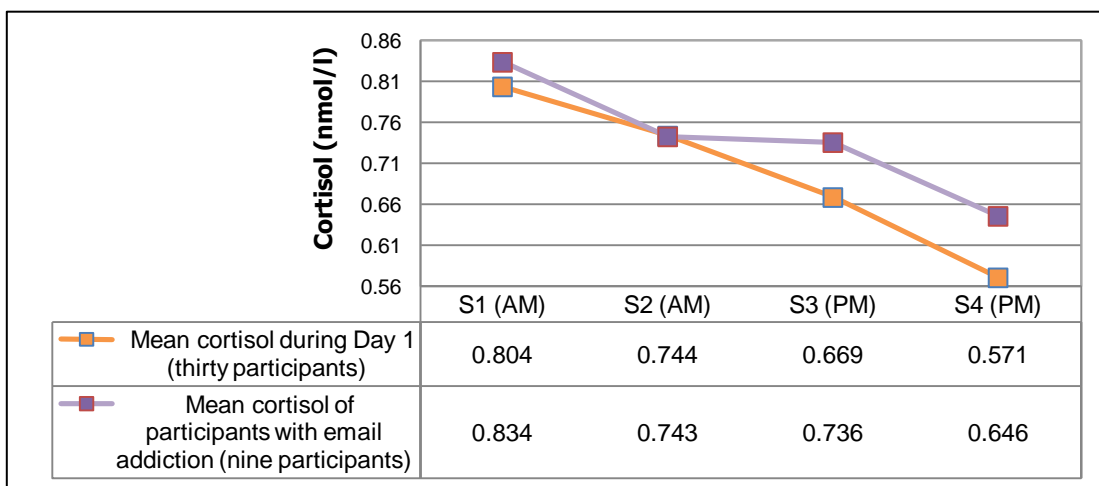
Despite discrepancies observed between perceived and physical stress of employees with email addiction, it was believed that the relationship could be explained as a possible paradox. Whilst it is plausible for an addiction, which carries mental and physical burden on the human body, to cause an increased stress response in the form of sustained or increased cortisol values as shown, the actual act of addiction can equally be personified as a pleasurable and satisfactory experience. As described in Bejerot's (1980) "addiction to pleasure" theory, it is "biologically normal to continue a pleasure stimulus as the pleasurable feelings become reinforced and drive the addiction's continued use" (Hanson, Venturelli & Fleckenstein 2009, pg.59). If email addiction followed this latter process then perceived and physical stress responses would vary by the individual and their feelings, perceptions and knowledge of the addiction itself. For most employees at the ███████████, the concept of email addiction was generally found to be a new phenomenon. In either case, it is worth noting that, for recovery to be successful, addiction needs to be treated with coping strategies such as those for stress-related disorders (Brady [n.d.]) in order for employees to

manage email in such a way as to reduce addictive habits, behaviours and tendencies.

4.6.2.3 Email filing and well-being

The results of the study found that almost all employees had suffered from email overload at some point in the workplace. Whilst the volume of email received can often depend on a number of factors such as job role, workplace culture, etc., its major contributors were shown in the literature to arise from the lack of time and organisation workers had to deal with email (Ingham 2003; Fitzgerald 2004; Brown 2007; Taylor, Fieldman & Altman 2008). Employees at the ▆▆▆▆▆▆▆▆ however repeatedly reported spending time organising their email and in the majority of cases would employ some type of filing approach to their email inbox. Based on the classifications of Whittaker & Sidner (1996) the results showed only a small number of employees did not file their email inbox (no-filers), whilst others filed email as and when necessary (spring-cleaners), or, as frequently as every day (frequent filers).

Email filing, i.e. manual classification into folders, serves the primary function of organising information to make it more accessible. An important secondary function is to remove messages from the inbox, and improve task management by reducing clutter (Whittaker, Bellotti & Gwizdka 2006). Whittaker & Sidner (1996) suggest that a user's choice of filing strategy often results in a number of additional problems that must be considered, and managed accordingly, depending on their approach and style. Table 4.6 identifies the problems that have been found to emerge for each filing strategy choice.

Table 4.6: Problems that emerge from choice of email filing strategy

Email Filing Strategy	Common scenario	Consequent problems
No Filers	Users make no current use of folders. Often inboxes are huge and overloaded. To reduce size of inbox they often delete large number of old items to a separate archive.	▪ Cluttered inbox with threads and unread messages ▪ Outstanding tasks not easily visible and quickly displaced ▪ Tends to solely rely on full-text search to find information
Spring Cleaners	Users deal with overloaded nature of inbox at intermittent clean-ups – normally every 1-3 months. They make use of folders as and when necessary to reduce size of inbox.	▪ Poor for task management as inbox gets larger ▪ Strong feelings of disorder before clean-up ▪ Inbox perceived as little archival use
Frequent Filers	Users make daily passes of email by filing or deleting. Inboxes are small and consist of mostly new items and devoid of conversational threads. Frequent use of folders reduces the size of inbox.	▪ Requires significant time and maintenance to file and delete accurately ▪ Cognitively difficult task as folder categories change as work focus shifts, often creating 'failed folders'

(based on findings from Whittaker & Sidner 1996)

Despite these concerns, email filing has been widely recommended to manage information transferred via email in the workplace (e.g. Whittaker, Bellotti & Moody 2005; Whittaker, Bellotti & Gwizdka 2006). In support of this, some academics (e.g. Whittaker & Sidner 1996; Boardman & Sasse 2004; Peric 2009) have gone as far as to theorise that when information is organised, a somewhat complex set of tasks, can be arranged and completed with a degree of order, and this consequently provides the user with a sense of well-being. A cross-tabulation, as shown in Table 4.7, indicated that ████ ██████████ employees with high perceived stress tended to adopt a spring cleaner or no-filer approach to their email inbox (five participants), whereas employees with low or neutral perceived stress tended to adopt a frequent filer approach (twelve participants). These findings, although only indicative, provide evidence that a sense of well-being (i.e. low perceived stress) can occur for employees who file and a sense of ill-being (i.e. high perceived stress) can occur for users who do not file.

Table 4.7: Cross-tabulation of perceived stress and email filing strategy

		Email Filing Strategy			Total
		No-filers	Spring cleaners	Frequent filers	
Perceived stress	Perceived low stress	1	6	7	14
	Perceived neutral stress	2	4	5	11
	Perceived high stress	1	4	0	5
Total		4	14	12	30

4.6.2.4 Bad email practice and poor workplace culture

Email is an efficient and timely tool that improves the way workers communicate. Well-designed and properly managed systems expedite communication, reduce paperwork and automate routine office tasks thereby increasing productivity and reducing costs. However, with the little email guidance and training available in most organisations, users are often left to their own devices to learn the norms – often picking up habits and behaviours from those around them. This can propagate 'bad practices' and 'poor culture', somewhat negating the positive impact of email (Thompson & Lloyd 2002). The findings from the ████████████████ found various adverse effects of email, some of which are not currently established in the literature, which have the potential to nurture a poor workplace culture.

There has been more recent evidence (see *HR Reporter* 2012) to suggest that organisations are moving towards an 'email culture'. In practice email is no longer just a medium of communication but rapidly growing as a medium to replace all other forms of interaction, most notably 'one-on-one' contact (*TSI Blog* 2012). As discussed in section 4.4.1.3, where some employees recognised that email was useful for reducing alternative communication mediums, for others the same feature was recorded as a hindrance. With

these concerns in mind, it was important that employees at the ███ ████████ had already begun to observe their own cultural email shift, e.g. managers delegating work tasks by email and workers increasingly feeling 'managed by email'.

Recent surveys (see *HR Reporter* 2012) have shown that 71% of workers believe an increased number of people will work from home by 2036, whilst 54% of current workers believe they may never meet any other members of their team and 39% believe employees are unlikely to meet their bosses before they start work. The ████████████, with over 72 locations in Wales and 14 locations abroad, have a largely dispersed workforce. It is unsurprising therefore that their use of email often involves sharing, delegating and directing workloads. There is also evidence to suggest that managers who work remotely from their employees have been found likely to give less feedback, make their employees feel less empowered, and create employees who are less satisfied with their employment than those in the office full-time, according to a study by Rensselaer Polytechnic Institute and GfK Custom Research (Golden & Fromen 2011). In addition, the study also shows that communication between employees and managers who work virtually contain fewer contextual indicators, which hamper accurate interpretations and foster misunderstandings (*TSI Blog* 2012). A group of ████████████ employees also expressed their concern with fellow colleagues who had become socially detached within the organisation through their recurrent and, in some cases, sole use of email to communicate. There is a body of research (e.g. Mirowsky & Ross 1986; Attridge 2005; Moreno-Jimenez *et al.* 2009) to suggest the lack of human engagement in the workplace can lead to personal distress, poorer job motivation, employee satisfaction and well-being (Ramjee 2012).

Another issue raised by ████████████ employees was the notion of a growing blame and 'cover your back' culture. Despite little literature found to exist with regard to email, this concept has been tentatively raised by academics in reference to letters and paperwork (e.g. Senge 1997; Pearn, Mulrooney & Payne 1998). There has however been much wider evidence in popular press (e.g. Dulye 2010; Courtney 2011; McIntyre [n.d.]), online blogs and forums (e.g. Sutton 2007; McCabe 2013). The growing use of audit trails was considered one contributor to the harbouring of such a culture within the ████████████. Historically audit trails have been widely accepted as a normal standard practice to track email messages from one person to another (outside or within an organisation). Likewise, ████ ████████ employees were eager to record the benefits of audit trails as a means to create and preserve the exchange of information. However, employees also began to find themselves in situations where audit trails were used only as evidence in a disagreement or in conflict about work against

them. It is anticipated that, if continued, this would likely breed a workplace culture where it would always be necessary to 'cover your back' and the resultant volume of email would likely increase.

In order to understand and address the sources of stress in the workplace, it is necessary to assess where any aspects of workplace culture can be improved (Hartney 2006, p.38). At the ███████████████ it would be necessary to nurture an email culture to ensure the adverse effects of email use are controllable and managed accordingly. The need for a consensual basis whereby all employees are made aware of how, when and why to use email could be provided through guidance and/or training (Thompson & Lloyd 2002).

4.7 Summary and conclusion

This chapter presented results of the ██████████████ study to address Objective 3 (*to conduct a series of detailed case studies to identify and examine the effect of email use on employee stress within the █████'* ████████████*). The concluding sub-sections reflect on the methods and shortcomings from the research design, and summarise the effectiveness of 'email free time' and email filing strategies to achieve Objective 4 (*to evaluate the use of established email management strategies, such as 'email free time' and email filing, to manage email stress and related stressors effectively within the ████████████████*).

4.7.1 Reflection on methods and research design

Although the research design was piloted (as described in section 3.5.3) prior to the on-site study, problems were raised by ████████████████ employees after the data were collected. These were the same issues anticipated, e.g. ABP machine cuff causing arm ache and error codes, human error when participants consumed food/drink before providing a saliva sample, and continued to occur despite providing all participants with an information sheet. It was evident that the types of methods chosen for this study, in practice, were not free from human and subsequently data inconsistencies. As a result, the decision to adopt an absent-researcher role, and one-shot experimental design, limited the ability to check for data reliability and validity. In the avoidance of these potential biases in future, the research design was updated and revised for future research studies (as discussed in section 3.6.4).

Consequently, due to the inconsistencies that arose between data gathered in Phase 1 and 2, the results of the study found a number of parallels and discrepancies. Although the research conducted at the ████████████████ study had no pre-emptive bias towards the definition of email stress, thus both psychological and physiological viewpoints were considered and appropriate stress indicators chosen, the end result led to the consideration

of a much wider academic debate (highlighted by Lazarus 1998; Schmorrow 2005; Lyons & Chamberlain 2006) as to which is more reflective of the truth – a psychological or a physiological understanding of stress. For example, is it accurate to conclude that a physical increased stress response, e.g. increased blood pressure and heart rate during email use, is more important than perceived stress? Does an employee suffer email stress if their perceived stress is high but their physical symptoms are low? This imminent quandary restrained any attempts at defining and understanding email stress in the context of this study. This was investigated further in Chapter 6.

4.7.2 Effectiveness of email free time and email filing strategies

The literature review first identified the notion of 'email free time' as a growing trend in organisations to combat the adverse effects of email in the workplace. After further exploring this idea through the ███████████ study, it was concluded that, although initial results found decreased stress between normal email use and 'email free time', this was not desirable for organisations such as the ███████████ over the long term. It was found that on occasions where email was immediately resumed, after the period of 'email free time', employees showed increased blood pressure, heart rate and, in a few instances, perceived stress that caused an increased stress response to occur. This was largely associated with employees using email more intensively on return or, equally, returning to a build up of email that they had to go on and deal with.

The literature shows that, in the long term, short sharp increases like those mentioned above can lead to long term chronic health conditions such as hypertension, thyroid disease, heart failure and coronary artery disease (*Info Blood Pressure* 2008; *Medtronic* 2010). Likewise it must be considered that reading and sending email were the most frequently recorded information tasks carried out by employees and whilst the ███████████, as one organisation, can implement 'email free time' this cannot be extended to other external organisations that demand important and timely information. It is unsurprising that, for these reasons, organisations such as Deloitte and Intel had to abandon such an approach (Robinson 2010). 'Email free time', as a means to manage or minimise the adverse effects of email use, was not recommended as it could not be deemed beneficial for all employees at the ███████████ or feasible for an organisation that sends and receives information from external parties.

Email filing strategies on the other hand, which had been widely recommended by academics (e.g. Whittaker & Sidner 1996; Boardman & Sasse 2004; Whittaker, Bellotti & Gwizdka 2006; Peric 2009) to organise information carried in email, had shown to be much more beneficial. Results found ███████████ employees with high perceived stress tended to

adopt a spring cleaner or no-filer approach to their email inbox, whereas employees with low or neutral perceived stress tended to adopt a frequent filer approach. These findings, although only indicative, provide evidence to support Whittaker & Sidner's (1996) notion that a sense of well-being can occur for those who file and a sense of ill-being can occur for those who do not. Alternative email management strategies that include the use of email filing are explored in Chapter 5.

Chapter 5 Initial Conceptualisation of Email Stress

"To give a satisfactory decision to the truth it is necessary to be rather an arbitrator than a party to the dispute"
*** Aristotle ***

5.1 Introduction

The thesis, thus far, has explored existing email stress theory (Chapter 2), established a unique methodology to measure email stress (Chapter 3) and applied this research design at the ▮▮▮▮▮▮▮▮▮▮ to assess email stress in the workplace (Chapter 4). The need for further research into the conceptualisation of email stress was first found necessary in the literature review, however it was only after this stage that time was taken to make sense of events observed from both the email stress literature, i.e. theory-based, and the research's own original findings, i.e. experience-based (Moody 2005, p.261). This relationship has always been reciprocal and mutually beneficial, as theory guides and generates ideas for practice in the same way as practice assesses worth and provides a foundation for new theory (Polit & Beck 2004, p.120).

This chapter consolidates the information gathered thus far, into one coherent and logical place, for the purpose of constructing a model towards the achievement of Objective 5 (*to develop an epistemology associated with the conceptualisation of email stress in the workplace*). Epistemology is traditionally understood as the "study and nature of knowledge and justification" (Schwandt 2001 in Carter & Little, 2007 p.1317), where epistemological development is concerned with how the researcher comes to know, the theories and beliefs they hold about knowing, and the manner in which they are part of and an influence on the knowing (Hofer & Pintrich 1997). Whilst there were no plans to take on the challenge of studying knowledge or justification (like philosophers such as *Plato, Aristotle, Descartes, Kant, Locke, Berkeley & Hulme* in Hetherington 2012), this branch of philosophy identified the importance of investigating origin, nature, methods and limits of a particular area or phenomena (Conee 2005; *Dictionary.com* 2013).

For the purpose of this thesis the development of an epistemology was understood as the justification of knowledge in the conceptualisation of email stress in the workplace, where conceptualisation was understood as the process of studying variables to make statements and adding value to concepts under investigation (Mueller 2004). This pragmatic epistemology was presented in the form of a model (Heylighen 1993). This chapter returns to the literature to explore the history of workplace stress and existing models of stress, before focusing on the conceptual model design.

5.2 History of workplace stress research

The term stress was founded in the early 14th century; however it first was given technical importance in the 17th century as part of works from physicist-biologist Robert Hooke (see *Encyclopaedia Britannica* 2012). Hooke was primarily concerned with man-made structures and how their design could carry heavy loads and resist natural forces that would otherwise destroy them, i.e. stress, strain and load. Although these usages have changed somewhat in the transition from physics to other disciplines, Hooke's research greatly influenced early 20th century models of stress in physiology, sociology and psychology. Evidently the focus on workplace stress is of most relevance to this thesis. Table 5.1 highlights the most important contributions made from scholars and theorists, which have guided workplace stress research over the last century [Google citations reference also used to emphasise impact.]

Table 5.1: Significant contributions to workplace stress research

Scholars / Theorists	Academic Discipline	Significant Contribution to theory	Google cited by*
Cannon (1929)	Psychobiology	Fight or flight. Connection made between emotional stress and physiology.	2319
Selye (1950)	Psychophysiology	General adaptation syndrome and systemic stress theory. Stereotypical response patterns of stress.	406
Lazarus (1966)	Cognitive psychology	Lazarus stress theory, appraisal and coping strategies.Psychological stress process and central mediators.	5930
Holmes & Rahe (1967)	Psychosomatic medicine	Life events inventory. Generalised attempt at incorporating stressful life of events to a broad population.	8613
Mackay *et al.* (1978)	Clinical Psychology	Cox & Mackay model of stress. Identified gap between perceived demand and capability.	388
Cooper & Smith (1985)	Occupational Health Psychology	First organisational stress study to observe blue collar employees.	85
Pearlin (1989)	Sociology	First linked practices of stress research with core sociological interests.	1431
Cartwright & Cooper (1997); Bond & Bunce (2000); *Health & Safety Executive* (2009).	Across all disciplines including: social sciences, business & management, UK government.	Stress theories and numerous methods, techniques, interventions and strategies, to control, manage and minimise workplace stress.	330; 373; 431; N.D..
Author conducted Google citations search on 01/10/2012. N.D.: No data.			

There has been a somewhat historical shift with regard to workplace stress and it has been concluded in several reviews of the literature (e.g. Cox 1993; Edworthy 2000, pp.5-7; Bonke & Gerstoft 2007) that there are essentially three different, but overlapping, approaches to its definition and study. The first approach conceptualises stress as an aversive characteristic of the work environment and treats it as an independent variable, i.e. the engineering model. The second approach defines stress in terms of the physiological effects of a wide range of aversive stimuli and treats stress as a dependent

variable, i.e. the physiological model. Finally, the third approach conceptualises stress in terms of the dynamic interaction between the person and their work environment. This is often inferred from the existence of interactions or cognitive processes and emotional reactions which underpin those interactions, i.e. the psychological model (Cox 1993, p.8). These latter models of stress, i.e. physiological and psychological, have underpinned the research throughout this thesis.

As noted by Lazarus (1993 p.1):

> "Research scholars are products of their times but their work also changes the way scientific issues are studied after them. The theme that survived in modern times is the idea of stress as an external load or demand on a biological, social or psychological system".

It is acknowledged that reviews on the history and scope of workplace stress research are already available (see Ganster & Schaubroeck 1991; Sullivan & Bhagat 1992; Cox 1993; Edworthy 2000, pp.5-7; Bickford 2005; Bonke & Gerstoft 2007), and as a result it was unnecessary to engage in such an endeavour. Instead, the focus was placed on stress theory and conceptual stress models, which, as the names suggest, is when a theory or model can be applied to explain observations of how to intervene, predict behaviour and guide stress research (Weber 2010, p.2).

5.3 Existing conceptual models and theories of workplace stress

There are many approaches to occupational stress, which often involve somewhat different types of causal and affected variables, and subsequently different labels for them. The language used in describing stress-related variables can be confusing because of both inconsistent usage by academics and professionals working in the area, and the use of stress terms by the public at large (Jex *et al.* 1992). Therefore, to make clear and consistent the way key terms are used in this thesis, the following definitions are offered: *stressors* are stress-producing events or activities of conditions in the work environment (e.g. email use); *stress response,* as referenced in Chapter 4, are the individual's responses to such stressor stimuli that are deemed harmful to themselves (i.e. increased blood pressure, heart rate, or perceived stress); and *stress* is a more general term describing situations in which stressors and strains are present (Beehr 1998, p.6).

It has been widely acknowledged that, although stress is sometimes of crisis proportions, it is not always of that severity. For that reason stress is not an inherent attribute of external conditions, but emanates from discrepancies between those conditions and characteristics of the individual (Aneshensel 1992, p.16-17). Early stress research by Cannon (1929 & 1939), Selye

(1950), and Lazarus (1966) among others, has given rise to numerous general theories and models of workplace stress.

A review of the literature identified a large collection of conceptual workplace stress models, frameworks and theories, devised from a variety of researchers and studies, e.g. Job demands-control by Karasek (1979); Effort-reward imbalance by Siegrist (1996); Transactional attributional model of the organizational stress process by Perrewe & Zellars (1999); Integrative work stress model by Lu *et al.* (2003); Person-environment fit framework by French *et al.* (1982); Dunn, Iglewicz & Moutier's (2008) model of well-being and stress; The Bucket Model of Stress by *Newzealand.govt.nz* (2010). Despite these having various features in common, e.g. at least in part all posit that the stress process includes exposure to stressors, they are distinguished by major theoretical differences (Huang, Feuerstein & Sauter 2002).

As identified by Sisley *et al.* (2010), there are classically two approaches to explaining stress in the workplace: (i) unitary approaches (causal versus intervention) and (ii) multidimensional approaches (integrative). The unitary type of approach explains a particular aspect of the process of stress, often involving a theoretical standpoint, such as focussing on the causes of stress or focussing on methods for preventing, minimising or managing stress. A well-recognised example of this is the Person-Environment (P-E) fit framework, illustrated in Figure 5.1, by French *et al.* (1982). The P-E fit theory attempts to bring the individual and the characteristics of the individual more clearly into the picture, asserting that stress results from a lack of fit or congruence between the person and his/her workplace environment (Caplan 1987; Van Roy 2008, p.18).

Alternatively, the multidimensional approach tends to integrate cause with recommendations by providing a holistic model that considers an explanatory phase and an action phase. The explanatory phase involves stressors and their effect, whereas the action phase considers the management aspect of dealing with the issue of stress and outlines potential recommendations based on the causal evidence. Many of these models focus on either a specific group of persons or target particular stressors; e.g. Israel *et al.*'s (1996) overarching conceptual model for occupational stress, safety and stress, as illustrated in Figure 5.2, was designed to conceptualise safety problems and provide guiding principles for effective prevention.

Figure 5.1: Schematic of person-environment fit model
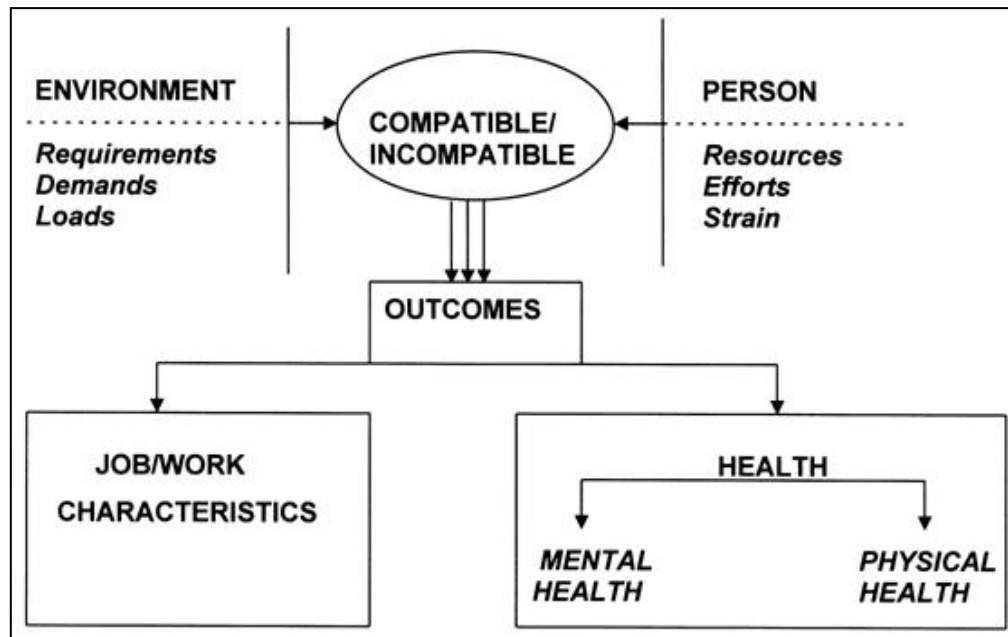
(as printed in Leonova 2009 [online])

Figure 5.2: Conceptual framework and principles for effective prevention
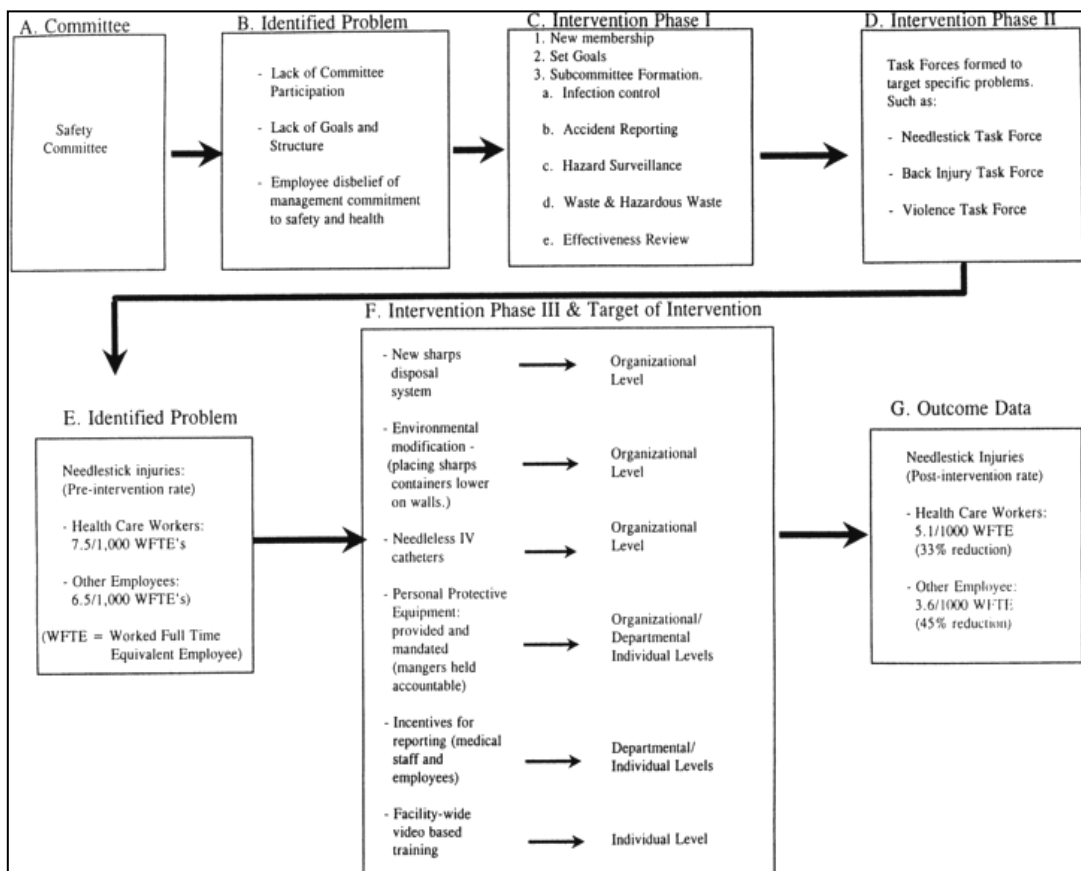
(as printed in Harvey *et al.* 2006 [online])

Several academics (e.g. Kerlinger 1979; Creswell 1994; Sekaran & Bougie 2009, p.81) have long since advocated the use of conceptual models as a means to shed light on a phenomenon that might be otherwise misunderstood or go unnoticed, or to provide a clear concept of the areas in which meaningful relationships are likely to exist surrounding a research problem (Cargan 2007, p.29). Existing conceptual models and theories of workplace stress offered a foundation for building a more structured conceptual representation of the email stress phenomena in a similar workplace scenario (Sisley *et al.* 2010).

In light of the research aims (*to determine whether email communication causes employees physiological and psychological stress and investigate the impact of email management strategies in the workplace*) the decision was made to adopt a multi-dimensional approach to the design process. Therefore, maintaining a pragmatic approach to research, an explanatory model was better served to understanding email stress and an action model was best suited for determining email management strategies in the workplace. The design process and rationale for creating a conceptual model are discussed in more detail in the following sections of this chapter.

5.4 Conceptual model design

The intention was to visually bring together accumulated facts into a coherent and orderly structure that provided both direction and impetus to the email stress research, and extend that which had been left previously unestablished in academic and practice-based literature to date. Despite some general limitations go the use of conceptual models in research,

However there were some limitations when using author was also aware of conceptual models' general limitations in research, and consequently took action to ensure its design and use remained valuable.

As Smyth (2004) suggests, consciously or unconsciously, conceptual models inform thought and practice by increasing the researcher's own personal sensitivity to data collection. Furthermore, noted by Meleis (2011, p.127), conceptual models tend to be regarded as pretheoretical and, as a result, contribution to knowledge about processes and outcomes are generally limited. It is for the reasons that, although previously considered the use of a model prior to data collection, it was designed only after the initial results of the first study were analysed and findings produced (i.e. ███████████ study presented in Chapter 4). Only at this stage could the conceptualisation of the email stress phenomenon from the data collected be achieved. It was accepted that subsequent models devised were a construction of knowledge bounded by the experiences of the researcher and as such could not be

attributed to more than it's worth. Nevertheless, the focus on understanding email stress was found imperative to move the thesis forward.

The key elements of the conceptual model design process are illustrated in Figure 5.3. It begins by providing an overview of email stress thus far; gathered from a review of previous email stress literature (presented in Chapter 2), themes derived from email stress measures (presented in Chapter 3) and the research's own findings (presented in Chapter 4). As a result, two independent models were developed. The first model was designed to theoretically classify typologies of email stress, i.e. explanatory model to connect email stressors and their effect in the workplace, and the second action model to formulate recommendations for effective email management in practice. Each part of the figure is discussed in more detail throughout this chapter under the following sections: overview of email stress, typologies of email stress and recommendations to manage email stress.

Figure 5.3: Conceptual model design process
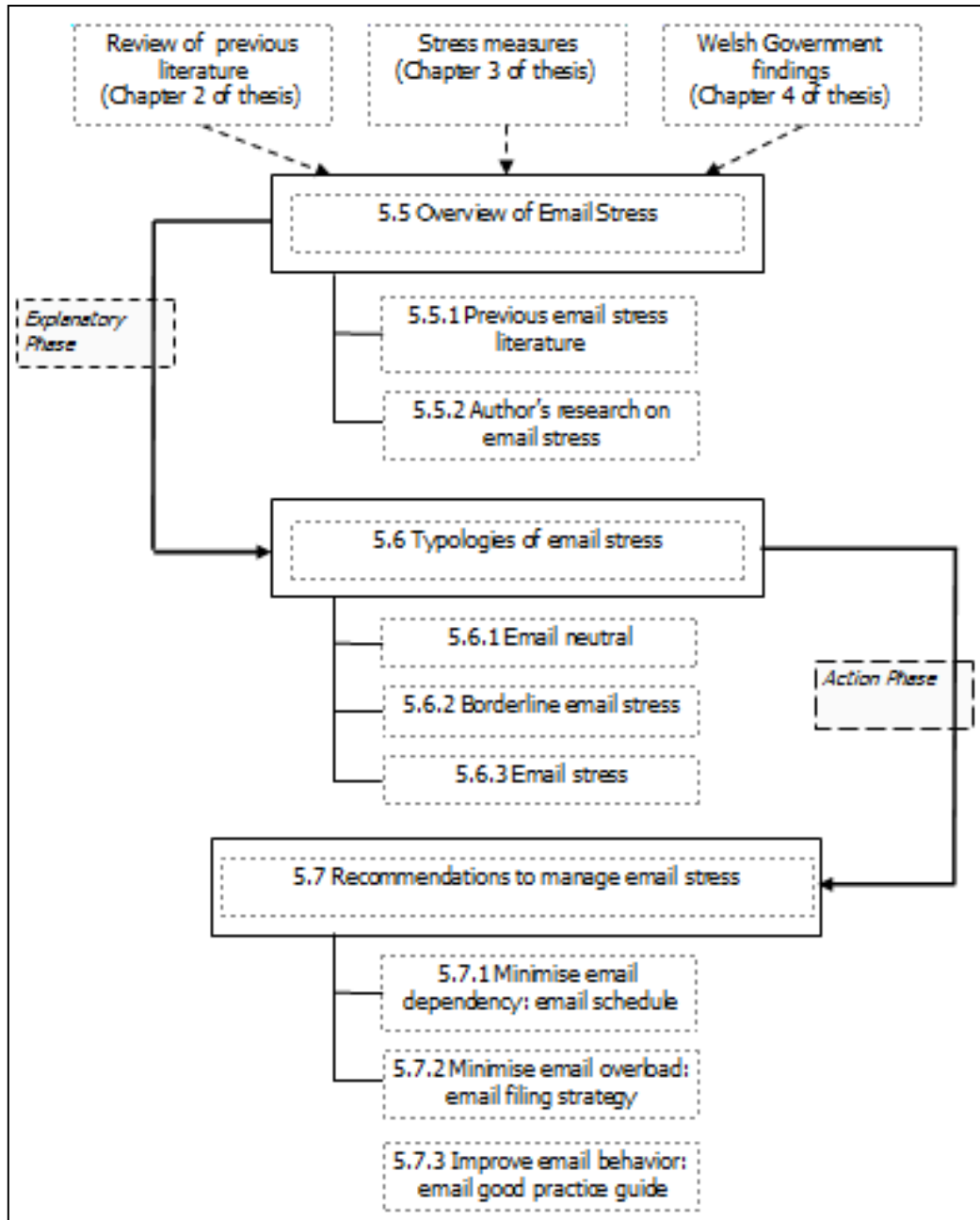
5.5 Overview of email stress

The terms 'email stress' and 'email related stress' have been widely used throughout this thesis. However, as mentioned at the start (see Chapter 1), the quintessential definition of the term has been largely speculated upon in both academic and popular research despite its universal use in the workplace. Although the earlier literature review (see Chapter 2) identified workers general views on email in the workplace, the body of empirical studies were found to be relatively small and discontinuous. Nevertheless, from the little literature that existed and following a comprehensive examination of stress literature, an email stress measuring methodology was developed (see Chapter 3). After an initial pilot study, the research design was delivered to the ███████████ and relevant findings presented (see Chapter 4).

The collated data gathered on email stress from preceding chapters of this thesis is illustrated in Figure 5.4. Themes derived from the email stress measuring methodology (as illustrated in green boxes in Figure 5.4) provided the starting point for connecting relationships between previous literature (as illustrated with red dotted lines on Figure 5.4) and the research's own findings (as illustrated with blue dotted lines on Figure 5.4). These research findings are recapitulated and discussed in the following sub-sections.

5.5.1 Previous email stress literature

A re-examination of previous literature (as presented in Chapter 2) yielded a small number of studies considered relevant to the identification and understanding of the term email stress. A brief summary of these findings are listed below, in chronological order, and cited on Figure 5.4 (illustrated with red dotted lines and boxes):

- Whittaker & Sidner's (1996) research suggested that users who filed regularly were less likely to suffer from the adverse effects of email and stress than those who did not file regularly;
- White & Cornu (2002, pp.355-356) found email to be fundamental in building interpersonal relationships within the workplace and in reducing stress due to its ease of use and formal 'professional' process;
- Boardman & Sasse (2004, p.589) suggested that a user's tendency to organise information may be directly influenced by their innate personality factors, i.e. users who stated that being tidy was important tended to be consistently pro-organising. Subsequently, it was found that users who were anti-organising were more likely to suffer email overload;
- Seeley (2004) stereotyped the personality of email users in the workplace, such as "Pat the Pen" who prefers either to talk or write and

Figure 5.4: Summary of relationships found between previous literature, author's choice in email stress measures and █████████████ study research findings
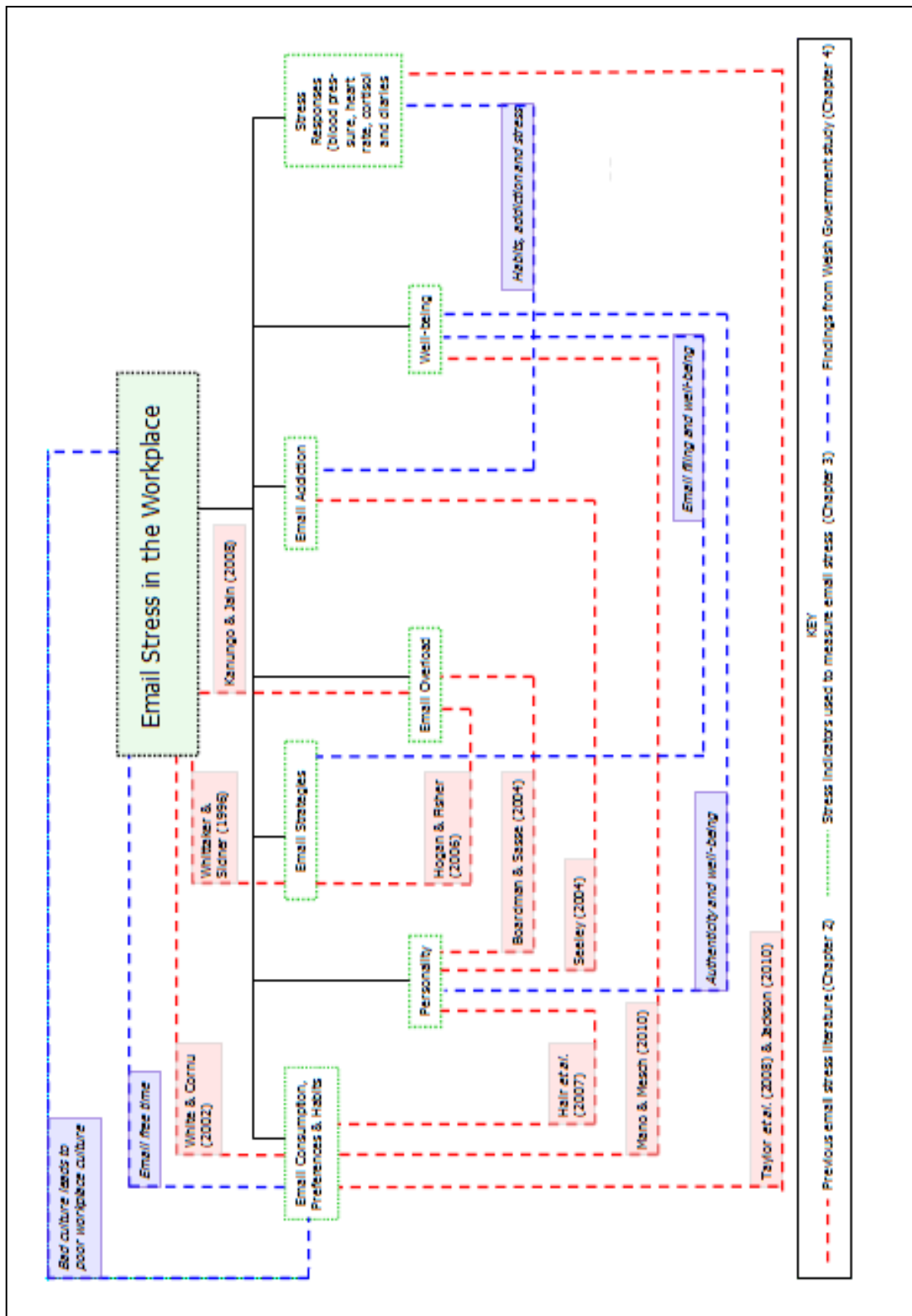
whose emails go unread for days, "Justin just online" who adores IT and always asks to be copied in on everything, and "Julie the email junkie" who prefers computers to people and tends to micromanage;

- Hogan & Fisher (2006) indicated users were less likely to suffer email overload if they felt that they could "keep on top" of their email, i.e. dealing with messages right away and receiving notifications for all/some/no new messages;

- Hair, Renaud & Ramsay (2007, pp.2799-2800) put forward a tentative scale to identify three types of underlying orientations towards email, i.e. relaxed, driven and stressed. The latter, for whom this orientation is dominant, do not find email a useful medium and the pressure to respond is experienced as a negative factor;

- Kanungo & Jain (2008 pp.313-314) found that high stress levels occurred when the rate of incoming email increased. However they proposed that every user would eventually settle down in a zone of email tolerance, which coupled with the requisite productivity results in an acceptable frequency of use. In addition, if a user disciplines themselves, i.e. via an email policy or makes changes to their reactive behaviour when email arrives, then email defects are likely to reduce;

- Taylor, Fieldman & Altman (2008) found that characteristics of email have an adverse impact upon well-being, stress and productivity; specifically blood pressure which was found to increase after inherently stressful communications, e.g. threatening and reprimanding emails;

- The results of a small pilot study by Jackson (2010) found email caused employees stress, i.e. increased heart rate during email use. This was often brought on by junk email, receiving email from unknown senders and poorly written emails;

- Mano & Mesch (2010) found email gives rise to side-effects, such as increased psychological burden and distress, which directly affect workers' well-being, e.g. work performance and effectiveness.

5.5.2 Author's research on email stress

To recap, the results drawn from the ███████████ study (as presented in Chapter 4), made the following additional findings relevant to the identification and understanding of the term email stress; as referenced on Figure 5.4 (illustrated with blue dotted lines and boxes):

- Email addiction and stress was a paradox whereby perceived and physical stress responses varied by the individual dependent on their feelings, perceptions and knowledge of the addiction itself. For recovery to be successful, addiction needs to be treated with relevant coping strategies to reduce addictive habits, behaviours and tendencies;

- Although only indicative, it provided evidence that a sense of well-being (i.e. low perceived stress) occurred for workers who filed and a sense of

ill-being (i.e. high perceived stress) occurred for workers who do not file their email;

- Several adverse effects of email use were found, which ultimately negate the positive impact of email on workplace culture, e.g. reduction in other forms of communication, managing staff via email, social detachment, audit trails and cover-your-back culture. The need for a consensual basis whereby all workers are made aware of how, when and why email should be used was deemed necessary to minimise these issues.

In addition to these findings, the following inferences were also made as a result of further exploring previous literature or as an outcome of the overall study's results (as reported in Chapter 4):

- Previous research by Sheldon *et al*. (1997) suggested that there may be a dynamic relationship between the big-five traits and the degree of authenticity a person feels within a particular job role. That is, feelings of authenticity were negatively correlated with anxiety, stress and depression, and positively correlated with self-esteem. Furthermore, they suggest that workers with a mixture of high authenticity personality traits provide more functional benefits to organisations;
- 'Email free time' as a means to manage email, and minimise the adverse effects of its use, were not deemed beneficial for all workers or feasible for an organisation that sends and receives email from external parties. Alternative recommendations to manage email would therefore be necessary.

5.6 Typologies of email stress

The first stage of the design was to build an explanatory model to connect email stressors and their effect in the workplace Explanatory models explaining the relationship between email and stress have not been established in academia to date. Instead a number of academics (e.g. Seeley 2004; Hair, Renaud & Ramsay 2007) have opted to construct typologies as a way of describing groups displaying different behaviours, attitudes or views of email in order to characterise users with email stress. The decision was made to construct a theoretical model that mutually incorporated both; firstly to explain email stress, in terms of contributing factors, and secondly to profile typologies of email workers.

The original themes derived from the email stress measuring methodology (as mentioned in section 5.5) were first regrouped into factors, specifically focusing on those which classified users into pre-established groups, such as email stressors, i.e. email overload/non email overload and email addicted/non email addicted; email strategy, i.e. frequent filer, spring cleaner and no filer; stress measures, i.e. low/high physiological stress (blood pressure, heart rate and cortisol) during email use and psychological stress

(perceived stress) in the workplace; and personality traits, i.e. high/low authenticity. Based on the information gathered from collated data on email stress thus far (as described in sections 5.5.1 and 5.5.2), a theoretical explanatory model was built to show the associated relationships between factors and, how combined, shaped three typologies: email neutral, borderline email stress and email stress; as illustrated in Figure 5.5. These are summarised in the succeeding sub-sections.

Figure 5.5: Proposed explanatory model showing relationships between factors and typologies of email stress
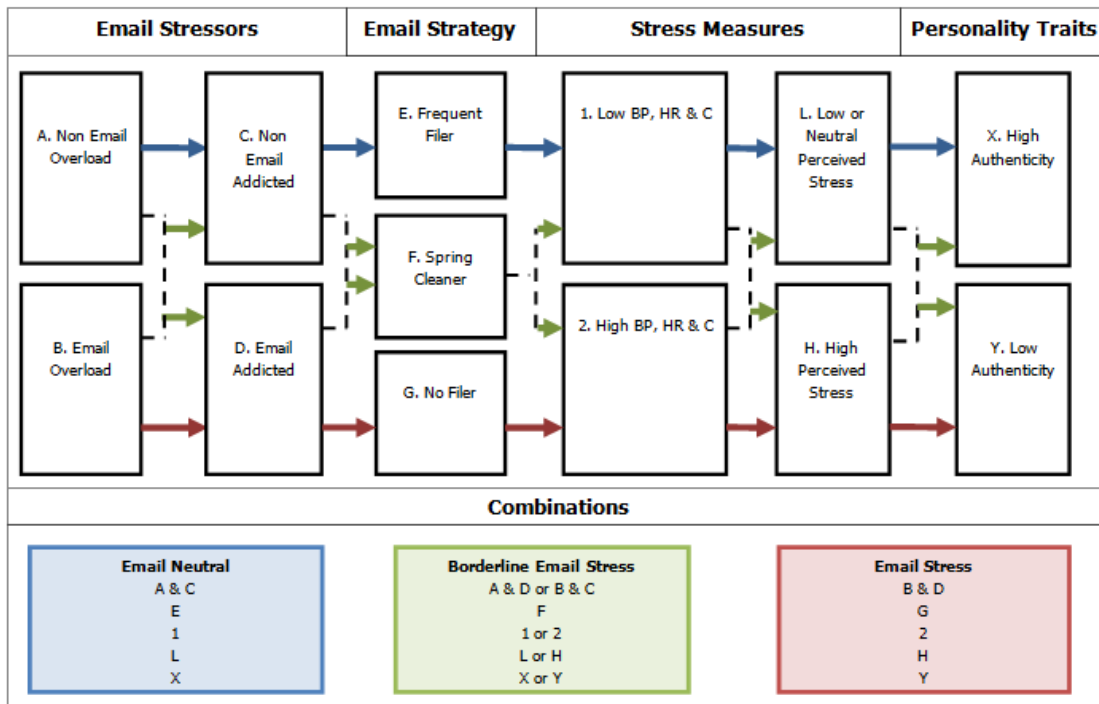
5.6.1 Email neutral

Email neutral (as illustrated with blue arrow/box on Figure 5.5) was characterised as a state of email harmony or, as expressed by Kanungo & Jain (2008, p.313), "a zone of email tolerance". These workers would generally prefer other forms of communication, i.e. face-to-face, telephone or letter writing (Seeley 2004). Nevertheless, when email neutral workers opt to use email it would play a role in reducing stress due to its ease of use and formal process (White & Cornu 2002).

Email neutral workers would, theoretically, be less likely to suffer from the adverse effects of email use or associate themselves with email stressors, such as email overload or email addiction, due to their pro-organising nature with regard to managing email and sense of "keeping on top" of their email inbox (Boardman & Sasse 2004; Hogan & Fisher 2006). As a result, they would likely be categorised as a frequent filer, i.e. conformed to filing email daily (Whittaker & Sidner 1996). The email neutral workers' general acceptance to email and lack of adverse side effects, for the most part,

would lead them to react positively to email or alternatively be unaffected by its use in the workplace. This was based on the same presumption as other studies (e.g. Taylor, Fieldman & Altman 2008; Jackson 2010; Mano & Mesch 2010) that found workers to react negatively to the adverse effects of email use; thus deducing the reverse to occur when no adverse effects of email use are present. Consequently workers of this nature, and those who file their email regularly, would be expected to show low or neutral, i.e. immeasurable, physical stress responses during email use and indicate overall low or neutral perceived stress in the workplace. Workers who are in a state of positive well-being are likely to be more genuine and self expressive, such as those with high authenticity personality traits, and thus expected to provide greater functional benefits to the organisation (Sheldon *et al.* 1997).

5.6.2 Borderline email stress
Borderline email stress (as illustrated with green arrow/box on Figure 5.5) was characterised as a state of email flux. In almost all cases workers that fall into this typology would respond inconsistently to email; whereby sometimes they may be unaffected by email use, and in other instances it may lead to irksome or frustrating problems in the workplace. As a result, these workers are expected to relate to a combination of different factors, although not all, intermittently over time.

Borderline email stressed workers may suffer from one or more email stressors, i.e. email overload and/or email addiction, which would likely stem from their shifting attitude towards managing email, e.g. pro-organising on some occasions and anti-organising in others (Boardman & Sasse 2004). Due to the workers' ever changing nature, they would be more prone to adopting a spring-cleaner filing approach to their email inbox, i.e. filing email as and when necessary (Whittaker & Sidner 1996). These overall inconsistencies in behaviours, attitudes and views are likely to lead workers to react positively or negatively to email (Taylor, Fieldman & Altman 2008; Jackson 2010), depending on the nature of the adverse effects of email use at the time, e.g. email addiction could lead to a sense of pleasure and low physical and perceived stress, whereas email overload could lead to high physical and perceived stress responses. In either case, workers could ultimately have either high or low authenticity personality traits (Sheldon *et al.* 1997).

5.6.3 Email stress
In direct contrast to email neutral, email stress (as illustrated with red arrow/box on Figure 5.5) was characterised as a state of email anxiety or, as described by Mano & Mesch (2010) "email distress". This typology builds on the work of Hair, Renaud & Ramsay (2007), who deduced that email stressed workers would not find email a useful medium and the pressure to

respond would often be negatively experienced. Workers who fall into this category would find email a psychological burden and a large distraction in the workplace (Mano & Mesch 2010).

Email stressed workers would, theoretically, be more likely to suffer from both email stressors, i.e. email overload and email addiction. These workers may often be found overusing email, which would likely incite an anti-organising temperament and lead them towards a no-filing email approach, due to lack of time to manage email effectively (Whittaker & Sidner 1996; Boardman & Sasse 2004). Email stressed workers that struggle with more than one adverse effect of email use, including email addiction, and do not regularly file their email would be more likely to react negatively to email showing both high physical and perceived stress responses during email use in the workplace (Taylor, Fieldman & Altman 2008; Jackson 2010; Mano & Mesch 2010). Workers in this position would be expected to show low authenticity, i.e. closed minded, introverted and disagreeable personality traits, which are correlated with anxiety, stress and depression, ultimately leading them to provide fewer functional benefits to the organisation (Sheldon *et al.* 1997).

5.7 Recommendations to manage email stress

Recommendations to manage email stress have been greatly sought after in workplace organisations and academic literature to date. Despite previous researchers' attempts to build email management strategies, techniques and tools, they were often found relevant only to specific email issues or limited by a lack of general understanding of the email stress phenomena (as summarised in Chapter 2). The decision was made to design an action model, based solely on the causal evidence established from the explanatory model designed (see Figure 5.5 in section 5.6) and data gathered thus far, to formulate recommendations for effective email stress management in practice.

It began with the clustering of factors used to establish email stress in the workplace, as discussed in section 5.6, into dependent and independent variables; a dependent variable being the presumed effect, and the independent variable being the presumed cause (Collier [n.d.]). It was rationalised that the first cluster of factors, e.g. physiological stress (blood pressure, heart rate and cortisol) and psychological stress (perceived stress), were dependent variables and the presumed effect of email stress in the workplace. These dependent variables are typically measured in response to an independent variable and as such are limited to observation alone. The second cluster of factors on the other hand, e.g. email overload, email

addiction[20], email strategy and personality traits, were considered independent variables and presumed causes of email stress in the workplace.

Independent variables typically vary and, as such, can be controlled or manipulated. However it was not feasible to control or manipulate personality, and as a result this was deemed a status variable (Collier [n.d.]). Furthermore, the information gathered from collated data on email stress thus far (as described in sections 5.5.1 and 5.5.2), specifically focussing on the findings from the ███████████. The study discovered several adverse effects of email use were found to negate the organisation's workplace culture. These email behaviours were also considered to be the independent variable and a presumed cause of email stress in the workplace.

After an extensive review of the literature, an action model was built, in the form of a flow chart, to encapsulate the factors presumed to cause email stress together with the recommendations devised from the findings. It is accepted that external pressures and natural chaotic factors (as detailed in section 1.5), e.g. organisational management and culture, exist that will not always make it feasible for workers to achieve these recommendations. Nevertheless, as illustrated in Figure 5.6, three sets of recommendations were prescribed to minimise email dependency, i.e. email schedule, to minimise email overload, i.e. email filing strategy, and to improve email behaviour, i.e. email good practice guide. These are summarised in the succeeding sub-sections.

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[20] It was considered that the term 'addiction' could affect a person's emotional state and potentially subject to some bias (Ovisiankina 1928; Mandler 1984). As a result, and to avoid any pre-empted anxiety or hesitation towards the recommendations, it was renamed email dependent.

Figure 5.6: Action model showing factors presumed to cause email stress and authors' recommendations
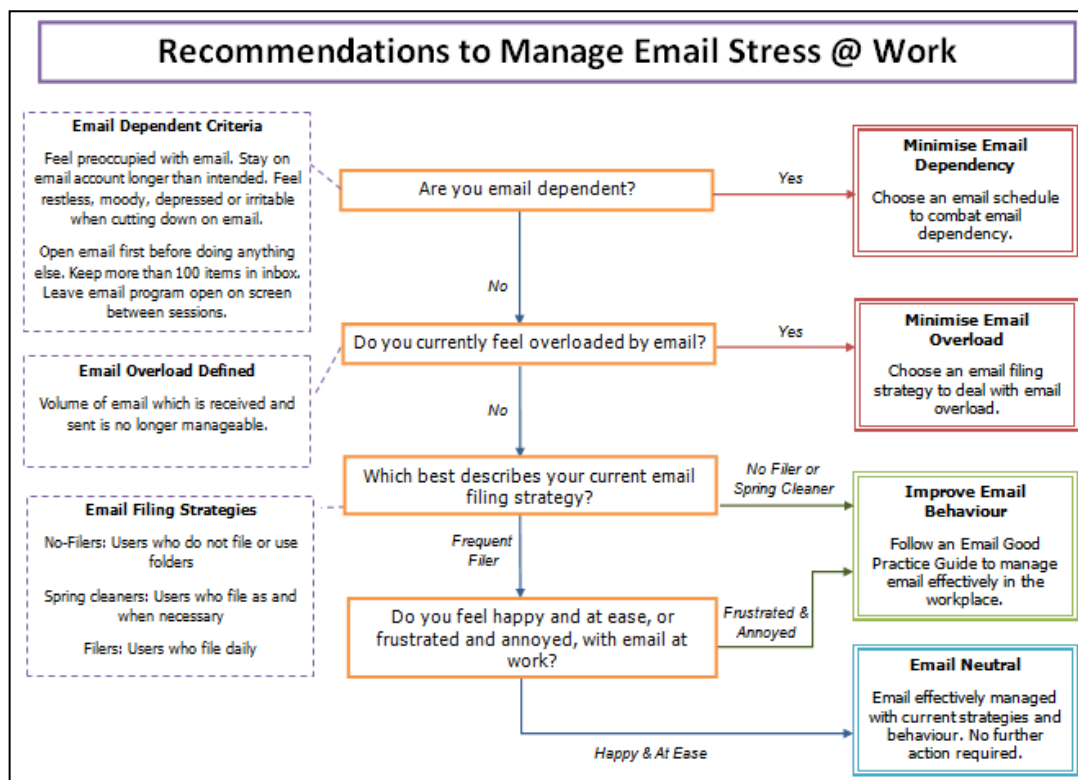
5.7.1 Minimise email dependency: email schedule

Email dependency, i.e. email addiction, often results from the distinct inability to resist checking email, even when it has just been viewed (Anderson 2008). For recovery to be successful email addiction needs to be treated with relevant coping strategies to reduce addictive habits, behaviours and tendencies. Workers who can therefore actively change this behaviour may find themselves in a better position to avoid the negative effects of email use (Jackson, Dawson & Wilson 2001).

In order to minimise email addiction it is recommended for workers to adopt an email schedule to take control of their work day. The principal aim of an email schedule is to avoid spending the entire day reading and responding to email. Instead workers are encouraged to create a timetable or plan, which specifies when and how often email is dealt with each day and how much time is necessary to manage email effectively. For that reason workers are advised to take the following steps to construct and implement an email schedule:

1. Choose a practical and realistic number of times to check email per day, e.g. three times per day.
2. Schedule specific times throughout the day to manage email, e.g. first thing in the morning (9am), after lunch (1pm) and end of work day (5pm).

3. Set the duration of time to deal with email during each session, e.g. maximum of thirty minutes.

4. Specify the email tasks to be complete during sessions, e.g. 1st session read email, 2nd session read and reply to email, 3rd session send and file email.

(McCorry 2005, pp.134-136)

It is suggested that workers attempt to follow a regular and consistent schedule throughout the work day, and to take their time in ensuring the schedule remains realistic and email is considered manageable. Once an email schedule is in place then workers should refrain from using email and begin disciplining themselves, i.e. by turning off new email alerts or closing their inbox program on computer entirely when not in use, to focus their attention on workplace tasks. Similarly, if workers' email correspondents are accustomed to immediate responses then a pre-drafted email or an automatic reply is advised to explain expected response time and alternative contact details if the message is considered urgent. It is the proposed use of an email schedule which would likely minimise the contributing factors of email addiction in the workplace.

5.7.2 Minimise email overload: email filing strategy

Email overload is a result of the volume of email which is received and sent that is no longer manageable (Whittaker & Sidner 1996). Whilst the volume of email received can often be dependent on a number of factors such as job role and workplace culture, in most cases the lack of time and order can often be the primary contributors. Therefore, in order to reduce email overload, it is recommended that workers adopt a regular filing approach to organise the email information they send and receive in a logical and preferred manner (Reid, Fraser-King & Schwaderer 2007, pp. 107-111).

Previous academics (e.g. Whittaker & Sidner 1996; Boardman & Sasse 2004; Hogan & Fisher 2006) have long since advocated the use of email filing in the workplace. Likewise many of the benefits have been established in existing literature to date, i.e. archiving for long term retrieval of information (Whittaker & Sidner 1996, p.276), and supporting nature of personal information management (Boardman & Sasse 2004). However the focus has often been on analysing email filing strategies after users have chosen them. Alternatively, it is suggested a shift is necessary to first teach workers the skill of creating and implementing appropriate email filing structures in practice. As a result it is advised that workers make the following additions to their email inbox:

1. Create action-related folders such as follow-up, action or pending. These folders help workers manage the immediate email information they receive.

2. Create standard folders such as corporate, newsletters, personal. These folders help workers manage routine or expected information they receive.

3. Create tailored folders that match current work tasks, projects or by person such as 'Project Email', line manager or frequent correspondents. These folders help workers manage their personal information.

4. Create subfolders where necessary to distinguish within primary folders. These folders are ultimately used to help workers archive for long term retrieval of information.

(McCorry 2005, pp.149-154; Whittaker & Sidner 1996)

It is proposed that workers, depending on the volume of email received, regularly attempt to file their email daily or weekly. It is equally important for workers to review their filing structure every six months and delete any failed, i.e. unused, folders. Wherever possible, workers should also create folders that run parallel to their paper and electronic file structures for ease of reference. Over time, workers would benefit from labelling their folders by date or year to improve retrieval and only use their primary inbox for email which is unread. It is also considered that some workers may fail to remember emails in the follow-up, action or pending folders and, if this is the case, are advised to revert back to a standard system of keeping all action-related email in their primary inbox. Workers who adopt an email filing structure would likely be in a better position to minimise the contributing factors of email overload in the workplace.

5.7.3 Improve email behaviour: email good practice guide

With the little email guidance and training available in most organisations, workers are often left to their own devices to learn the norms – often picking up habits and behaviours from those around them. This can propagate 'bad practices' and 'poor culture', somewhat negating the positive impact of email (Thompson & Lloyd 2002). In order to improve email behaviour in the workplace a universal email good practice guide (presented in Appendix L) was developed. This was designed to be a formal document for encouraging and nurturing a positive email culture. A summary, titled 'Twenty DOs and DONTs', to guide email use in the workplace, is presented in Table 5.2. The need for a consensual basis whereby all workers are made aware of how, when and why email should be used was deemed necessary. Its proposed use would provide a benchmark for educating new and existing workers and, overall, aim to improve employees email behaviour in the workplace.

Table 5.2: Email good practice guide: 'Twenty DOs and DONTs'

Email Good Practice Guide : Twenty DOs & DONTs	
1. DO use the Seven Point Test before sending email	11. DONT send email in the heat of the moment. Wait 24 hours before replying.
2. DO ensure email is tamper proof	12. DONT use CAPITALS as it is considered shouting.
3. DO ensure email follows defined policies of the organisation	13. DONT criticise or defame people by email.
4. DO use audit trails to record messages going in and out the organisation	14. DONT blind copy unless it is necessary to avoid suspicion and hearsay.
5. DO ensure email archiving and backing up is done regularly	15. DONT avoid people or "hide" behind email
6. DO rely on email in conjunction with other media (e.g. with face-to-face, meetings, phone, etc.)	16. DONT delegate via email unless time is made to follow up and check recipients' understanding
7. DO ensure email is communicated clearly and effectively.	17. DONT discuss confidential matters by email.
8. DO create rules and filters to manage SPAM and corporate messages	18. DONT send corporate email messages and newsletters without ensuring relevance or if the recipient wants to receive it.
9. DO create an email schedule that stipulates when, where, how often email is accessed during the work day.	19. DONT use email as an urgent delivery system, use alternative mediums instead.
10. DO make use of file folders to organise information received and sent.	20. DONT use "reply to all" or "cc" unless message is relevant to all recipients.

5.8 Chapter summary

This chapter consolidated existing email stress theory, the research's choice of email stress measures and results gathered from the ▮▮▮▮▮▮▮ study to build an initial conceptualisation of email stress towards the achievement of Objective 5 (*to develop an epistemology associated with the conceptualisation of email stress in the workplace*).

The pragmatic research approach, which led the decision making part of this thesis, remained unremitting in these considerations. Placing the research problem as central, preserving values of 'what' and 'how', the model adopted a multidimensional approach. As a result two independent models, i.e. explanatory and action, were devised. The explanatory model was designed to connect email stressors and their effect in the workplace to further understand email stress, whereas the action model, built in the form of a flow chart, was used to link descriptors and recommendations to determine suitable workplace email management strategies. However, as both models were limited by the construction of knowledge and experiences of the researcher, in order to add value the decision was made to return to the ▮▮▮▮▮▮▮ with the aim of validating the explanatory and action model designs. This also provided the researcher an opportunity to probe the previous ▮▮▮▮▮▮▮ study's results and ensured the models remained open to new or unexpected occurrences (Smyth 2004). Results of the follow-up study are presented in Chapter 6.

Chapter 6 ███████████████ Follow-Up Study

"Each problem that I solved became a rule which served afterwards to solve other problems"
*** Rene Descartes ***

6.1 Introduction

This thesis has extended the scope of the email stress theory to build an initial conceptualisation of email stress in the workplace towards the achievement of Objective 5 (*to develop an epistemology associated with the conceptualisation of email stress in the workplace*). Two independent models had been previously established in an attempt to visually bring together accumulated facts into a coherent and orderly structure that provided both direction and impetus to the email stress research and extend that which had been left previously unestablished in academic and practice-based literature to date. A multidimensional approach to integrate cause with recommendation provided a holistic understanding of the research problem that considered both explanatory and action phases. Building on works of Chapter 5, the chapter endeavours to validate the models devised.

Two important caveats need to be addressed. Firstly, the validation process typically requires a team of researchers and is often a multi-year multi-person endeavour (Carley 1996). This research had no such resources to exploit and, alternatively, made use of a small-scale focus group to achieve similar results. Furthermore, the term 'value' has many connotations and, in reference to the design of conceptual models relevant to the workplace, can emphasise either the requirements of the business, quality of the model criterion or the individual participants (Wolff & Frank 2005). The decision was made to focus on the latter and, instead of employing a team of researchers, return to the original participants at the ███████████████ to gather feedback on the models devised. The second caveat is that models and their output should generally be described and presented independent of, and generally prior to, validation. For these reasons the validation was presented separately from the models themselves. From a purely presentational point of view, the models cannot be adequately explained, results presented, and validation technique and results described within a single chapter (Carley 1996). Therefore the conceptual models are presented in Chapter 5, and this chapter presents the analysis and validation of results.

6.2 Internal model validation

Model validation is "concerned with determining if a model is an accurate representation of the system under study" (Kleijen 1995, p.145). This measure has more frequently been cited in the technical sciences literature, i.e. mathematics, engineering and computing, and often limited to the validation of simulation or computational models (e.g. Kleijen 1995; Thacker

et al. 2004; Moody 2005; Martis 2006). Despite the models (as presented in Chapter 5) not falling into either of these categories, it was deemed no less necessary to conduct some type of validation to ensure they met their intended requirements. Furthermore, it was sought to provide a sense of credibility, specifically with regard to the design and interpretation of findings of the models devised. The validation therefore was to establish that the models produced both sound insight and sound data by removing barriers and objections to the models' use (Macal 2005).

Discussions of validity point to one or more of the following six types of validation: conceptual, internal, external, cross-model, data and security (Knepell & Arangno 1993). Each type of validity was assessed in terms of whether or not there was an acceptable degree; whereby "acceptable" was defined by the needs of the researcher (Carley 1996). Conceptual, internal and external[21] validity were determined to be the most achievable in that they were, for the most part, concerned with the relationship between the simulated and the real, i.e. do the theoretical models represent and correctly reproduce behaviour of the real world system? (Macal 2005). Alternative types of validation, although considered, were not deemed suitable due to their specialised interest on aspects of simulation or computational models alone, i.e. cross-model validation to statistically review the computational model's expected level of fit; data validity to record the accuracy of simulated generated data; and security to provide adequate safe-guards or assurances that the program used to build the model is tamper proof (Carley 1996).

Subsequently conceptual validity had already been established as part of the explanatory model (typologies described in section 5.6), and the action model (recommendations described in section 5.7). The issue of whether the models accurately represent the phenomena under study is justified by the use of evidential support, generated from existing literature and independent research, in the models' design process. Despite these early considerations, they remained limited and only predictive of human behaviour. As a result, the decision was made to conduct a two-stage process of internal validation to establish expected relationships and to add further value to the models' design. The process and stages of internal validation illustrated in Figure 6.1.

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[21] It worth noting that the author placed value on external validation. However this called for using truly independent data and the same research study to validate the conceptual models devised.

Figure 6.1: Internal validation process and stages
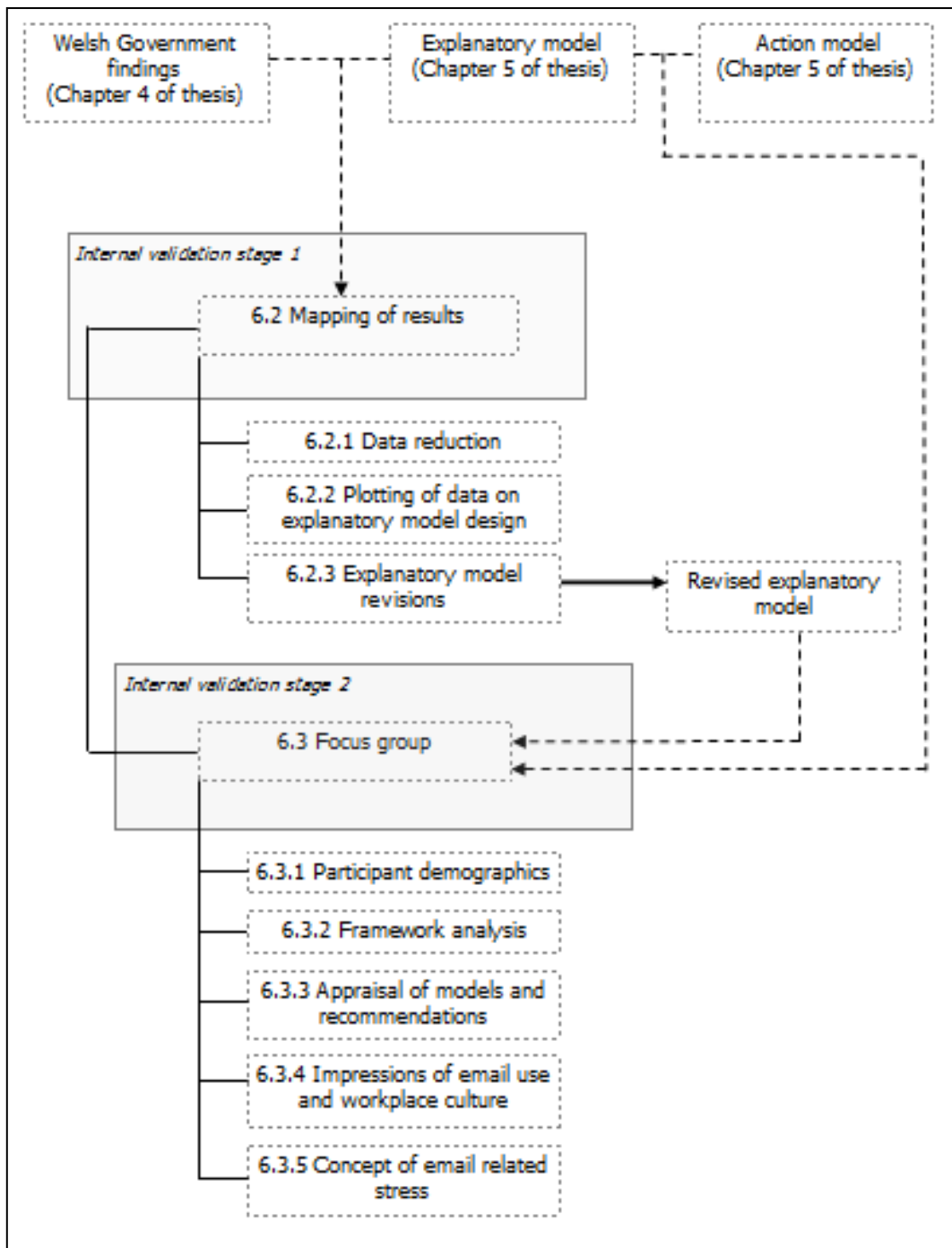
The first stage of internal validation was to substantiate the predictive models of email stress using real data gathered. For simplicity of exposition the term "real data" refers to results collected from the original ▉▉▉▉ ▉▉▉▉▉▉ study (see Chapter 4). The real data was first mapped to the explanatory conceptual model designed (as presented in Chapter 5). The purpose of this was to estimate the predictive accuracy of the model, based on the data collected from the same study used to develop the model itself (Thacker *et al.* 2004). As a result, an adjusted model, i.e. revised explanatory model, was developed in light of the new findings. Whilst a

similar strategy was considered for validating the action model, this was ultimately deemed infeasible; as the real system did not exist and measurements could not be replicated from the same participants at this stage[22] (Hillston 2003, p.107).

In light of the limitations presented in the first stage, the second stage of internal validation was designed to evaluate the performance of all conceptual models, i.e. explanatory model, revised explanatory model and action model, in effectively understanding and managing email stress. To achieve this, a focus group was carried out as a public review of results. This provided an open forum for workers, i.e. ████████████ participants, to critically review the assumptions made from the models designed and provide feedback. After the investigation was complete, the collective data gathered was used to make recommendations for future research and shape the final study (see ████████████ study in Chapter 7).

Each part of the internal validation process, as shown in Figure 6.1, is discussed in more detail throughout this chapter, under the following sections: mapping of results, focus group, and recommendations for future research and final study.

6.2 Mapping of results

This section reports the first stage of the internal validation process. Previous literature refers to this as 'real system measurements' and has long been established as the most reliable and preferred way to internally validate a conceptual model (Hillston 2003; Thacker *et al.* 2004). A number of decisions were made to ensure the mapping process was conducted accurately and fairly in light of the real data gathered. The following sub-sections outline the rationale for data reduction, the plotting of real data on explanatory model design and subsequent explanatory model revisions made in light of the new findings discovered.

6.2.1 Data reduction

The original ████████████ study gathered a total of thirty participants' data. For the purposes of mapping, the sample size was reduced to its most representative form. Thus the following decisions were made for inclusion:

(i) Reduce the sample to those participants that had completed each and every aspect of the research design, i.e. valid responses to all questionnaires (email behaviour, usage, personality and well-being) and stress measures (blood pressure, heart rate and cortisol), in order to

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[22] As noted in section 3.7.1 of this thesis, since the time of the initial research conducted in July 2010, a number of employees had left the organisation or been made redundant in the time passing. Due to these external circumstances, only a fraction of the thirty participants that had previously taken part in the original study remained with the organisation.

maintain a level of consistency and accuracy across all the factors of the explanatory model;

(ii) Taking into account that participants stress measures varied across different email tasks, the decision was made to use data gathered during Day 1 (Email Use) for periods of email use only. This ensured stress measures were reflective of email in isolation, and any variations that participants may or may not have shown when using email alongside other activities were eliminated;

(iii) In order to group participants' stress responses comparatively, high stress was considered above baseline average of blood pressure, heart rate and cortisol readings, and low stress was considered below baseline average of blood pressure, heart rate and cortisol readings. If these readings were inconsistent from one another, then the final grouping was determined by any two stress measures with the same conclusion, e.g. a participant indicating high blood pressure and heart rate, however low cortisol values, were considered to be in the 'High BP, HR & C' group during email use.

In total twelve of the thirty participants' data met the desired requirements for inclusion and were used to plot data on the explanatory model design. To ensure anonymity, and to remain consistent throughout this chapter, the twelve participants were re-referenced in number format, i.e. #1 - #12.

6.2.2 Plotting of data on explanatory model design

The data from the sample size of twelve participants was plotted onto the explanatory model design; as shown in Figure 6.2. Based on the data plotted, the results found six of the twelve participants showed the effect and were classified borderline email stress. The remaining six participants however were unclassified, i.e. not characterised by any of the three theorised email typologies. As a result it was determined, at this stage, that the agreement between the theoretical model and the real data was inconclusive.

The research implications and issues surrounding the use of such a small sample size were considered. More specifically, it was acknowledged that small sample sizes and/or low incidences often result in limited data for analysis, poor distribution and representation of users (Anderson & Vingrys 2001; *NADBank* 2012). Nevertheless, despite these concerns, the process and presentation of mapping real data was found to far outweigh the disadvantages. The data was readily available and, even though limited, enhanced the value of the models' design from its earlier theoretically-limited position.

Figure 6.2: Plotting participants' data (data based on twelve participants) on explanatory model design
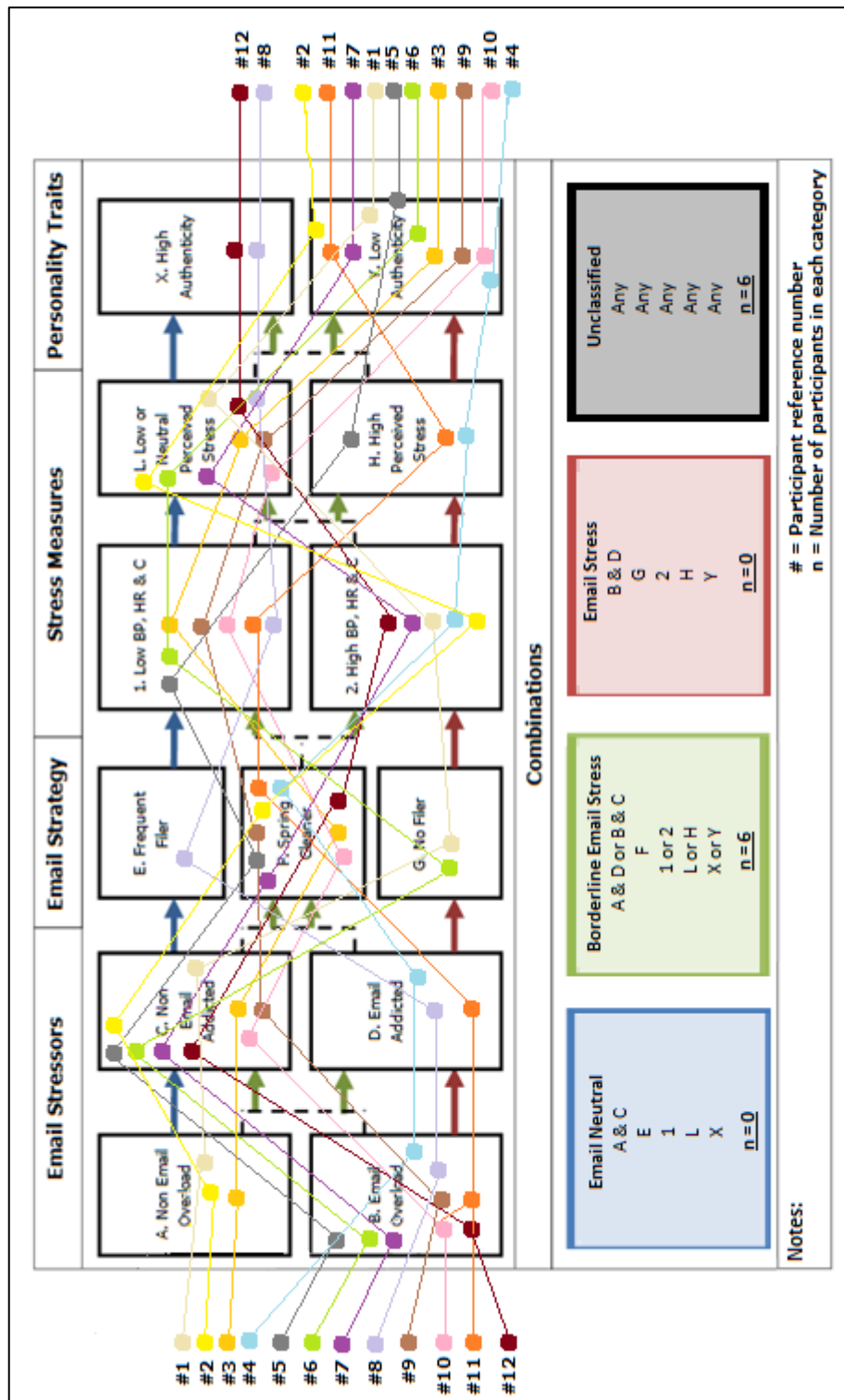
6.2.3 Explanatory model revisions

It is worth noting that there was no intention to discount the original explanatory model designed; instead, using the results from the data plotted, an adjusted model was designed for illustration, as presented in Figure 6.3. The revisions to the model design reflect new knowledge, based solely on

the results presented as part of this chapter, concerning the relationship between factors of email stress and affects of this on the three email typologies initially devised. Thus, broadly speaking, the revisions to the conceptual model were divided into two classes: (i) revisions to the causal factors, and (ii) revisions to general form.

6.2.3.1 Revisions to the causal factors

The initial expected relationships discovered between factors associated with email stress were incoherent with those as a result of the real data plotted. A summary of the previous assumptions (described in section 5.6) and observations in light of the real data added are listed below. These are also considered in the revised explanatory model design as illustrated in Figure 6.3.

Figure 6.3: Revised explanatory model design
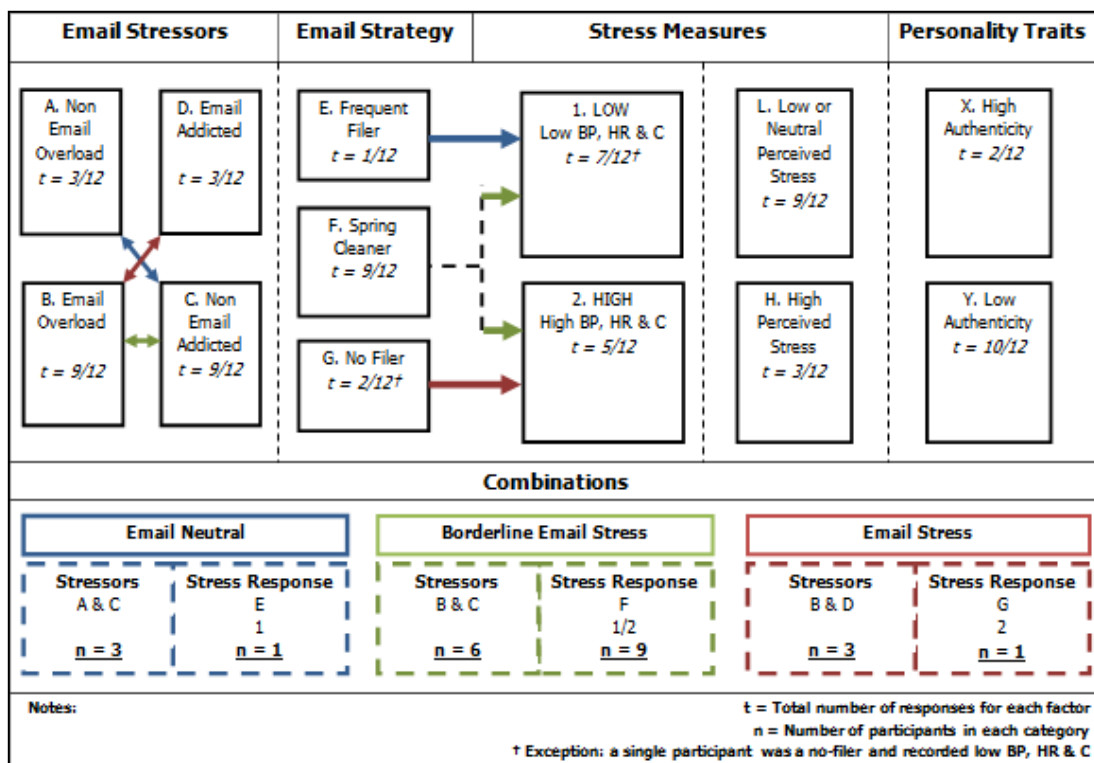
- *Assumption: Workers with email overload were more likely to suffer from email addiction; and vice versa.* The results initially provided some evidence to support the assumption, i.e. all participants who did not suffer from email overload, also did not suffer from email addiction. However the results were only indicative when the situation was reversed, i.e. three of the nine participants with email overload suffered from email addiction. Despite the initial association, the remaining results suggest these stressors are mutually exclusive.

- *Assumption: Workers would be more likely to associate themselves with email stressors, such as email overload or addiction, due to their anti-*

organising temperament and choice of no-filing approach; and vice versa. It emerged that participant's choice of filing strategy and their association with email stressors were unrelated, i.e. those who did not file email were no more or less likely to suffer from email overload or addiction than their filing counterparts.

- *Assumption: Workers who regularly file their email would show low or neutral physical stress responses, i.e. blood pressure (BP), heart rate (HR) and cortisol (C), during email use; and vice versa.* Apart from one exception, the data appeared to conform to the assumption that users who file were less likely to suffer a stress response during email use than those who did not file. This however was supported by a very low incidence rate, i.e. one frequent filer recorded a low physical stress response, and one no filer recorded a high physical stress response. The remaining were spring cleaners which, as expected, showed both low and high physical stress responses.

- *Assumption: Workers' physical stress response during email use would imitate a similar perceived stress response in the workplace, i.e. users who showed high physical stress would also show high perceived stress, and vice versa.* As previously discussed in results of the ███ ████████ study (first mentioned in section 4.6.2.1), discrepancies that arose between recorded physical and perceived stress responses mirrored a similar incongruity with the real data plotted, e.g. four of the five participants recording high BP, HR & C during email use, also recorded low or neutral perceived stress in the workplace.

- *Assumption: Workers who are in a state of positive well-being are likely to show high authenticity personality traits, and vice versa.* The results provided limited evidence to support this assumption, and subsequently remained only indicative of the effect, e.g. two of the nine participants recorded low perceived stress in the workplace and displayed OCEAR, i.e. openness, conscientiousness, extrovert, agreeableness and relaxed, personality traits.

6.2.3.2 Revisions to general form

In light of the revisions made to the causal factors of email stress on the original explanatory model, as discussed in the previous section, the general form of the conceptual model was subsequently adjusted to fit the new results. More pertinently, at this stage it was found logical to develop a two-part typology, as opposed to the standard single typology of the previous model. In adopting this strategy the model provides a more superior meaning to the terms *stress*, *stressors*, and *stress responses*, as originally defined by Beehr (1998) in section 5.3, by moving away from the generic denotation of stress. The terminology used to capture each factor, i.e. email

overload and email addiction as *stressors*, and email filing choice and physical stress during email use as *stress responses*, was deemed more accurate in identifying workers' email stress, whereby participants could fall into more than one category depending on their *stressors* or *stress responses*.

Consequently, the three email typologies initially devised (as described in sections 5.6.1-5.6.3) were re-examined. In light of the revisions made to the causal factors, these typologies were formed irrespective of workers' perceived stress or personality traits. A summary of the revisions to the three email typologies are listed below, and illustrated in the revised explanatory model (presented in Figure 6.3).

- Email neutral (as illustrated with blue arrow/box on Figure 6.3): This category was maintained as a state of email harmony or, as expressed by Kanungo & Jain (2008, p.313), "a zone of email tolerance". Workers were determined email neutral by the following stressors or stress responses: (i) minimal adverse effects of email use or association with email stressors, e.g. non email overloaded and non email addicted, or (ii) categorised as a frequent filer with low physical stress during email use in the workplace.

- Borderline email stress (as illustrated with green arrow/box on Figure 6.3): This category remained a state of email flux, whereby workers would respond inconsistently to email. Workers were determined borderline email stressed by the following stressors or stress responses: (i) signs or symptoms from one email stressor, e.g. non email overloaded and email addicted, or (ii) categorised as a spring cleaner with low or high physical stress during email use in the workplace.

- Email stress (as illustrated with red arrow/box on Figure 6.3): This category was a state of email anxiety or, as described by Mano & Mesch (2010) "email distress". Workers were determined email stressed by the following stressors or stress responses: (i) signs and symptoms from both email stressors, e.g. email overloaded and email addicted, or (ii) categorised as a no filer with high physical stress during email use in the workplace.

6.3 Focus group

This section reports the second stage of the internal validation process, and takes into consideration each step of the focus group study design (as described in section 3.7). The following sub-sections outline participants' demographics, the researcher's framework analysis, before going on to report and discuss the results of the focus group study and the implications of these on future research. The interview guide, focus group transcript and facilitator's notes are presented in Appendix I.

6.3.1 Participant demographics

Four participants from the ██████████████ took part in a single focus group as part of this research study. The greatest issue encountered during the course of this study was in securing an adequate number of participants for the focus group. Despite such a small sample size[23], those who did participate were open about their experiences and provided the researcher with a great deal of valuable information. The participant age range varied between 37 years and 53 years. On this occasion three participants were male, and one female. Participants varied in civil service grade, i.e. one Management Band 1, two in Management Band 3 and one Team Support; and from one of three divisions, i.e. Health, Local Government, People, Places and Corporate Service; within the organisation (████████████ organisational structure illustrated in Appendix K). For ease of reference each participant was labelled randomly, i.e. A, B, C & D.

To ensure that participants' contributions were recorded correctly, and facilitator's interpretations were in equal agreement with participants' intended description, a member validation was conducted (Taylor, Gibbs & Lewins 2005). This involved participants completing a short questionnaire, via email, on receipt of the transcription. Responses to the member validation are detailed in Table 6.1.

Table 6.1: Member validation responses

Question	Participant Response			
	A	*B*	*C*	*D*
1. **Do you feel the transcript reflects your views/opinions accurately?**	YES	YES	YES	YES
2. **Is there anything you would like to add to the information provided?**	YES*	NO	NO	NO
3. **Is there anything you would like to remove from the information provided?**	NO	NO	NO	NO
* Comment: "I feel this trial needs to be run on a wider scale with perhaps staff who have a history of stress or stressful workloads. Allowing them to use their 'coping mechanisms' on their e-mail days. Without a bigger data set of people can you draw any statistical conclusions?"				

6.3.2 Framework analysis

The decision was made to explore the raw data gathered from the focus group using a framework analysis, prescribed by Ritchie & Spencer (1994), as mentioned in section 3.7.2. This allowed for themes to develop from both the research questions and narratives of participants. A summary of key themes derived from the interview guide are outlined in Figure 6.4. These were subsequently used to shape the focus group results reported in the following parts of this section.

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[23] Ibid

Figure 6.4: Key themes derived from the interview guide and framework analysis
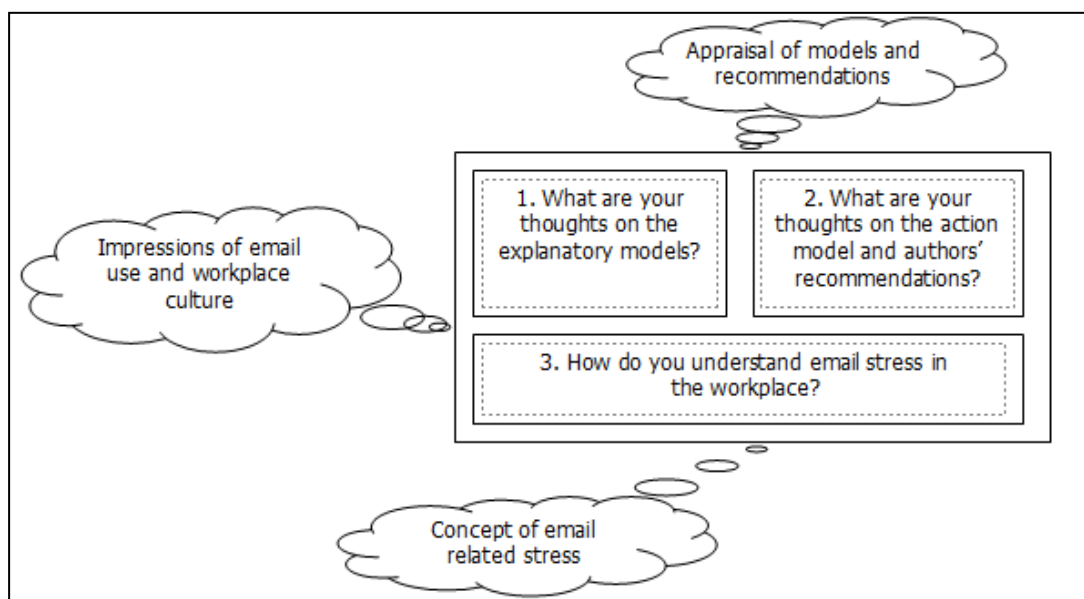
6.3.3 Appraisal of models and recommendations

The focus group sought employees' appraisal of the conceptual models devised in this chapter and those in Chapter 5. The facilitator provided participants with paper copies of each model, followed by a brief oral explanation. These were presented in the following order:

(i) Explanatory model showing relationships between factors and typologies of email stress (Figure 5.5 as presented in section 5.6).

(ii) Revised explanatory model design (Figure 6.3 as presented in section 6.2.3).

(iii) Action model showing factors presumed to cause email stress and author's recommendations (Figure 5.6 as presented in section 5.7).

Participants initially found the first explanatory model to be a logical prediction of email stress in the workplace, with Participant C commenting "*I think that is a reasonable assumption*", whilst others followed this sentiment by nodding in agreement. After the revised explanatory model was presented, participants appeared surprised by the results of the ▉▉▉ ▉▉▉▉▉ study, as Participant A remarks "... *there are other stress factors at work here I presume*".

This consequently led to a brief discussion on the impact of filing and stress. Participant A, in reference to other work colleagues, indicates "*their main fear was that they didn't file but didn't appear to be stressed... But they knew that they had to keep electronic records and the stress they got was when it came to the spring cleaning and the filing*". Contrary to previous research (e.g. Whittaker & Sidner 1996; Boardman & Sasse 2004; Peric 2009), this supports an alternative argument, as discussed in section 2.4.3, that the impact of filing can be a hindrance rather than an aid. Thus, email

filing is a paradoxical situation: even though it is critical to organising and managing email efficiently, if users suffer from email overload or increased workloads they are likely to have less time to file, which results in increased volumes of unorganised email (Balter & Sidner 2002).

Despite these concerns, participants were quick to dismiss the filing recommendations as a result of their new upgraded email system. Shortly after the first study, the ████████████ launched iShare, a record keeping software, which automatically archives all employees' email accounts every two months. The need for individual filing had subsequently become superfluous, as noted by Participant D "*I think now coz your email[s] get archived after a certain amount of time, filing becomes redundant... you can still search for it in the archives*". This new type of software takes the onus away from employees and relies on the system for mass storage irrespective of value from the information stored. In the long run these types of systems have led to extremely expensive storage networks and, due to the little financial cost to the individual email sender, people overuse the resource until it is rendered virtually ineffective (Schulman 2005). Likewise this attitude, which finds email always being recorded and preserved, could continue to harbour a 'cover your back culture', as revealed in the first study's results (described in section 4.6.2.4) and may cause long term issues in workplace confidentiality and privacy.

When presented with the action model, participants generated an expansive debate. In light of the recommendations, i.e. minimising overload and setting up an email schedule, Participant D commented "*I'm not convinced that having set times in the day would map to reality... I think that's very difficult because some people do send urgent things on email and I think you would be more stressed if you didn't take a handle on what was coming in.*" These led to concerns in practicalities of an email break in such a just-in-time and information centred work environment. Participant A, in reprisal, suggests "*... ignore them and they'll ring if it's super urgent*". This was quickly responded to by Participant D "*... you would get a bit of a hiding for doing that!*" This dialogue presented an interesting new discovery. Whilst the turn of phrase "*get a bit of a hiding*" would, in a literal sense, suggest some form of physical violence, the participant appeared to point towards a type of management reprimand. This type of behaviour between management and staff had not been raised as a concern in the first study, however does indicate an underlying cultural appreciation that employees are expected to respond to email as soon as possible; regardless of email best practices, or other workloads and tasks.

The facilitator probed participants to share their views about the changes they thought were necessary for employees to successfully implement the prescribed recommendations. Participant D unenthusiastically commented "*I*

don't think it will change", followed by a concerned Participant B commenting *"I find it [reference to change] irritating"*. These lackadaisical comments appeared consistent among all participants, as remarked by Participant A *"well that's reality isn't it. You can say people should phone but they won't... you can set these things up [reference to recommendations] but to use them properly is all (pause) fun"*. This lack of enthusiasm indicates workers are resistant to change their current practice or have little faith that any changes in the form of recommendations are likely to be a triumph. Continued opposition is likely to foster an uncooperative environment and hinder any form of successful implementation in the workplace.

Overall it appears vital for further research to be carried out in order to methodologically test the action model, and associated recommendations, to determine their impact and added value on workers in practice. Such an investigation, if successful, may then be likely to encourage workers to change their email practices.

6.3.4 Impressions of email use and workplace culture

Leading on from the appraisal of models and recommendations, the focus group participants shed additional light on email use and, more generally, the workplace culture within the ███████████. Whilst the facilitator had not planned to probe participants on these issues, the subsequent implications of these dialogues were deemed relevant; both in understanding email stress and prescribing management strategies in real workplace settings.

Participants throughout the focus group frequently referred to the new era, brought on by the use of new technologies such as email, and the impact it has on a wider social and corporate age; i.e. *"I think we live in an information age... the tv generation or whatever they want to call it... we like information, we like to be able to respond quickly to things and the whole idea of writing a hand written letter to somebody now is official"* as explained by Participant A. In addition Participant D adds *"I think it's just the general understate cultural environment and immediacy of everything juggled up together"*. As briefly mentioned in the previous section, the participants continued to point towards a just-in-time and information centred environment. Whilst the impact of this cultural climate has seen great debate among academics (e.g. Fallows 2002; Lichtenstein & Swatman 2003; Wojcik 2005), the true impact will only be evident after further exploratory research and/or society reflects, reviews and appraises these technological advances in history.

Furthermore, as briefly identified in the first study's results, the notion that email can assist employees in alienating, or socially detaching, themselves from others in the workplace was observed. Moreover, as observed with one

of Participant C's comments, the employee indicated that email as a medium could be used to avoid other communications that they find themselves less comfortable with; "*I find speaking in public somewhat stressful so I find meetings in general difficult than email correspondence. Public speaking isn't really my thing*". As discussed in section 4.6.2.4, there is a body of research (e.g. Mirowsky & Ross 1986; Attridge 2005; Moreno-Jimenez *et al.* 2009) to suggest that the lack of human engagement in the workplace can lead to personal distress, poorer job motivation, employee satisfaction and well-being (Ramjee 2012).

On more than one occasion, participants also made reference to the distractive element of email use, e.g. Participant B remarked "*hold on a second, they don't disappear though... if I'm reading something else, it just won't go away till you open it and for me that is a distraction*". This supports previous research by Hogan & Fisher (2006) who found users were more likely to suffer from email overload if they were distracted by notifications, e.g. email interruptions. Likewise, and in agreement, Participant D adds "*we work in a distractive environment*". This led to a brief discussion on the recent changes made in office layout where employees moved from small private offices to an open plan work space. Participant D remarks "*we work in an open plan, and it's just mayhem. You can't concentrate, it's very hard... and emails are just a small part of the problem*". In recent years the interior architectural profession has shifted from working almost exclusively with a total closed-plan concept and gradually evolved to the other extreme, the total open plan. This general shift has resulted from continuing attempts to find the best office environment formula for providing flexibility, efficiency, and a better, more productive work environment (Rayfield 1994, p.96). Although the reasons for this change can only be speculated within the ███████████████, i.e. space utilisation, costs, communication and security, it has, in its initial performance, presented itself to be detrimental to worker efficiency.

Another pertinent topic raised by participants was the use of Blackberry's and other hand held devices as a means to access use. Although brief, Participant D recognised that "*as you walk around a lot of people are checking their mobile phones quite regularly and I think that must be giving them more stress*". When the facilitator probed participants on the use of mobile devices for email at work, Participant 23 was quick to diagnose the issue at hand "*I think those people who have those Blackberrys are probably people less likely to be as adept to using them as well*". Popular research over the last few years has been flooded with articles, blogs and forums suggesting links between mobile devices-email-stress, fostering hazardous workplace environments (e.g. Limberg 2008; *SG Forums* 2009; *BBC News Technology* 2011a). More recently Waller & Ragsdell (2012) recognised the detrimental

effects of the 24-hour email culture on employees' lives outside of their contracted working hours; in the hope of triggering further research into the long-term psychological and sociological effects.

Finally, all participants were in alliance when discussions turned towards the environmental impact of printing out work related emails. Many agreed with Participant A that "*I hate the disclaimer at the end and I often see people print out emails with two words [and] it's the same disclaimer five times... we shouldn't be printing out emails full stop*". To enforce the point, Participant B suggested "*it shouldn't be allowed*". Whilst the first study identified a small number of participants were printing out email as a means to manage email overload (as previously mentioned in section 4.4.1.4), its detrimental effect was not considered. As a result of the feedback, the decision was made to add this item to the email good practice guide (first presented in section 5.7.3), i.e. DONT unnecessarily print out emails or, if required, remove disclaimers before doing so.

6.3.5 Concept of email related stress

The focus group provided the facilitator with an opportunity to explore the participants' understanding of email stress. As mentioned in the original study's results chapter, an imminent quandary was revealed which restrained any construction for the term email stress, i.e. which is more reflective of the truth – a psychological or a physiological understanding of stress? (first mentioned in section 4.7.1). When the facilitator probed participants with this quandary, the debate as first highlighted by Lazarus (1998), Schmorrow (2005) and Lyons & Chamberlain (2006) continued. Whilst Participant C nods enthusiastically in agreement, Participant A remarks "*I wouldn't give it a special name. But I would put in a description... coming back from your holidays and there is three hundred emails*". It appears for these participants that email stress shares the same meaning as email overload (as defined in section 2.3.2.3), where it is a psychological burden that is "a result of the email volume received and sent that is no longer manageable" (Ingham 2003). However despite Participant A's initial appreciation for the psychological outlook towards email stress, they quickly undermine its value entirely, e.g. "*is perception half the battle? I don't know.... you are asking them for their own opinions, which is pointless*".

Participant A continued to draw attention to the positive elements of using physiological measures, such as cortisol, in interpreting a human's level of stress. However they went on to identify the problematic nature and practicalities of such stress measures; "*I've noticed a huge increase in stress and anxiety... but we are not giving them biometric tests to find out*". The participant here raises an interesting and valuable point, which led to an evaluation of physiological stress measures. Whilst the initial benefits of both psychological and physiological stress measures were considered paramount

(as previously discussed in section 2.3.3.1), in light of the limitations from the first study (summarised in section 4.7.1) and in addition to cost of equipment and training of staff to undertake diagnostics, the argument could be made that physiological measures are ultimately not, in the short term, viable or practical in the workplace. The shift seen in the academic community from physiological to psychological measures subsequently mirrors this argument with the growing use of qualitative research which, in practice, is more feasible and has the ability to deliver on a larger scale in workplace environments.

6.4 Reflection on methods and research design

The researcher made the decision to use focus groups as a way to explore participant's views, experiences, motivations and values in understanding and managing email stress. Likewise the research was also in a position to prompt, probe and extend the scope of answers to generate additional data left undiscovered in the original research study. On reflection of the experience, a number of issues that arose were noted and subsequently alternative methods to improve future research studies were considered.

Firstly, it was recommended that researchers conduct one, or several, pilot studies to attain firsthand experience in managing a group of people (in a similar environment) and to build researcher confidence in effectively directing areas of enquiry through discussion. Similarly, pilot studies allow researchers to practice various scenarios to better prepare the information beforehand. Feedback as part of this pilot study showed that one participant was "*finding it hard to follow everything on these boxes*". Therefore alternative ways to present the information should be considered in anticipation of a similar situation occurring in future.

Likewise the detail necessary to explain the conceptual models, under scrutiny as part of the focus group, were greater than what was initially expected. With the small number of participants involved in the focus group, future researchers may choose to consider alternative data collection tools such as one-on-one interviews. Similarly researchers should also consider alternative means of recording the information during a focus group, as relevant information can be lost in traditional voice-only recording, e.g. pauses between questions and behavioural expressions/cues during discussion. Video recording offers an alternative technique to record these different types of data. However this should be used with caution as the Hawthorne Effect (as first mentioned in section 3.5.2) could cause unintentional data bias in the behaviour of those participants under investigation.

6.5 Chapter summary

This chapter used a two stage model validation process to validate the explanatory and action models, originally devised in Chapter 5, towards the achievement of Objective 5 (*to develop an epistemology associated with the conceptualisation of email stress in the workplace*). The first stage involved mapping real data, i.e. individual results of the ▮▮▮▮▮▮▮▮ study, to the initial explanatory model design. This resulted in an adjusted explanatory model to appreciate new knowledge concerning the relationship between factors of email stress and email typologies. Whilst a similar strategy for validating the action model was consdered, this was unachievable as measurements could not be replicated with the same participants. In the second stage of the process a public review of results in the form of a focus group was carried out, which provided an open forum for workers to critically review the assumptions made from the models designed and provide the researcher feedback. After the investigation was complete the collective data gathered was used to make recommendations for future research.

Similarly, the need to test the action model, and associated recommendations, was found necessary to determine its impact on workers in practice. This shaped the final study, at the ▮▮▮▮▮▮▮, presented in Chapter 7, to address Objective 6 (*to critique the use of an email training intervention to manage email stress and related stressors*). On achievement of this objective, a multidimensional conceptual model of email stress and management strategies could be devised to achieve Objective 5 (*to develop an epistemology associated with the conceptualisation of email stress in the workplace*).

Chapter 7 ███████████ Study

"Better to illuminate than merely to shine, to deliver to others contemplated truths than merely to contemplate"
*** Thomas Aquinas ***

7.1 Introduction

This chapter presents results of the final study to address Objective 6 (*to critique the use of an email training intervention to manage email stress and related stressors*). As concluded in the previous chapter, the action model first prescribed in Chapter 5, and validated as part of Chapter 6, required further investigation to explore the impact of prescribed recommendations in the workplace. The ███████████ volunteered to take part in the study and the decision was made to develop a bespoke email management training intervention. This involved the combined use of seminar based training and computer animation videos, selected and designed alongside the aforementioned recommendations. Whilst seminar based training had been highlighted in the literature review as a popular means to disseminate information and provide training in the workplace, the recorded use of computer animation videos to deliver the same message to workers had not been achieved in theory or in practice. Furthermore, lessons learned from the first study at the ███████████ (as described in Chapter 4) were used and, where necessary, improvements were made to the research design for this study. Results and findings presented in this chapter should thus be considered separate, or an addition, to those reported in previous studies.

7.2 Participant demographics

Seven participants from the ███████████ department at Loughborough University took part in the study. The participant age range was 35 years to 52 years, with a mean age of 42 years. On this occasion six participants were female and one male. Participants' job roles varied, as shown in Figure 7.1, and within one of three departmental divisions, shown in Figure 7.2.

Participants across the department were recruited following an in-house email advertisement and were a sample of workplace email users. That is, all participants used their work-provided email account on a daily basis to communicate both internally and externally on behalf of the organisation. Internal email often involved communicating between students, lecturers and fellow department members at the University. External communications were more varied, from multi-national to local enterprise in the private, public or charity sectors. Participants largely used the Microsoft Outlook email application for access, enabled via the Loughborough University Web App, and proficiency levels ranged from novice to expert.

Figure 7.1: Distribution of job roles (data based on seven participants)
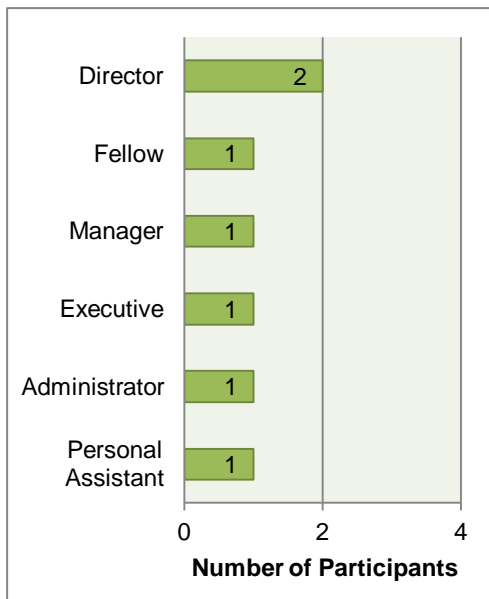
Figure 7.2: Distribution of division (data based on seven participants)
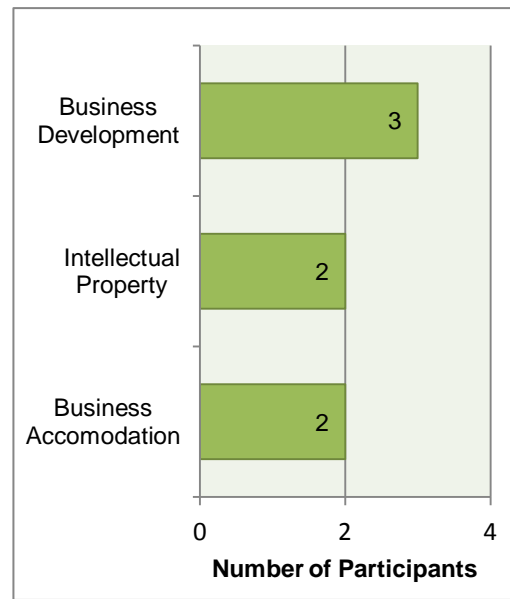
7.3 Reporting of results

The reported results of the study are illustrated in Figure 7.3 and take into consideration each phase of the study design (as described in section 3.8). It is worth noting that a pre-test vs. post-test experimental design was adopted, whereby monitoring period [1] & [2] observed the dependent variable, i.e. email use before the intervention, and the monitoring period [3] & [4] observed email use after the intervention, i.e. independent variable. It is worth noting that the interval between pre-test and post-test varied between two to four weeks for each participant. This chapter presents findings from these combined results, i.e. before and after the intervention. Each part of the mind map is discussed in more detail in the following order: Training intervention, Phase 1 (pre-testing vs. post-testing), Phase 2 (pre-testing vs. post-testing), Phase 1 & 2 (data triangulation) and Discussion.

Figure 7.3: Mind map of ▮▮▮▮▮▮▮▮ study results

Enterprise Office study results

7.4 Training intervention
- 7.4.1 Seminar training
- 7.4.2 Computer animation videos
- 7.4.3 Participants' feedback

7.5 Phase 1 (pre vs. post)
- 7.5.1 Email behaviour
  - 7.5.1.1 Email consumption
  - 7.5.1.2 Email preferences and habits
  - 7.5.1.3 Email overload
  - 7.5.1.4 Email strategies
- 7.5.2 Email addiction
- 7.5.3 Personality
- 7.5.4 Well-being

7.6 Phase 2 (pre vs. post)
- 7.6.1 Calculations and invalid data
- 7.6.2 Stress response during email and work activities
  - 7.6.1.1 Blood pressure and heart rate
  - 7.6.1.2 Cortisol
  - 7.6.1.3 Stress Scores
- 7.6.3 Stress response during information activities
- 7.6.4 Stress response before and after training intervention

7.7 Phase 1 & 2 (data triangulation)
- 7.7.1 Profile: Participant 1
- 7.7.2 Profile: Participant 2
- 7.7.3 Profile: Participant 3
- 7.7.4 Profile: Participant 4
- 7.7.5 Profile: Participant 5
- 7.7.6 Profile: Participant 6
- 7.7.7 Profile: Participant 7

7.8 Discussion
- 7.8.1 Key findings
- 7.8.2 Additional findings
  - 7.8.2.1 Psychological vs. physical: "is perception half the battle?"
  - 7.8.2.2 Openness vs. resistance: managing organisation change

7.4 Training intervention

This section outlines the prescribed training intervention, i.e. combined use of seminar based training and computer animations, delivered to participants as part of the ▮▮▮▮▮▮▮▮▮ study. The seminar workshop was recommended[24], whereas animation videos were purposely designed on the action model and recommendations (as previously described in section 5.7). In turn, details of the design, content and delivery methods used as part of the seminar and computer animations are discussed, before going on to report participants' overall feedback.

7.4.1 Seminar based training

Seminar based training (SBT) is a growing trend, and has been widely used in previous research, to deliver new material (as mentioned in section 2.4.2). Nevertheless, the longevity of such an approach has led some academics to be apprehensive of its use, e.g. Jackson & Culjak (2006) found that although SBT was shown to have substantial costs savings, the effects were found only to last a month before employees reverted back to their old habits. Despite these concerns it has been proven to successfully elevate education and enlighten workers in both small and large groups, and is often found to be the most inexpensive method of training (Jackson & Culjak 2006; Allen, 2007 pp.97-99). Likewise, in addition to building on previous research conducted to date, the novel approach taken to include computer animation videos was used to complement SBT (addressed in section 7.4.2).

7.4.1.1 Design, content and delivery

For the purpose of this study a seminar workshop provided by *Emailogic* (2010), an established email management provider, in collaboration with Loughborough University IT services, was recommended[25] to be the most rigorous, practical and viable delivery of the email training intervention. Participants were invited to a ninety-minute session, held at the Rutland building training rooms, on the 24th February 2012. The session focused on the following:

- Action Planning – evidence of good and bad email users
- The rules of writing good emails using IMPACT
    - o I = Intent – What do you want to achieve as a result of sending email?
    - o M = Medium – Is email the best medium to achieve your intent?
    - o P = Profile – How do you want to profile yourself to others?

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[24] Seminar training was recommended to the researcher by the Staff Development office at Loughborough University, who oversaw the research project.
[25] Ibid.

- o A = Assumptions – Is there anything you have assumed about your recipient that might not be correct?
- o C = Craft – Craft your message to be read easily
- o T = Them – Before you send an email imagine you are the recipient and re-read
- Subject Lines – suitable and unsuitable use of subject lines
- Subject Prefixes – recommended use of prefixes such as ACTION (for action), FYI (for your information), REQ (request), URGENT (urgent), SOC (social) and END or EOM (suffix if the whole message is in the subject line).

In addition, to those mentioned above, a reference guide was supplied to all participants that covered the relevant information for/set-up of:

- Email Audits – guide on how to evaluate messages in order to: limit the number of times interrupted, to build scheduled and focused time to routine and manage email, to delegate or direct any traffic and to eliminate any completely inessential emails (similar to email schedule as described in section 5.7.1);
- Features of Microsoft Outlook – explanation of functions and features of Microsoft Outlook, principally focusing on how to create rules and filters (similar to email filing strategy as described in section 5.7.2);
- Email Do's and Dont's – a summary of do's and dont's such as re-read messages before sending, phone or speak to people face-to-face, not to send messages that are hard to understand and not to cry wolf and mark an email urgent (similar to email good practice guide as described in section 5.7.3).

7.4.2 Computer animation videos

Computer animation is best understood as a motion picture made from a series of 2D or 3D computer graphics (Lind 2011; *Webopedia* 2012), and generally can be associated with television entertainment such as cartoons or animated films. Nevertheless animators have now started to use them regularly in a variety of industries from architecture, to the automobile industry, to forensic science. The benefit of using animations in these 'non-animation' industries has given makers the capability to show something that could not be visualised in any other way, and, equally serves instructional messages or storytelling purposes (Naillon [n.d.]), e.g. Digital Preservation Europe developed an entire series of animations to boost public awareness (Ashenfelder 2011), and the British Government invested in animated films to stop British teenagers turning to terrorism (*Wish You Waziristan* 2012).

Several academic research studies (e.g. Chieu *et al.* 2009; Holzinger *et al.* 2008; Lowe 2003; Srikwan & Jakobsson 2008) and projects (e.g. Pederson & Villekold 2005) have found computer animations to be an effective tool to

promote discussion and eliciting user rationality for putting play-to-action. The notion of helping viewers develop their practice can, in some cases, have a supplantation effect that helps them perform cognitive processes that they could not otherwise perform[26]. Likewise, engaging stories with interesting characters have a powerful ability to capture and hold viewer attention in order to leave a memorable impression. Rickel (2001) suggested that if such stories could be harnessed for education and training, the result could provide a potent tool for learning. Unsurprisingly, less than a decade later, animations have become the norm for educating students in Computer Science (in Holzinger *et al.* 2008), Mathematics (in Chieu *et al.* 2009), and Teaching (in Moreno & Ortegano-Layne 2008). In turn, the growing rate of private businesses now hosting animation videos for the sole purpose of training employees is on the rise. Organisations such as *ARLAND* (2011) provide sales and customer service training, and *Quodos Animation* ([n.d.]) offer safety videos to reinforce procedures and protocols for their clients.

Although there is no accurate system of discovering how many animations have previously been created in the education, training or workplace sectors, and those currently still in use today, they all share a common design theme to inform, teach and train viewers. Existing literature and research to date had yet to exploit this approach as a means to deliver an email training intervention to employees in theory or in practice.

7.4.2.1 Design, content and delivery

For the purpose of this study three computer animation videos were created as an outlet to deliver the devised recommendations for email stress, i.e. email schedule (as presented in section 5.7.1), email filing strategy (as presented in section 5.7.2) and email good practice guide (as presented in section 5.7.3) to complement the seminar workshop.

Previous research (e.g. Barker *et al.* 2002; Gill 2009; Hurt & Metzger 2003 p.1; Lipman 1999; Sharda 2010) has shown that viewers tend to react more positively to hearing stories and, if successful, share and repeat them to others. In order to build an effective set of animations the decision was made to adopt a storytelling approach and adapted versions[27] of more familiar and well-known characters and scenery settings that the audience could easily identify with were used. The movie maker software at *Xtranormal* (2012) was used to design, create and upload five-minute animation videos and music (illustrated with screen shots in Figures 7.4) to *YouTube.com* (2012). To ensure participants were treated fairly the

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[26] Lowe, R.K. & Schnotz, W. *Reasons for using animation.* Unpublished manuscript. Available online at http://tecfaetu.unige.ch. p.92.
[27] A disclaimer was displayed at the start of each video to denote the use of fictional characters and opinions reflected as those solely of the author.

animation videos were made available online to all ████████████ participants from 27th February 2012.

Figure 7.4: Collage of screen shots from animation videos: 'email on the star trek enterprise', 'talking email with barack obama' and 'email juke box'
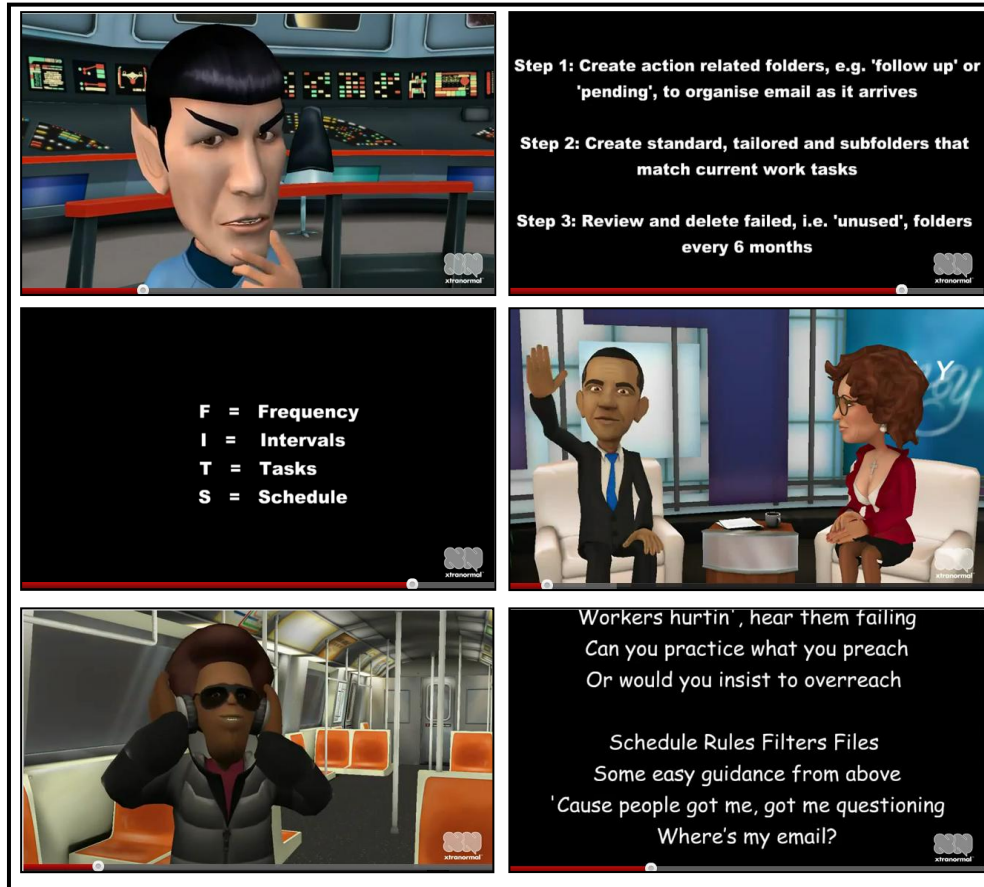
7.4.3 Participants' feedback

Participants were administered with evaluation forms immediately after the seminar workshop finished. These were supplied and summarised externally by Loughborough University IT services and Staff Development. To add to this, the researcher administered an independent survey (see Appendix M) to gather feedback on both the seminar and animation videos. A total of seven participants responded. The evaluation forms were gathered anonymously and results supplied to the researcher in group form, and individual feedback from the latter survey was added to each participant's profile.

On the whole, participants responded well to the training intervention. Three participants found the seminar and video training to be most useful, where remaining participants would recommend either the video or seminar exclusively. Likewise, the majority of participants (six from seven) answered 'Yes' when asked if they had changed their email behaviour as a result of the training intervention. Five of these participants were also found to have implemented many of the recommendations prescribed, e.g. IMPACT,

subject lines, and subject prefixes, to better manage their email use. Finally, participants also shared their own opinions of how the training could be improved in future, responses presented in Table 7.1.

Table 7.1: List of responses to 'how do you think the training could be improved?'

Responses
• *"Bit longer and more on managing folders/incoming file/email management"*
• *"A bit more time for discussion"*
• *"More recognition that much communication is outside the University. Also much of our communication is less transactional than the examples given"*
• *"Perhaps a short practical"*
• *"A little more understanding about individual questions or situations – it was black or white to the trainer – no medium group"*

7.5 Phase 1 (pre-testing vs. post-testing)

This section reports generalised findings from Phase 1 of the research design and explores the psychological view points of email stress before (pre-testing) and after (post-testing) the training intervention. This was achieved with email behaviour, usage, personality and well-being questionnaires. Responses were used to identify changes and evaluate the impact of the training intervention as an email management tool. Results from the email-related questionnaires were separated by the areas of enquiry.

7.5.1 Email behaviour

Participants were administered with pre-testing and post-testing (see Appendix B) email behaviour questionnaires. Attitudinal questions were grouped according to subject themes, and in some cases included more than one response. Frequency distribution graphs, where necessary, were used to present results. Incomplete questions were treated as invalid and not included in the findings. A total of seven participants responded to both questionnaires, results presented in the following sub-sections.

7.5.1.1 Email consumption

Participants were asked during pre-testing and post-testing to estimate how heavily they used email day-to-day in the workplace. Overall, participants claimed to have received and sent anywhere between twenty emails and sixty emails per day, before the training intervention commenced. On average this showed that an employee read up to forty emails, and likewise sent near sixty emails per day. On completion of the training intervention, participants were asked to estimate for a second time the volume of email they received and sent, comparative figures shown in Table 7.2.

Table 7.2: Pre-testing vs. post-testing estimated email consumption

	Pre-Testing		Post-testing	
	Sent	*Received*	*Sent*	*Received*
Participant 1	40	60	40	60
Participant 2	40	60	40	60
Participant 3	20	40	20	40
Participant 4	60	60	(40)	60
Participant 5	40	80	(60)	80
Participant 6	20	40	20	40
Participant 7	40	60	40	60

Results showed many participants (five from seven) continued to send and receive the same amount of email after the training intervention. The remaining two participants however subsequently changed their email consumption; i.e. one participant reduced the amount of email they sent by nearly a third, and another increased the volume of email they sent by a similar amount. As a result, on average, an employee sent and received the same volume of email before the training intervention as after, i.e. forty and sixty emails respectively.

7.5.1.2 Email preferences and habits

Participants, during pre-testing, were asked to describe how they would typically use their email inbox. The results found that all seven participants would leave their email inbox open on their desktop throughout the work day. In addition, one participant used an alert system for new email, in the form of an on-screen pop up box, and two participants claimed to check their inbox at regular intervals. In both cases, this was found to be as frequent as every hour of the work day. Participants were also asked to recall on what occasions they were glad, and when they were annoyed, to receive new email. The most common responses are shown in Figure 7.5 – 'When are you glad to receive new email?' and Figure 7.6 – 'When are you annoyed to receive new email?'.

Figure 7.5: Pre-testing frequency of responses to 'When are you glad to receive new email?' (data based on seven participants)
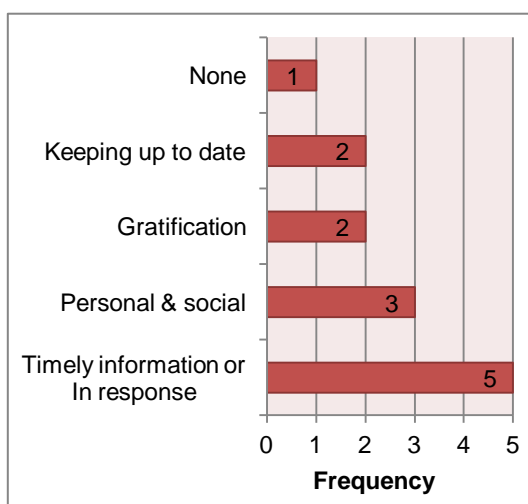
Figure 7.6: Pre-testing frequency of responses to 'When are you annoyed to receive new email?' (data based on seven participants)
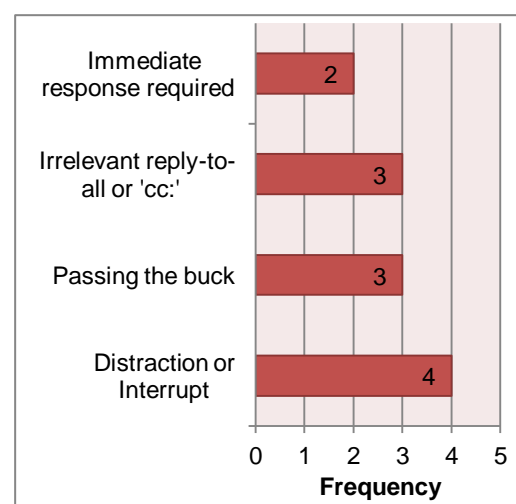
Of the seven participants questioned, five participants were glad to receive new email for timely information, specifically when it was relevant to a piece of work or in direct response to a previous email sent. Results also found three participants were glad to receive personal emails from friends, family and social emails from work colleagues. Likewise two participants appreciated gratification email (as defined in section 4.4.1.2), such as "*well done*" and "*thank you*", in reply to work or information sent. The same numbers of participants were also found to use email as a means of keeping up to date or "*in the loop*". However, for one participant, the response read "*never!,*" indicating an extremely frustrated email user who could not recognise any benefits to email use.

Participants also went on to identify a number of instances when they were annoyed to receive new email. Four participants indicated that email often distracts or interrupts them from more important work activities, e.g. "*it does take my focus off other tasks I may be trying to finish*". Additionally, three participants agreed that they were carbon copied ('cc:') in irrelevant email messages unnecessarily. One participant commented on the frustration and waste of time this caused, i.e. "*I have to read a long page of text to make sure it doesn't really concern me*". Participants (three from seven) also acknowledged email would, on some occasions, be used as a means to blame others for one's mistakes or as a way to "pass the buck", e.g. "*when people interfere with your job*" or "*when being asked or volunteered to do something that is not your job*". Of similar concern, two participants recognised the increased expectation for immediate email responses, e.g. "*when my workload is very high and my email inbox has over 15 emails to action*".

During post-testing participants were asked to comment on the changes they had made or seen in their email preferences and habits since the training intervention was completed. Two participants claimed their email writing style vastly improved, with the use of better subject lines and clearer expectations within emails they sent. Likewise another two participants consciously began reducing the number of times they accessed email, and one participant recognised that they no longer left their email inbox open on their desktop throughout the work day. Both of these participants commented on the positive impact these changes had on lowering the number of email interruptions that occurred whilst carrying out their work activities.

On the other hand, for some participants (two from seven) the training intervention did not appear to support or encourage any change in email behaviour. One of these participants indicated that they were too busy to deal with their current email inbox to put the training into practice because

"*work takes over*", whilst the other added that they "*fully intend to become a reformed character but need time to invest to do it*".

7.5.1.3 Email overload

Participants were asked during pre-testing to identify if they suffered from email overload in the workplace, and the approach they adopted to relieve overload or, if appropriate, an explanation as to why they did not feel overloaded. This was used to distinguish between employees' perception of email overload, and to discover existing techniques used to manage these issues. The distribution of participants who claimed to have suffered email overload is shown in Figure 7.7 and strategies to relieve overload are shown in Figure 7.8.

Results found the majority of participants (six from seven) felt overloaded by the volume of email they received. On this occasion, one participant responded 'could not answer'. It was also revealed that four participants did not adopt any strategy in managing email overload. Remaining participants attempted to combat overload in one of two ways, i.e. one participant filed and deleted email, and two participants set aside a period of time in the day. For one of these participants this was found to be in their own personal time, i.e. out of work-hours.

Figure 7.7: Pre-testing distribution of participants who suffered email overload (data based on seven participants)
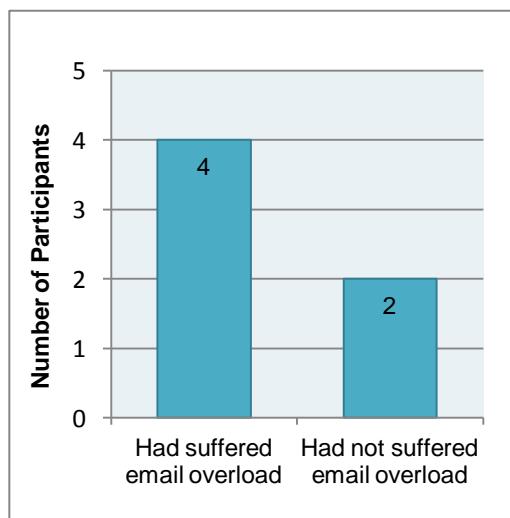
Figure 7.8: Pre-testing frequency of responses to 'How do you relieve overload of email?' (data based on seven participants)
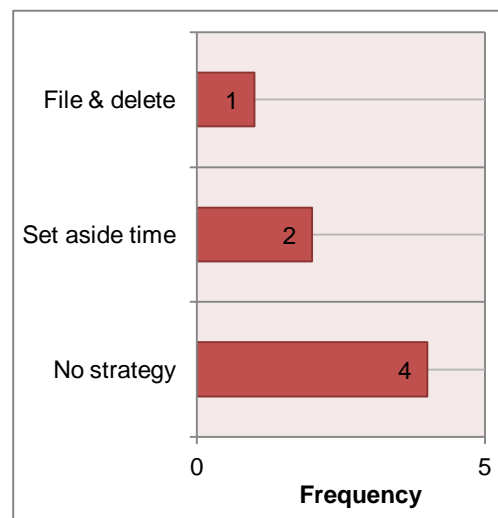
During post-testing participants were asked again if they continued to suffer email overload in the workplace, as results show in Figure 7.9. Results found that four participants continued to suffer, and two participants no longer suffered, from email overload after the training intervention.

Participants were also asked what new strategies they adopted to relieve overload or, if appropriate, an explanation as to why they no longer felt overloaded by email. Of the four participants that continued to suffer

Figure 7.9: Post-testing distribution of participants who suffered email overload (data based on seven participants)

email overload, all began using the new strategies advised as part of the training intervention. Two participants made reference to new filing techniques, the use of prefixes and an email schedule to better manage their email over set periods of time during the day.

However, three (from four participants) noted that whilst the strategies "*helped a bit*" to minimise the problem, the same feelings of frustration remained. One participant found they were still managing their old emails (i.e. those sent and received prior to the training intervention), which refrained them from changing their email behaviour. Similarly, another participant commented: "*the tips are ok as long as you find the time to file and reduce your current inbox... Only then [can you] manage the inbox going forward*". The two participants that no longer felt overloaded by email, both found the adoption of new strategies provided them with much clearer principles to email use, and the introduction of more effective email preferences and habits, e.g. "*I now manage email at work better... adopting techniques such as subject prefixes and dealing with email only once and in order of importance*".

7.5.1.4 Email strategies

Participants were asked during pre-testing and post-testing to identify their preferred choice of email filing. Based on the filing classification of Whittaker & Sidner (1996) the distribution of participants' filing strategies is shown in Figure 7.10.

Pre-testing results found one no-filer (no use of folders), two frequent-filers (folder users who try and clean up their inbox daily) and four spring-cleaners (folder users who clean up their inbox periodically). However, during post-testing, it was revealed two participants changed their email filing strategy; i.e. one participant transformed their no-filer strategy to spring-cleaning and another participant changed their spring-cleaning strategy to frequent-filing. Thus all participants adopted some type of filing strategy to manage their email use in the workplace.

7.5.2 Email addiction

Participants were administered with the same email usage questionnaire (see Appendix C) before and after the training intervention. This was used to identify levels of email addition from a combination of clinical and behavioural characteristics. As a result, participants' responses yielded two relations: (i) email addict and (ii) non-email dependent. Email addiction was classified with five or more positive responses to eight questions from each criterion, i.e. 'yes' in criteria 1 and 'most often' in criteria 2. Participants could conceivably have a low subscale score in one criterion and high subscale score in another. A total of seven participants responded to both questionnaires. The distribution of participants classified with email addiction, during pre-testing and post-testing, is shown in Figure 7.11.

Figure 7.10: Pre-testing vs. post-testing distribution of participants' choice in email filing strategy (data based on seven participants)
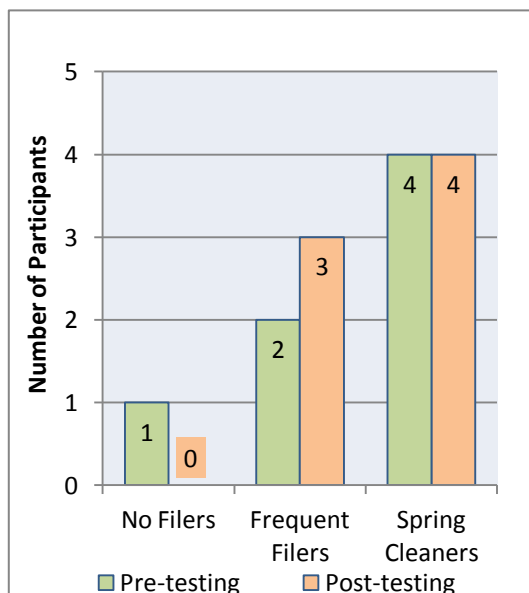
Figure 7.11: Pre-testing vs. post-testing distribution of participants classified with email addiction (data based on seven participants)
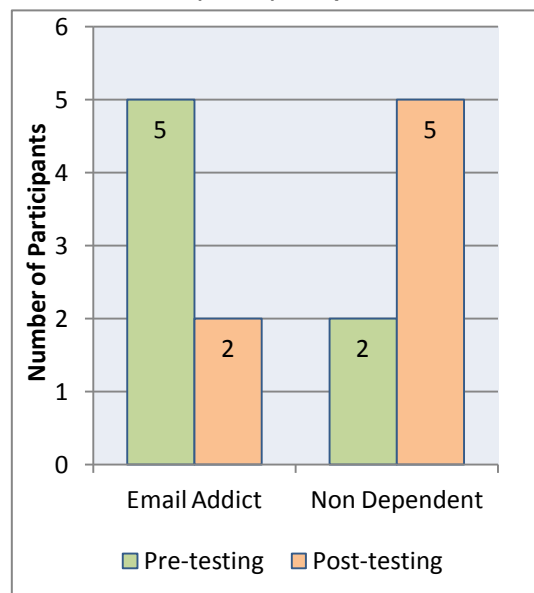
Results revealed five participants were classified with email addiction before the training intervention. Two participants were classified using Criteria 1, one participant using Criteria 2 and two participants using both Criteria 1 and 2. After the training intervention only two participants continued to be classified with addiction, based solely on Criteria 1. The distribution of participants' positive responses during pre-testing and post-testing is shown in Table 7.3. Taken as a whole, the most common clinical and behavioural characteristics identified by participants during pre-testing were feeling preoccupied with email (seven participants), opening email first before doing anything else (six participants), and staying on email account longer than originally intended (six participants). Post-testing results identified similar characteristics, however these were recognised by fewer participants after the training intervention, e.g. staying on email account longer than originally intended (five participants), needing more time to read email (five participants), leaving email program open on desktop between sessions (five participants) and checking for emails on an hourly basis or less (five participants).

Table 7.3: Pre-testing vs. post-testing distribution of positive responses to email addiction criterion

Criteria 1		(Q1) Preoccupied with email	(Q2) Need for more time	(Q3) Repeated efforts to cut back or stop	(Q4) Irritable when attempting to cut back	(Q5) Stay on longer than intended	(Q6) Jeopardized or risked significant moment	(Q7) Lied to conceal use	(Q8) Means to escape problems or relieve mood
Participant 1	Pre-test	√	√			√			
	Post-test	√	√	√		√			
Participant 2	Pre-test	√	√		√	√		√	√
	Post-test		√		√	√			
Participant 3	Pre-test	√				√			
	Post-test	√							
Participant 4	Pre-test	√	√	√	√	√			
	Post-test		√	√		√			
Participant 5	Pre-test	√							
	Post-test								
Participant 6	Pre-test	√	√	√		√			√
	Post-test	√	√	√		√			
Participant 7	Pre-test	√	√	√	√	√		√	√
	Post-test	√	√	√	√	√			

Criteria 2		(Q9) Open email first when at work	(Q10) Stop task to answer email	(Q11) More than 100 items in inbox	(Q12) Email person next to you	(Q13) Annoyed if no response with an hour	(Q14) Look up every time new email announced	(Q15) Leave email program open on desktop	(Q16) Check emails on hourly basis (or less)
Participant 1	Pre-test	√	√	√		√	√	√	√
	Post-test	√	√					√	√
Participant 2	Pre-test	√	√					√	√
	Post-test	√	√			√		√	√
Participant 3	Pre-test	√		√	√		√		
	Post-test			√			√		
Participant 4	Pre-test	√	√		√		√	√	√
	Post-test				√			√	√
Participant 5	Pre-test	√							√
	Post-test						√		√
Participant 6	Pre-test		√					√	
	Post-test							√	
Participant 7	Pre-test	√	√	√		√	√	√	√
	Post-test	√	√	√		√	√	√	√

7.5.3 Personality

Participants were administered with a personality questionnaire (see Appendix D), before and after the training intervention. This was based on the Big Five Inventory (BFI) scale by John, Naumann & Soto (2008), to identify five fundamental personality traits including: openness/closed minded, conscientious/disorganised, extraverted/introverted,

agreeable/disagreeable, and relaxed/neurotic (Digman 1990). The data for each participant was input online (at Oliver 2000) and relevant feedback and scores extracted accordingly. A total of seven participants responded to both questionnaires. On this occasion, one participant scored highly in OCEAR personality traits, suggesting they are more genuine and self-expressive within their given role in comparison to their counterparts (Sheldon *et al.* 1997). A list of participants' recorded personality traits during pre-testing and post-testing is shown in Table 7.4.

The results revealed four participants' combined personality traits differed between pre-testing and post-testing. Although these personality changes varied by participant, for some a change occurred in more than one trait. Whilst the Big Five has undeniably generated much support amongst academics and researchers alike, it is fundamentally incapable of explaining personality trait differences and/or their causes. The comprehensive classification system of the Big Five is based solely on empirical findings with no underlying theory. This ultimately limits its ability to provide theoretical justification for why scores may differ between individuals, and for assumptions such as why sensation seeking and gregariousness are predictive of general extroversion, for instance. Likewise, measures such as the Big Five, heavily rely on self-reported responses, which make them vulnerable to bias and falsification. As a result, changes in responses over time may represent genuine underlying personality differences, or it may simply be an artefact of the way participants answered the questions (*CenterSite* 2012).

Table 7.4: Pre-testing vs. post-testing personality traits combination

	Pre-Testing	Post-Testing
Participant 1	Openness – Conscientious – Introverted – Disagreeable - Relaxed	Openness – Conscientious – Introverted – Disagreeable – Relaxed
Participant 2	Openness – Conscientious – Extraverted – Disagreeable - Relaxed	Closed - Conscientious – Extraverted – Disagreeable - Relaxed
Participant 3	Closed - Conscientious – Extraverted – Agreeable - Relaxed	Closed - Conscientious – Introverted – Disagreeable - Relaxed
Participant 4	Openness – Conscientious – Extraverted – Agreeable - Relaxed	Openness – Conscientious – Extraverted – Agreeable - Relaxed
Participant 5	Openness – Conscientious – Extraverted – Agreeable - Neurotic	Openness – Conscientious – Extraverted – Agreeable - Neurotic
Participant 6	Closed – Disorganised – Extraverted – Disagreeable - Relaxed	Closed – Conscientious – Extraverted – Disagreeable - Relaxed
Participant 7	Closed – Conscientious – Extraverted – Agreeable - Neurotic	Closed – Disorganised – Introverted – Agreeable - Neurotic

7.5.4 Well-being

Participants were administered with a well-being questionnaire (see Appendix E) before and after the training intervention. This was used to further understand the degree to which participants appraised their life as stressful, and to give an indication of participants' psychological stress levels in the workplace. A Perceived Stress Scale (PSS) score of 0 to 40 could be achieved and, on this occasion, categorised into low (less than 15), neutral (16-24) and high (greater than 25) stress categories. Seven participants responded and results were valid. The distribution of participants perceived stress scores, during pre-testing and post-testing, are shown in Figure 7.12. Overall results found three participants' perceived stress scores were lower after completing the training intervention, three participants scores remained the same and one participant's score increased.

Figure 7.12: Pre-testing vs. post-testing distribution of perceived stress scores
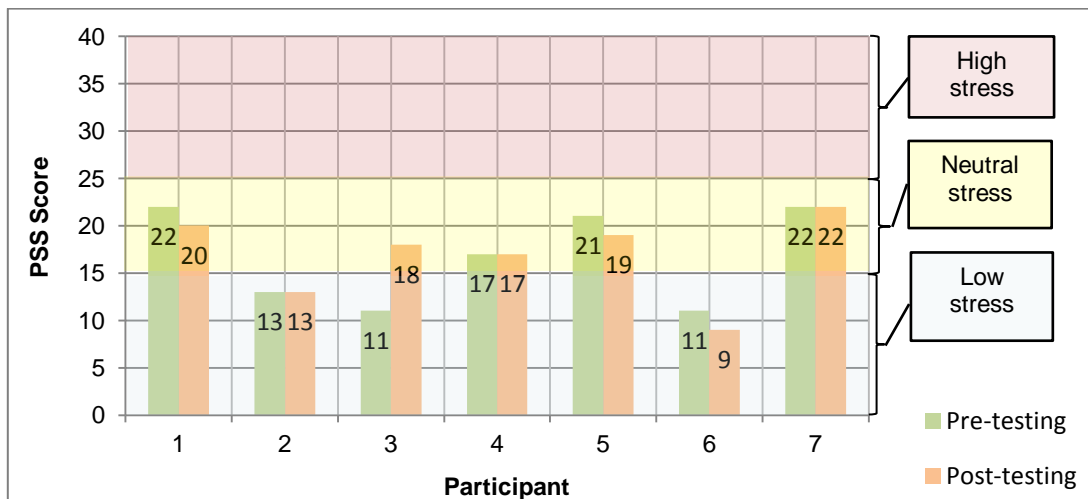
7.6 Phase 2 (pre-testing vs. post-testing)

This section reports the generalised findings from Phase 2 of the research design and explores the physiological view point of email stress before (pre-testing) and after (post-testing) the training intervention. This was achieved using observation of blood pressure, heart rate, cortisol, and email diaries. Responses were used to identify changes and evaluate the impact of the training intervention as an email management tool. Results were combined to create a stress response and cross-referenced with diary entries separated by activities.

7.6.1 Calculations and invalid data

Participants were provided with Spacelabs ABP machine to measure blood pressure and heart rate, test tubes to collect saliva-samples for cortisol testing and administered email diaries to record activities, across four monitoring periods. The first and second monitoring periods collected data before the training intervention, where the third and fourth monitoring

periods collected data after the training intervention. Thus, participants generated the following data:

- Day 1/Day 2 (pre-test) and Day 3/Day 4 (post-test) blood pressure readings
- Day 1/Day 2 (pre-test) and Day 3/Day 4 (post-test) heart rate readings
- Day 1/Day 2 (pre-test) and Day 3/Day 4 (post-test) cortisol readings
- Day 1/Day 2 (pre-test) and Day 3/Day 4 (post-test) diary entries, including email activities and stress scores.

For the purpose of clarity, the adjective 'stress response' was defined as an increased or decreased response observed from blood pressure, heart rate, cortisol or stress scores during a recorded activity. The calculations used to form the basis of a stress response are detailed in the next sections.

7.6.1.1 Blood pressure and heart rate

For the purpose of this study the baseline was the computed blood pressure, i.e. mean arterial pressure (MAP) [= [(2 x diastolic) + systolic] / 3], and heart rate averages across Day 1, Day 2, Day 3 and Day 4, respectively, for each participant. Participants thus acted as their own baseline for each monitoring period whereby an increase above baseline indicated elevated stress or, likewise, decrease below baseline indicated reduced stress, during recorded activities. From the twenty-eight monitoring periods possible from this study, i.e. seven participants over four monitoring periods, one seventh of blood pressure and heart rate recordings were missing. Participants on these occasions had either failed to attach/remove machine according to instructions or were unable to wear the machine during the allocated period. Phase 2 results were thus based on a total of twenty-four monitoring periods.

7.6.1.2 Cortisol

Mean cortisol values were computed for each interval during Day 1, Day 2, Day 3 and Day 4, respectively, i.e. at the start of the monitoring period (Sample 1 AM), before lunch (Sample 2 AM), in the afternoon (Sample 3 PM) and at the end of the day (Sample 4 PM), from all valid samples collected. For the purpose of this study, these mean values were considered the baseline for each monitoring period and used for within group comparison. From the one hundred and twelve saliva samples possible, i.e. seven participants over four days completing four samples, less than a tenth were missing. On these occasions participants either failed to remember or only partial saliva samples were collected. Phase 2 results were thus based on a total one hundred and two saliva samples.

7.6.1.3 Stress scores

A rating scale question (i.e. how stressed have you felt over that time period?) was used in the email diaries to gather a perceived perception of stress during recorded activities. An equidistant presentation of scales, i.e. 1 to 10 (1=Low, 10=High), was used. The mean stress scores were calculated and used as the baseline for each monitoring period whereby an increase above the baseline indicated elevated stress or, likewise, decrease below baseline indicated reduced stress. Participants thus acted as their own baseline for each monitoring period. From the twenty eight email diaries collected, i.e. seven participants completing four email diaries, one was missing. On this occasion the participant either failed to remember, or chose not, to record responses. Phase 2 results were thus based on a total twenty seven monitoring periods.

7.6.2 Stress response during email and work activities

Participants' blood pressure and heart rate were monitored to discover if employees experienced an increased stress response when using email in the workplace, and if this varied when multitasked alongside other work activities. A tally, based on collective data gathered from Day 1, Day 2, Day 3 and Day 4, respectively, recorded the number of instances each participant's blood pressure and heart rate increased during recorded activities. A summary of results, ranked in order of highest total instances to lowest, is presented in Table 7.5.

Participants' email activities were clustered into three groupings: (i) email only, i.e. using email exclusively, (ii) multitasking email and other communications, e.g. email & phone, email & meeting and email, phone & meeting and (iii) multitasking email and non-communications, e.g. email & paperwork, email & word processing, email & travel, to name a few. Overall results revealed participants had almost double the number of increased blood pressure and heart rate readings when email was used alongside other communications, compared to email and non-communications or email on its own, in the workplace.

Table 7.5: Tally of increased blood pressure, heart rate and stress score instances during email and work activities

		Participant							**Sub-Total**	**Total**
		#1	**#2**	**#3**	**#4**	**#5**	**#6**	**#7**		
Email & Other Communications	BP	5	8	10	10	16	4	2	55	101
	HR	6	2	8	8	11	10	1	46	
Other Communications	BP	13	1	2	1	5	6	5	33	66
	HR	8	3	0	9	6	2	5	33	
Email & Non-Communications	BP	0	2	9	3	3	8	8	33	63
	HR	0	2	10	4	4	4	6	30	
Email Only	BP	6	2	2	5	0	2	6	23	53
	HR	8	3	3	6	0	4	6	30	
Multitasking Other Communications	BP	0	0	0	4	0	0	0	4	6
	HR	0	0	0	0	0	2	0	2	

In addition, work activities were clustered at times when email was not used, such as other communications, e.g. phone only or meeting only, and multitasking of other communications, e.g. phone & meetings. This is shown in Table 7.5. Based on results tallied from the final ranking, figures showed multitasking email & other communications to cause the most number of increased blood pressure and heart rate instances, and multitasking of other communications, specifically those not including email, to cause the least. These results indicate that email specific activities, rather than employee's ability to multitask, may be causal of increased blood pressure and heart rate readings.

7.6.3 Stress response during information activities

The various email tasks carried out by participants in the workplace, e.g. reading, filing, sending and finding email, were monitored to discover if employees experienced an increased stress response, and if this varied by activity. These tasks were clustered into four groupings: (i) information gathering (IG), (ii) information sharing (IS), (iii) information management (IM) and (iv) information retrieval (IR). A tally, based on collective data gathered from Day 1, Day 2, Day 3 and Day 4, respectively, recorded the number of instances each participant's blood pressure, heart rate and stress scores increased. A summary of results, based on the most common activity groupings[28], ranked in order of highest total instances, is shown in Table 7.6.

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[28] It is worth noting that the information activities presented in the table were highlighted by the majority of participants, i.e. five or more. Whilst other combinations of activities were carried out these were recorded by fewer participants and caused fewer instances of elevated stress responses.

Table 7.6: Ranked tally of increased blood pressure, heart rate and stress score instances during information activities

Email Task	Information Activities		#1	#2	#3	#4	#5	#6	#7	Sub-Total	Total
Reading and sending	IG & IS	BP	1	0	0	12	10	3	4	30	79
		HR	3	0	0	8	7	6	4	28	
		SS	3	3	0	4	7	4	10	21	
Reading, sending and finding	IG, IS & IR	BP	5	6	2	0	0	7	4	24	65
		HR	5	2	1	0	1	8	5	22	
		SS	5	2	2	0	0	4	6	19	
Reading, sending and filing	IG, IS & IM	BP	2	1	9	2	1	0	4	19	42
		HR	1	1	6	2	1	0	1	12	
		SS	0	0	7	0	4	0	0	11	
Reading, sending, filing and finding	IG, IS, IM & IR	BP	2	0	3	2	5	0	2	14	38
		HR	2	0	4	3	4	0	2	15	
		SS	2	0	2	2	3	0	0	9	

Results found the most instances of increased blood pressure, heart rate and stress scores occurred when participants were reading and sending email, i.e. gathering and sharing information. The second and third ranked tasks also included the above, in addition to finding email and filing email, respectively. It was also evident that participants frequently multitasked two or three different activities at the same time. Nevertheless, the multitasking of all four information activities ranked only fourth on the scale, with almost half the number of recorded increases as reading and sending alone. Moreover perceived stress scores appeared, for the most part, proportionate to the physical stress responses recorded. Taken as a whole, the observed results indicate that information gathering and sharing activities are contributory to the majority of employees' elevated stress responses.

7.6.4 Stress response before and after training intervention

Participants' blood pressure, heart rate, stress scores and cortisol were monitored to discover if participant's stress responses varied after the introduction of the training intervention. Mean blood pressure and heart rate readings during pre-testing and post-testing were initially compared to explore overall differences amongst participants. However, as shown in Table 7.7, results were largely inconsistent. Two participants showed an increase in both blood pressure and heart rate after the intervention, one participant showed a decrease in both, and four participants presented conflicting readings, i.e. where blood pressure decreased and heart rate increased, or vice versa, simultaneously. Mean blood pressure and heart rate readings, specifically during email activities, were thus calculated and used for comparison. However similar issues, as noted above, continued to occur and results remained inconclusive.

Nevertheless, results accrued from participants' perceived stress scores proved to be more consistent than their blood pressure and heart rate counterparts. Presented in Table 7.7, stress scores during pre-testing/post-testing, and during email pre-testing/post-testing, revealed that five of the six participants with valid responses, went on to show a decrease in mean stress scores during post-testing. This indicated participants' overall stress responses were lower after the training intervention. However, a direct comparison of cortisol values recorded during pre-testing and post-testing found both periods to be of similar cortisol concentration. Thus both followed a normal metabolism curve and diurnal rhythm; with highest levels observed in the early morning followed by continued gradual decline and lowest levels reported at the end of the day (Talbott, 2007 p.44). The only observed irregularity, as shown in Figure 7.13, occurred between Sample 2 and Sample 3 where overall cortisol was lower during post-testing. This tentatively suggests participants may have secreted slightly more cortisol, indicating an elevated stress response, when compared to similar timed pre-testing results.

Figure 7.13: Pre-testing vs. post-testing mean cortisol levels

	S1 (AM)	S2 (AM)	S3 (PM)	S4 (PM)
Mean cortisol during Pre-Testing	1.3562	1.2	1.1125	1.046
Mean cortisol during Post-Testing	1.3585	1.1799	1.0584	1.0272
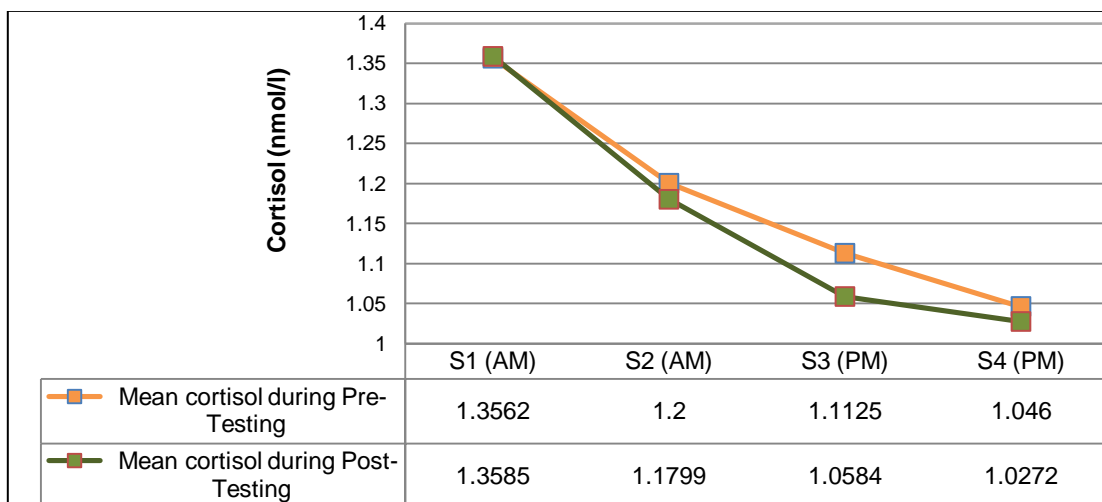
Table 7.7: Pre-testing vs. post-testing mean blood pressure, heart rate and stress scores

	Mean during Pre-testing	**Mean during Post-testing**	**± dif**	**Mean during Email (Pre)**	**Mean during Email (Post)**	**± dif**
Participant 1	MAP: 94.5 HR: 60.5 SS: 3.5	MAP: 93.5 HR: 64 SS: 3.5	-1.0 +3.5 +/- 0	MAP: 94.2 HR: 61.0 SS: 3.6	MAP: 94.8 HR: 66.1 SS: 3.6	-0.6 +5.1 +/- 0
Participant 2	MAP: 93 HR: 83 SS: 3.1	MAP: 102 HR: 88 SS: 2.6	+9.0 +5.0 -0.5	MAP: 93.9 HR: 81.9 SS: 3	MAP: 102.4 HR: 86.5 SS: 2.3	+8.5 +4.6 -0.7
Participant 3	MAP: 82.5 HR: 72.5 SS: 2.6	MAP: 83.5 HR: 72 *N.D.*	+1.0 -0.5 -----	MAP: 84.4 HR: 72.9 SS: 2.8	MAP: 84.4 HR: 71.2 *N.D.*	+/- 0 -1.7 -----
Participant 4	MAP: 95.5 HR: 64.5 SS: 3.2	MAP: 93.5 HR: 62 SS: 1.4	-2.0 -2.5 -1.8	MAP: 96.0 HR: 62.7 SS: 3.2	MAP: 93.9 HR: 62.2 SS: 1.3	-2.1 -0.5 -1.9
Participant 5	MAP: 94.5 HR: 71.5 SS: 6	MAP: 96.5 HR: 70.5 SS: 5.8	+2.0 -1.0 -0.2	MAP: 94.1 HR: 71.7 SS: 6	MAP: 96.9 HR: 70.4 SS: 5.9	+2.8 -1.3 -0.1
Participant 6	MAP: 85 HR: 81.5 SS: 3	MAP: 83 HR: 85 SS: 2.1	-2.0 +3.5 -0.9	MAP: 83.9 HR: 81.8 SS: 3.2	MAP: 83.2 HR: 86.4 SS: 1.9	-0.7 +4.6 -1.3
Participant 7	MAP: 93 HR: 83 SS: 3.9	MAP: 96 HR: 88 SS: 2.8	+3.0 +5.0 -1.1	MAP: 93.0 HR: 83.2 SS: 4.2	MAP: 94.8 HR: 84.8 SS: 2.2	+1.8 +1.6 -2.0
Note: MAP = Mean arterial blood pressure, millimetres of mercury (mmhg); HR = heart rate, beats per minute (bmp); *N.D.* = No data.						

7.7 Phase 1 & 2 (data triangulation)

To provide a comprehensive insight of a participant's individual results and the impact of the email training intervention, an in-depth analysis using data triangulation, i.e. bringing together a variety of data sources to profile each participant on a case-by-case basis, was conducted. This ensured the researchers own notes were synthesised together with psychological responses recorded during Phase 1 (as previously discussed in section 7.5) and physical responses recorded during Phase 2 (as previously discussed in section 7.6). In turn, each participant's results were examined and profiles summarised, as presented in the following sub-sections.

7.7.1 Profile: Participant 1

Participant 1 was female, with no known health issues, who had only consulted the GP for minor ailments in the past two years. Pre-testing results found she often left her inbox open throughout the work day, although she later made note that her email was often limited with the majority of her time being spent using email at the end of the day or out of work-hours, i.e. evenings at home. Likewise results showed few instances of increased email related stress responses. This was expected if email was used outside work hours and thus not monitored in this study. Nevertheless, when increases occurred they were frequently found during other activities, specifically meetings. Taken as a whole, Participant 1 appeared to suffer with an

unhealthy email-work-life balance, indicating excessive email use with no active email management strategy in place to handle the volume of email received and sent.

Reflecting on the training intervention, Participant 1 appeared optimistic with some of her post-testing results, e.g. improvements in writing clearer emails. In addition, whilst she continued to feel overloaded by email, after the training intervention she no longer showed signs of email addiction (previously qualified on Criteria 2). She also displayed a lower perceived stress score and actively changed her email filing strategy from no-filer to spring-cleaner. On the other hand, physical stress responses gathered were found to be overall higher after the intervention. Discrepancies between perceived and physical stress indicators suggested that whilst the training intervention may have improved some aspects of email use and perceived stress, it was unable to minimise the physical stress email induced in the same way.

The researcher also made note that Participant 1 on more than one occasion appeared reluctant to change her email behaviour and responded least well to the training intervention delivery. In reference to her own email use, before and after the intervention, she commented: "*well that's the way it is and it won't change*" and "*I need to send those emails… there is no changing that*". Likewise she made no changes to her email consumption after the intervention, and later noted that she would not recommend the seminar workshop or videos to her colleagues. When probed, Participant 1 alleged the "*seminar didn't really relate to the nature of work and tasks in our office*" and "*discussion was strongly discouraged and curtailed*".

7.7.2 Profile: Participant 2
Participant 2 was female with some minor health issues, none of which were found to advertently affect stress, either psychologically or physically, as part of this study. Participant 2 immediately raised concerns with email use at the start of data collection, as asked 'when are you glad to receive new email?' she commented "*Never!*". Her email management approach before the training intervention was to leave her inbox open throughout the work day. It is worth noting that she managed multiple email inboxes as part of her job role. Participant 2 adopted a spring cleaning filing strategy, suffered from email addiction (qualified on Criteria 1) and responded with 'could not answer' when asked if she experienced email overload in the workplace. Overall she was found to much prefer other forms of communication, such as the phone, and thus primarily struggled with the amount of email that needed handling throughout the work day.

On the whole, Participant 2 commended the training intervention. In particular the videos, which she enjoyed and recommended others to view.

Likewise she commented: "*the seminar training was really useful and motivating*". However, post-testing results found she made few changes to her email use. Although she acknowledged accessing email less frequently, she made no improvements to her choice of filing strategy and continued to leave her inbox open on the desktop. Defending this decision she added that Microsoft Word or Excel programmes were usually on the front screen, where email remained underneath. Likewise, Participant 2 showed no changes in workplace well-being and continued to suffer from email addiction (qualified for a second time on Criteria 1) after the training intervention.

Comparative data from pre-testing and post-testing indicated Participant 2's physical stress responses were, on average, higher after the training intervention than before. Although on a number of instances there were some inconsistencies, e.g. blood pressure and stress scores were unsynchronised despite the fact that equivalent heart rate readings and stress scores, over the same period, corresponded to one another. Nevertheless, results suggest the training intervention was neither beneficial to her perceived nor physical stress responses in comparison to normal use.

7.7.3 Profile: Participant 3

Participant 3 was female, with no known health issues, who had only consulted the GP for minor ailments in the past two years. Whilst she recognised many benefits of email use, e.g. "*saves paper - saves time – instant delivery*", pre-testing results suggested Participant 3 was frustrated with email as a result of other people's attitude and/or behaviour, rather than her own: e.g. "*sometimes people don't realise that some things would be easier dealt with by phone... often email doesn't answer the whole question or prompts another set of questions*". Participant 3 adopted a frequent-filer approach to email, suffered from email overload and, whilst associated with some signs of email addiction, did not qualify on either criterion. Furthermore results found Participant 3, in the majority of instances, showed increased stress responses during multitasking activities, e.g. using email in meetings, on the phone or alongside paperwork, and fewest instances of increased stress occurred when multitasking involved email filing. On the whole, Participant 3 appeared to cope well with email and struggles appeared to be the result of not being able to control other people's misgivings with email and multitasking more than one communication medium at a time rather than email alone.

Post-testing results found Participant 3 responded very well to the training intervention and championed many of the recommendations to fellow co-workers and other study participants. Since the training intervention she had made many changes to her email habits, such as incorporating IMPACT, subject lines and subject prefixes, into everyday email use. She found both the videos and seminar to be useful, and noted their value as a combination.

Comparisons between pre-testing and post-testing found email related stress responses were, for the most part, consistently lower after the intervention. Nevertheless perceived stress scores increased, and she continued to suffer from email overload. Although notes this was "...*much less and constant*".

It is also worth noting that Participant 3 indicated her job role within the organisation had changed and she felt significantly more stressed when data was collected during post-testing in comparison to pre-testing. Re-iterating her confidence in the training intervention she added that it had changed her email behaviour more positively, e.g. "*not checking email in between the day has taken away my sense of guilt I had for not checking and minimised the amount I am interrupted*". On the whole, the training intervention appeared to greatly improve Participant 3's attitude and behaviour in managing email in the workplace. Whilst workplace well-being had not been found to show such improvements, a number of natural chaotic factors (as detailed in section 1.5) were considered the source in this case.

7.7.4 Profile: Participant 4
Participant 4 was female, with no known health issues, who had only consulted the GP for minor ailments in the past two years. Participant 4 displayed OCEAR traits during both personality assessments and, as previous research by Sheldon *et al.* (1997) suggests, she was more likely to feel genuine and self-expressive within her given role in comparison to others (as previously mentioned in section 7.5.3). In main stream psychology, authenticity is also considered to be the most fundamental aspect of well-being (e.g. Horney 1951; Rogers 1961; Winnicott 1965; Yalom 1980). Participant 4, during both pre-testing and post-testing, scored neutral perceived stress in the workplace.

In terms of email use, data collected during pre-testing found Participant 4 to be a spring-cleaner, who often left her inbox open and regularly checked emails more than ten times a day. Moreover she was found to suffer from both email overload and email addiction (qualified on Criteria 1 & 2). Physical stress response results were relatively consistent with those above and diary entries supported the belief that she frequently checked email throughout the day. Reading and sending activities typically caused more instances in increased blood pressure, heart rate and stress scores. Taken as a whole, Participant 4 was found to consistently over-check email throughout the day and as a result demonstrated many addictive characteristics when managing email at work. This email behaviour however did not appear to adversely affect her overall workplace well-being.

As a result of the training intervention Participant 4 actively made the decision to change her filing strategy to frequent filing. She also found it to have helped relieve some of her problems with email use; specifically

adopting new techniques such as IMPACT, which allowed her to work out what she wanted from each email before she sent it. Furthermore it was noted how encouraged she felt when other participants in the study began making similar changes to their email use immediately after the training had taken place. Physical stress responses recorded during post-testing were found to support these assumptions. Participant 4 reduced her email consumption, was no longer classified with email addiction and displayed decreased stress responses, across all four stress indicators, during email use after the training intervention. The training intervention largely improved Participant 4's email behaviour, and whilst she continued to feel overloaded by email, she commented: "*I am still working through the old emails trying to file them*".

7.7.5 Profile: Participant 5

Participant 5 was male, with no known health issues, who had only consulted the GP for minor ailments in the past two years. Data collected during pre-testing found he placed great value on email as an "*essential work tool*", and "*essential to my role in external activities*". Advocating that email should be "*clear in subject and the text... and action (if any) required*", he went on to add that "*I am sure that I don't really do this well, but mange ok*". Participant 5 recorded the highest volume in email consumption, sending and receiving up to 40 emails, and 80 emails, per day respectively. Furthermore he suffered from email overload and, whilst associated with some signs of email addiction, did not qualify on either criterion. In general, Participant 5 appeared to manage his email well, adopting a frequent filing strategy, and was consciously aware of how changes could be made to improve his own email behaviour. It is worth noting that Participant 5 did share a personal assistant and as a result his email would often be filtered or delegated accordingly.

Overall feedback on the training intervention was very positive and Participant 5 asserted that the training, specifically the videos, helped him to manage email at work better. Post-testing results revealed a decrease in perceived workplace stress, and he no longer considered himself to suffer from email overload. Nevertheless, since the training intervention he openly admitted to making few changes to his email behaviour and had increased the number of emails he sent by almost a third, i.e. 'up to 40 emails' to 'up to 60 emails' per day. Defending this decision he added "[I] *fully intend to become a reformed character but need time to invest to do it*".

Physical stress response results appeared to show some inconsistencies. Whilst he displayed a decrease in heart rate and stress scores during email use after the training intervention, concurrently blood pressure readings across the same period increased. Similarly, cortisol levels appeared to follow a normal metabolism curve and diurnal rhythm during post-testing, in

comparison to pre-testing when it was notably heightened. This indicated a lower stress response after the training intervention. Discrepancies between stress indicators suggested that whilst the training intervention may have improved some aspects of his perceived and physical stress, modest changes made to his email use indicated the training had not been put into practice and thus may not be accountable for any positive change in stress.

7.7.6 Profile: Participant 6

Participant 6 was female who had consulted her GP and attended a hospital outpatient department in the past two years. This was not found to advertently affect stress, either psychologically or physically, as part of this study. Data collected during pre-testing found her to be a spring-cleaner, who often left her inbox open and regularly checked email up to six times a day. When it came to managing email, she was unaware of how to folder effectively and often lost work/actions amongst incoming new mail. Most of her frustration with email stemmed from the lack of time she had to manage her inbox, before and after the training intervention, and how she struggled to "*find time to file*". Furthermore, she frequently found herself being distracted by email and commented: "*it does take my focus off other tasks I may be trying to finish*". Despite showing low perceived stress scores in the workplace, she also suffered from email overload and email addiction (qualified on Criteria 1). Generally speaking she appeared to struggle most with her time management and organisation of tasks.

Participant 6 commented that the training intervention was "*valuable*". She now ensures her emails are short and concise, and actively uses other forms of communication, such as the phone, to share information more quickly. Even so, she was quick to remark that the delivery of the seminar workshop was poor and that the trainer "*was just giving the info*" and it was ultimately "*left up to you what you do with it!*". Nevertheless she would recommend both the seminar workshop and videos to her colleagues, and added: "*mainly seminar – videos as back up*". Comparison between pre-testing and post-testing results found several inconsistencies between physical stress responses, i.e. Participant 6 displayed decreased blood pressure and stress scores during email use after the training intervention, where concurrent heart rate readings increased. Cortisol levels on the other hand showed a decrease and, likewise, workplace well-being scores remained low after the intervention. For the most part the training was found to improve her email behaviour and perceived stress, although physical stress responses during email use could not be determined.

7.7.7 Profile: Participant 7

Participant 7 was female, suffered from asthma and had only consulted the GP for mild ailments in the past two years. Pre-testing results found she

suffered from email overload and email addiction (qualified on Criteria 1 & 2). She was also found to be a spring cleaner and used her inbox to store the entirety of her work tasks and information including contacts, appointments and electronic documents. Consequently this allowed her access to her workload from any location, which led her to admit that she often took work home and found herself managing email outside work hours. For the most part, Participant 7 appeared to struggle to maintain an email-work-life balance and subsequently demonstrated many addictive characteristics when using email. Furthermore, her recorded well-being score of 22 was on the fringe of neutral to high perceived stress in the workplace.

Participant 7 made several changes to her email behaviour after the training intervention, including filing, reducing inbox size from 900 to 140 emails, and trying to read and action email on one occasion She continued to adopt a spring cleaner filing strategy, which she notes "*is not quite daily but more*" and has also incorporated an email schedule into her work day. The latter appears to have also supported her efforts to "*stop checking* [email] *as much at home or on weekends*". On the whole she found the training intervention to be helpful as it "*made me realise how many poorly constructed emails I receive and how much time I waste as a result of trying to work out what to do*". Nevertheless results also indicated she suffered email overload and, although she showed some improvements, continued to be classified with email addiction (qualified on Criteria 1 only). Likewise, physical stress response results showed inconsistencies, i.e. decrease in both stress scores and cortisol levels during email use were found to occur during post-testing, as blood pressure and heart rate readings across the same period increased. Thus, whilst overall Participant 7 showed improvements in her mentality when dealing with email use, her overall stress responses could not be determined.

7.8 Discussion
This section presents the main research findings with wider contextual references to academic literature. The key findings are summarised, before going on to identify the additional relationships found between psychological and physiological stress, and openness vs. resistance to managing organisational change.

7.8.1 Key findings
The main findings of the study showed that

Before the training intervention:

- Employees were glad to receive new email for timely information or in response, gratification for work complete and for personal/social communication

- They were particularly annoyed when new email interrupted or distracted them from work tasks, when colleagues were found passing the buck or when irrelevantly copied/'reply to all'/'cc' emails were received
- The majority of employees adopted some type of filing strategy, suffered from email overload and several were characterised with email addiction.

After the training intervention:

- Several employees actively changed their email behaviour and habits, e.g. improved writing style and checked email on fewer occasions each day, whilst others acknowledged an intention to change, although in practice this had been unachieved and time restraints were often blamed
- Employees continued to adopt some type of filing strategy, a third of employees no longer suffered email overload, and less than half continued to suffer email addiction
- Physical stress responses, particularly blood pressure and heart rate readings, were largely inconsistent. Even so, generally speaking, cortisol levels indicated employees experienced more stress, whereas perceived stress scores indicated less stress, after the training intervention.

7.8.2 Additional findings

Bringing together results, from both the group and individual participant profiles, led to the discovery of few additional findings from the ███████ █████ study. Explored in more depth as part of the following sub-sections these included: psychological vs. physical – "is perception half the battle?" and openness vs. resistance – managing organisational change.

7.8.2.1 Psychological vs. physical: "is perception half the battle?"

Earlier in this thesis, as part of a focus group conducted at the ██████ ████████, a quandary was presented of which was more reflective of the truth – a psychological or a physiological understanding of stress? At the time, one of the employees commented: "*is perception half the battle?*" (as mentioned in section 6.3.5). Whilst little value was placed on this comment, data collected from the ██████████ revealed that two employees were found to show positive perceived and physical stress, despite few practical changes to their email behaviour being achieved after the training intervention (see section 7.7.5 and 7.7.6 for participants 5 and 6 profiles respectively).

Over the past thirty years, there has been much research (e.g. Freud 1961; Loftus & Klinger 1992; Greenwald *et al.,* 1995; Dewey 1997; Bargh & Morsella 2008; Griffin & Moorehead 2012) on the extent to which people are aware of the influences on their judgements and decisions, and reasons for their behaviour. The power of perception, first coined by Aristotle and later revisited in works by Sorabji (1974), Fowler (1995) and Caston (2005), to name a few, has been widely explored and debated. Fundamentally, the

power of perception suggests that a human's sense organs take on, and in some instances become, what it is they perceive (Caston 2005 p.245). Thus, if they perceive their email to be manageable, despite existing feelings of frustration and/or stress, their ability to cope matches their perception rather than reality. Confusion as to the interpretation of Aristotle's theory has caused much debate. Academics such as Sorabji (1974) support the literal stance, i.e. interpret this to be a physiological process in which the sense organs 'literally takes on' the perceptible quality. However others such as Burnyeat (1983) place no value in physiological or material change during perception, instead assuming it to be a purely 'spiritual'.

In much the same way, psychologists have taken these theories of the mind and applied them in practice as a tool for achievement, e.g. positive thinking. When it comes to issues surrounding stress, coping and health, common to most views is the idea that positive thinking or well-intentions in some way involves holding positive expectancies for one's future. Such expectancies are thought to have built-in implications for behaviour. That is, the actions that people take are thought to be greatly influenced by their expectations about the likely consequences of those actions. People who see desired outcomes as attainable continue to strive for those outcomes, even when progress is slow or difficult. When outcomes seem sufficiently unattainable, people withdraw their effort and disengage themselves from their goals. Therefore, people's expectations provide a basis for engaging in one of two different classes of behaviour: continued striving or giving up (Scheier & Carver 1993).

Whilst issues are raised, the debate of this study's results on such a literal impact of employee's ability to perceive less stress or exploit positive-thinking to experience less stress, both psychologically and physically, is interminable. Thus it is neither relevant nor achievable within the realms of this thesis. Nevertheless, the notion that such an attitude can improve human behaviour indicates the concerns of one's ability and attitude to cope with change. This is addressed in the next section.

7.8.2.2 Openness vs. resistance: managing organisational change

Responses to questionnaires, and notes made by the researcher throughout the study, found some of the employees within the ███████████ appeared both open and reluctant to change their email behaviour. Recognised in the participant profile results (as described in sections 7.7.1 to 7.7.7), Participant 3 advocated the training intervention, and actively recommended it to other employees in the workplace. Consequently, Participant 3 involuntarily acted as an 'email champion' on behalf of the training intervention. Champions are often employees within the organisation, at any level, who have the social, political or interpersonal

knowledge to influence the acceptance of organisational change (Warrick 2009). As Howell (2005) recognises, dedicated champions are pivotal to success and have been responsible for most of the significant changes that succeed, and thus must be supported in their efforts (Beatty & Gordon 1991; Coakes & Smith 2007). These roles often fall naturally, and as argued by Warrick (2009), change can be rarely accomplished without someone championing it.

In contrast, profile results from Participant 1, who openly criticised the training intervention and her work environment, implied she could never change her email behaviour. Likewise, Participants 5 and 6, who both provided positive feedback on the training intervention, were found to be neither in a position or willing to take time to make the changes needed to improve email use. Reluctance and/or potential resistance to organisational change, as indicated by these participants, represents an important aspect of an employee's readiness and motivation to embrace new guidance, advice, and/or recommendations. As such, recipient participation is a fundamental aspect of the change process (Armenakis & Harris 2009).

According to Burnes (2004) change is an ever-present feature of organisational life, both at an operational and strategic level. Graetz (2000), cited in By (2005), goes as far as to suggest that "against a backdrop of increasing globalisation, deregulation, the rapid pace of technological innovation, a growing knowledge workforce, and shifting social and demographic trends, few would dispute that the primary task for management today is the leadership of organisational change". Balogun & Hailey (2004) record the failure rate of change initiatives at approximately 70 per cent. The methodology behind reaching this specific number can arguably be questioned, along with the interpretation of 'failure' and 'success' (By 2007), nevertheless the problem for organisations remains, how do you ensure change? While there is ever-growing literature emphasising the importance of change and ways to approach it, including champions and recipient participation as noted above, very little empirical evidence has been provided on the likelihood of sustainable change.

Many researchers (e.g. Armenakis, Harris & Mossholder 1993; Madsen, Miller & John 2005; Smith 2005; Holt *et al.* 2007) advocate the need for change readiness, i.e. the cognitive precursor to the behaviours of either resistance to, or support for, a change effort, before any form of intervention begins. Whilst others believe support is necessary after delivery, or during the implementation phase. The latter techniques and strategies, although not exclusive, typically fall into one of the following categories: education and communication, participation and involvement, assistance and support, incentives, negotiation, manipulation and co-optation and coercion (Pathak 2011, p.108). Previous academics and heads of organisations have been

found to use these strategies in different forms, e.g. training and workshops (Blokdijk 2008, p.24; Kneer 2009, p.1), feedback and recognition (Al-Mudimigh & Al-Mashari 2002), top management commitment/support (Jex 2002, pp.456-458), and role models or 'champions' (Liang 2010, pp.76-77), and consider them to have led effective change management. Nevertheless, longevity of such strategies remains limited.

For the most part, the presence of employee will, motivation or positive thinking (as mentioned in section 7.8.2.1) to embrace the change process in practice is considered essential to generating success (McLaughlin 2005). In terms of training interventions, like those used in the ▮▮▮▮▮▮▮▮▮ study, employees need to be convinced that it is relevant to their roles, responsibilities and working relationships (Hellriegel & Slocum 2009, p.512). This has led some researchers (e.g. Nadler 1981; Huy & Mintzberg 2003; By 2005) to believe that the construction of pragmatic frameworks for managing change is essential, where the consensus is that change comes in all shapes, forms and sizes that no one blanket provisory can be established (Burnes 1996; Grieves 2000; By 2005 & 2007). Future research would benefit from considering these additional techniques when supporting change and/or implementation of email management strategies in the workplace.

7.9 Summary and conclusion
This chapter presented results of the ▮▮▮▮▮▮▮▮▮ study to achieve Objective 6 (*to critique the use of an email training intervention to manage email stress and related stressors*). The concluding sub-sections reflect on the methods and shortcomings from the research design, and summarise the effectiveness of email training to manage email stress and related stressors.

7.9.1 Reflection on methods and research design
Discrepancies between psychological and physiological stress responses were previously raised in the first study at the ▮▮▮▮▮▮▮▮▮ (as mentioned in section 4.6.2.1). In an attempt to minimise these variations in later research, changes were made for the ▮▮▮▮▮▮▮▮ study (as described in section 3.8). Despite these efforts, for a second time the research design yielded both parallel and overlapping results and, after data triangulation, more variations between measures were identified. Similar factors, e.g. recording errors or social desirability, as previously raised in the first study were considered that could have caused such inconsistencies as noted above. However, data collected from the ▮▮▮▮▮▮▮▮ also revealed discrepancies between stress responses, e.g. concurrently low perceived and high physical stress, and within stress measures, e.g. blood pressure and heart rate incongruity. The literature to re-examine triangulation, in order to identify issues associated with its use in research, was carried out.

Many strengths and benefits have been identified (e.g. Jick 1979; Gable 1994; Erzberger & Prein 1997; Jakob 2001; Hammersley 2008; Casey & Murphy 2009); some of which had already been identified when rationalising triangulation as part of the research design (as described in section 3.4.4 for methods triangulation and 3.8.2.1 for data triangulation). However, whilst it has the potential to yield more comprehensive and insightful data, results of this study and the previous study, have shown triangulation can equally lead to contradictory findings or few conclusions being drawn. The main failing ascribed to the interpretation of triangulation is that it assumes there is one reality and this is knowable (Colwell & Richardson 2002). Some commentators (e.g. Blaikie 1991 & 1993; Erzberger & Kelle 2003) deny these assumptions on the grounds that people have different perspectives of the world and, as such, respond differently to certain phenomena. The case of triangulation however shows how relatively straightforward practical research strategies have become caught up in the philosophical debates that now plague such inquiries. Checking other sources of information – both for the purposes of testing the validity of one's initial interpretation and to provide complementary information – is a routinely used practice in everyday life and one that was incorporated into scholarly work in the human sciences long before the triangulation metaphor was developed (Hammersley 2008). Given this, data is neither accepted nor rejected based on triangulation grounds.

Instead, it is advocated that data of different types can be used to determine what interpretations of the phenomena are more or less likely to be valid and provide complementary information that illuminates different aspects of what is studied. As a result, evaluation of the training intervention (addressed in section 7.9.2) adopted a triangulation-as-seeking-complementary-information investigative strategy, rather than triangulation-as-validity-checking of data gathered. These forms of investigative triangulation thus offer evidence to inform judgement rather than techniques to provide guaranteed truth or completeness (Hammersley 2008).

It also became evident to the researcher how many of the relevant, yet undisclosed conditions participants may or may not choose to share in research studies, e.g. Participant 3 made efforts to inform the researcher her change in job role and subsequent affect this had on her stress during post-testing. It is worth considering that many other conditions and/or circumstances that participants could have undisclosed or, likewise, those that the data collection tools chosen could equally not account for, e.g. a participant could have been running up and down the stairs when the device recorded blood pressure and heart rate, or receive emotional news that changed mood or overall well-being that was unrecorded on the email diaries. Similarly, reliability issues with regard to the questionnaires used, i.e. Personality/Big Five, were noticeable after considerable differences were

discovered over a relatively short, three month data collection, time span. Consequently the choice to adopt an absent-researcher role, with the intention to minimise the Hawthorne Effect and retain a natural and real-world environment of the phenomenon, limited verification of results. On the whole, it appeared that the decision to change research design, i.e. add more monitoring periods and repeated measures, with the intention to improve rigour and reliability of the stress indicators chosen as part of this study, only exacerbated the reality of natural chaotic factors and variables, and limitations of the chosen research design and data collection tools. It is made clear at the start of this thesis that the research design would be limited by an array of independent variables that could not be isolated from the environment under study. It became evident that whilst the natural workplace environment to measure and understand email related stress provided the greatest insight, it would always remain virtually impossible to model and factors exist beyond the researcher's control (Walliman 2006).

7.9.2 Overall effectiveness of email training

An action model to present recommendations was devised to better manage email in the workplace (see Figure 5.6 in this thesis). This was derived from a comprehensive synthesis of existing literature, research methodology and authors own research findings (as summarised in Chapter 5). However, the need to test the effectiveness of these recommendations was deemed necessary and subsequently formed an email training intervention that included seminar based training and animation videos with the ██████ ██████ at Loughborough University.

On reflection, the training intervention was considered successful at improving many aspects of email use. For the most part, employees showed fewer signs of email addiction, improvements in their email filing strategy, and lowered perceived stress in the workplace. However, in some cases employees were found to show minimal, if any, changes after the training intervention, e.g. email consumption remained the same and employees continued to suffer from email overload. As noted in the preceding section, discrepancies were also found to occur between most employees' stress responses, e.g. concurrent low perceived and high physical stress, and within stress measures, e.g. blood pressure and heart rate incongruity. Further examination to explore participants' results on a case-by-case basis led to the notion that other factors could be at play, although none of these could be deemed causal (as previously discussed in section 7.8.2). Although feedback suggested areas for improvement, the email training was not found to be detrimental and did contribute to the improved email management for some employees. It is therefore concluded both the seminar based training and animation videos to be an effective intervention to manage email stress and related stressors in the workplace.

It is worth noting that the study design did not explore the action model recommendations individually, but rather as a combined effort to improve email use. With this in mind, future research may benefit from setting up multiple experimental designs to further explore elements of the training intervention in isolation, e.g. seminar based training or video animations only, to test the extent to which each of these could be found to improve email behaviour. Likewise, comments and feedback gathered on the training intervention would need to be considered and lessons learnt to improve use in future research. Nevertheless these should not undermine the action models recommendations or the conclusions drawn.

Chapter 8 Conclusion

"Do not spoil what you have, by desiring what you have not. Remember that what you now have was once among the things you only hoped for"
*** Epicurus ***

8.1 Chapter overview

This final chapter concludes the research of this thesis. To synthesise the research studies, and illustrate links between the key research findings, the model of email stress and management strategies is first presented. The chapter identifies the original contributions to knowledge found in this thesis and summarises how far the aims and objectives of this research have been fulfilled. Finally the limitations and advantages of this research, reflections on the process of performing research in industry and recommendations for further work are summarised.

8.2 Model of email stress and management strategies

The section brings together key research findings and identifies links within this research to present a model of email stress and management strategies in the workplace to achieve Objective 5 (*to develop an epistemology associated with the conceptualisation of email stress in the workplace*).

A systematic procedure was followed in the final stages of this research to construct a multidimensional model of email stress. Two independent conceptual models (as reported in Chapter 5), were initially constructed on previous literature (Chapter 2) and the research's own findings (Chapter 4). The explanatory model (see Figure 6.3) was designed to connect email stressors and their effect in the workplace, whereas the action model (see Figure 5.6), built in the form of a flow chart, was used to link descriptors and recommendations. After internal validation of the explanatory model (see Chapter 6) and an investigation in the workplace to evaluate the effectiveness of recommendations prescribed from the action model (see Chapter 7), the thesis was in a position to bring these models together to create a single integrative multidimensional model. The following sub-sections report on tasks achieved to construct the model.

8.2.1 Establish aim of the model

The thesis initially set out to devise a model to address Objective 5 (*to develop an epistemology associated with the conceptualisation of email stress in the workplace*). As first mentioned in section 5.1, the development of an epistemology was understood as the justification of knowledge in the conceptualisation of email stress in the workplace, where conceptualisation was understood as the process of studying variables to make statements and adding value to concepts under investigation (Mueller 2004).

This broad scope allowed for the construction of two multifaceted models, i.e. explanatory and action. However the need for a more specific aim was necessary to ensure the final model was realistic and achievable. The model would therefore depend on the problems that are to be solved, i.e. should produce correct (or approximate) predictions or problem-solutions (Heylighen 1993). Thus, in line with the research aims (*to determine whether email communication causes employees physiological and psychological stress and investigate the impact of email management strategies in the workplace*), the aim of the model was to identify both effects and causes of email stress, i.e. the problem, and management strategies, i.e. the solution. In order to achieve this, it was necessary to first consider the measures, stressors and management strategies reported throughout this thesis.

8.2.2 Key model measures, stressors and management strategies

The research design used to measure email stress (see Chapter 3), identified a number of stressors relevant to email stress (see Chapters 4, 5 and 6) and explored several different email management strategies to improve email in the workplace (see Chapter 5, 6 and 7). These variables, meticulously discussed up to this point and requiring no further explanation, are presented in Table 8.1. This provided the basis for scrutinising factors and in determining those for inclusion in the final model. The subsequent relationships, as established within this thesis, between factors are summarised in Figure 8.1.

Table 8.1: Summary of measures, stressors and management strategies

Measures	Stressors	Management Strategies

• Physical Stress
  ○ Blood Pressure
  ○ Heart Rate
  ○ Cortisol
• Perceived stress
  ○ Stress scores
  ○ Workplace well-being
• Personality
	• Email Overload
	• Email Addiction
	• Email Strategy
	  ○ Frequent Filer
	  ○ Spring Cleaner
	  ○ No Filer
	• Email Behaviours
		• 'Email free time'
		• Seminar based training and animation videos
		  ○ Email Schedule
		  ○ Email Filing
		  ○ Email Good Practice

Although relatively simple in form, Figure 8.1 visually communicates the relationships directly relevant to the phenomenon of email stress without adding confusion, or the inclusion, of extraneous information. It also allowed for the attribution of presumed causes, i.e. stressors (independent variable), with presumed effects (dependent variable) and management strategies accordingly. As a result, positive relationships (as illustrated with blue dotted lines on Figure 8.1), negative relationships (as illustrated with red dotted lines on Figure 8.1) or both (as illustrated with green dotted lines on Figure 8.1) could be distinguished between these factors. These relationships were reflected on before the final model design.

Figure 8.1: Relationships between presumed effects, presumed causes and management strategies
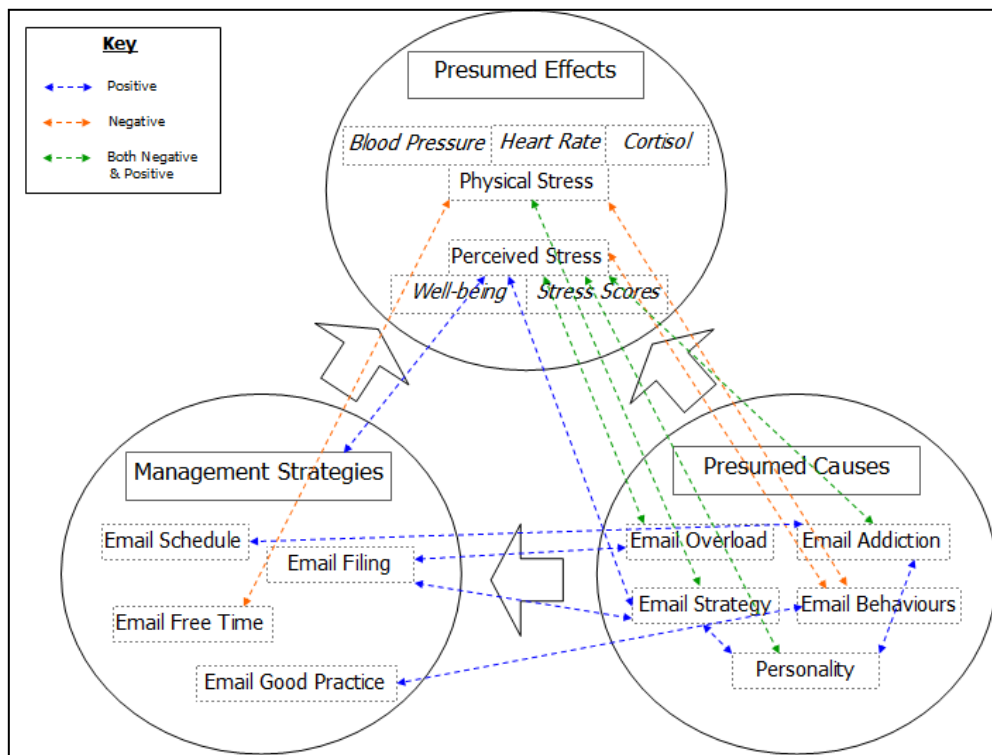
8.2.3 Articulate key questions or alternative approaches

It was pertinent for the model to meet a set of requirements, which when applied adequately addressed the needs of the model and more accurately ensured the expectations of the model could be met. The aim was re-examined (as first mentioned in section 8.2.1) and the following questions were identified to be answered in the affirmative:

- Can the model be used by academics and practitioners?
- Does the model account for psychological and physiological interpretations of email stress?
- Does it recommend suitable strategies to manage email use that have been tried and tested, and considered effective, in the workplace?
- Does the model account for positive and negative relationships found to exist in academic research studies and/or the researcher's insights?
- Can the model be added to by future research?

During construction of the multidimensional model, alternative model designs and questions arose. Aware that all models represent an incomplete abstraction of the phenomenon and the need for detail and focus change over time, the many questions and alternative hypotheses throughout the development process were documented (Gross 2003); see alternative designs and researcher's notes in Appendix N. These are considered relevant records in the justification of the model and for the stimulation of discussion or alternative choices in future research.

8.2.4 Present and review model

The multidimensional model of email stress and email management strategies is presented in Figure 8.2.

Figure 8.2: Model of email stress and email management strategies
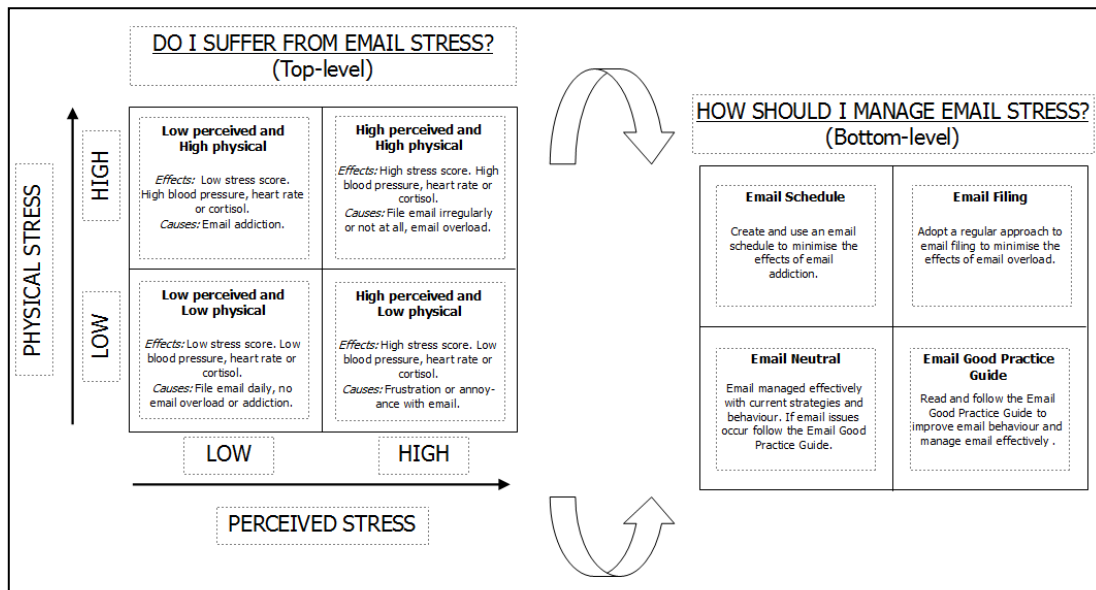
The problem-solution model is an extension of earlier models and designed for use by both academics and practitioners to determine email stress (i.e. do I suffer from email stress?) and recommend appropriate management strategies to improve on issues identified (i.e. how should I manage email stress?). The top-level (see left-hand side of model in Figure 8.2) can be used to consider the multifaceted levels of email stress and mutually encompass presumed effects, i.e. perceived stress and physical stress such as blood pressure, heart rate or cortisol, and presumed causes, i.e. email overload, email addiction, behaviour and existing filing strategies. The bottom-level (see right-hand side of Figure 8.2) is parallel to the top-level and purposively recommends relevant and effective management strategies based on the user's response to email stress as identified in the top-level.

The key questions the model sought to achieve (as mentioned in section 8.2.3) and subsequent limitations are examined in the following sub-sections.

8.2.4.1 Can the model be used by academics and practitioners?

The initial explanatory and action models (as devised in Chapter 5) were designed to meet the needs of academics and practitioners respectively. It would be fair to assume that the explanatory model was framed for academics concerned with email stress theory and the relevant measures, effects and causes identified as part of previous literature and the research's own findings. The action model on the other hand focused more on the practitioners need to find a solution to a problem, with factors presumed to cause email stress linked to the relevant recommendations and management

strategies. The multidimensional model was aimed at bringing these previous models together in order to fulfil both these users' needs.

8.2.4.2 Does the model account for psychological and physiological interpretations of email stress?

In order to remain objective equal value was placed on the general understanding of, and measures used to determine, psychological and physiological email stress in the workplace. This remained consistent in the design of the final model. Efforts to appreciate both physical and perceived interpretations of email stress in order to provide a fair representation of the research's own findings and user's understandings of the phenomena were made. It is worth noting that the motivation to achieve an answer is the reason the psychological vs. physiological debate exists and the differences between these viewpoints is likely to grow.

8.2.4.3 Does it recommend suitable strategies to manage email use that have been tried and tested, or considered effective, in the workplace?

Email management strategies found to be effective as part of this thesis were included. 'Email free time' (as mentioned in section 4.7.2) was not included. Email schedules, email filing and email good practice guide used as part of the email training (as mentioned in section 7.9.2) on the other hand were integrated to the final model design.

8.2.4.4 Does the model account for positive and negative relationships found to exist in academic research studies and/or the researcher's insights?

As previously mentioned in section 8.2.2, and illustrated in Figure 8.1 of this chapter, all positive, negative and combined relationships between factors relevant to email stress as identified throughout this thesis were identified. The final conceptual model included only those relationships established as part of this research or factors that were considered appropriate and relevant to the model design layout. This minimised the need to include any irrelevant relationships between factors and/or unnecessary information on the final model. Since no model can ever hope to capture all relevant information, and even if such a complete model were to exist, it would be too complicated to use in any practical way (Heylighen 1993). It is worth noting that alternative model designs (see Appendix N) were considered however, as expected, included too much information which became unclear and unmanageable in the model's design.

8.2.4.5 Can the model be added to by future research?

The model itself is flexible and any amendments or adjustments can be added with relative ease to either level, i.e. top or bottom, accordingly.

However future research is somewhat limited as it is assumed the repeated use of the 'email stress measuring methodology' (as presented in Chapter 3) to determine both perceived and, with more difficulty, physical signs of email stress in the workplace. Stress measures such as blood pressure, heart rate and cortisol testing are not common place in natural workplace environments or readily available to many practitioners. Whilst the physical stress measures were excluded in alternative model designs (see Appendix N), the implication of solely using perceived stress tools was considered subjective, bias and unreflective of the comprehensive understanding of email stress that had been sought throughout this thesis. As a result, the use of physical stress responses remained despite difficulties in monitoring and/or research design.

8.3 Original contributions to knowledge

This thesis demonstrated original contributions to three distinct yet interconnected areas of knowledge, i.e. (i) methodology (systematic methods to solve a research problem), (ii) theory (affirmation or development of evidence to inform or extend existing literature) and (iii) practice (method of inquiry to solve or activate a solution of problems).

First, a gap in the literature was identified for a set of data collection tools to further understand and measure email related stress. The unique research design, otherwise coined email stress measuring methodology (as presented in Chapter 3), was devised to investigate email stress in the workplace (Chapters 4 and 7). This methodological research design is considered more significant than the empirical data collected as the methods had not been previously used together and can be adopted by other researchers or by another organisation in future studies. Likewise the ever evolving nature of technology in developing new innovative techniques and tools to advance stress measurement in the workplace could be also introduced and used as part of a similar research design.

The theoretical and practical contributions to knowledge were developed in the form of a model. A gap in the literature was identified for a more comprehensive understanding of email stress to determine its causes and effects (theory), and, recommendations to improve its management in the workplace (practice). Existing email stress theory and research's own findings (Chapter 5) were consolidated to design a problem-solution model of email stress and management strategies (Chapter 8). The model identified the physical and perceived indicators of email stress, with reference to effects and causes established in this research, to further extend existing literature in the field of email stress. Likewise, it provided practitioners with a suitable selection of tried and tested solutions, i.e. management strategies, relevant to email stress in the workplace.

8.4 Research aims and objectives revisited

The rationale for the study was to explore email stress in order to collectively bring together theory and practice towards an enhanced understanding of its role in the workplace. This research endeavoured to explore the quandary of psychological vs. physiological stress in an attempt to bring cohesion between the different perspectives and develop a means to measure email stress from both viewpoints. Finally, in order to improve the current situation, the notion of 'email free time' and other email management strategies needed to be addressed and investigated.

The aims of this research were therefore as follows:

> *To determine whether email communication causes employees physiological and psychological stress and investigate the impact of email management strategies in the workplace.*

In order to achieve these aims the following objectives were set:

1. To conduct a review of the literature to recognise and understand the general views on email use in the workplace.
2. To develop a research design to measure email stress in the workplace.
3. To conduct a series of detailed case studies to identify and examine the effect of email use on employee stress within the ████ ██████████.
4. To evaluate the use of established email management strategies, such as 'email free time' and email filing, to manage email stress and related stressors effectively within the ████████████████.
5. To develop an epistemology associated with the conceptualisation of email stress in the workplace.
6. To critique the use of an email training intervention to manage email stress and related stressors.

The aims were achieved by meeting the six specific objectives set out above. The following section summarises how far the objectives have been fulfilled and the conclusions reached as a result of this research.

8.4.1 Objective 1: To conduct a review of the literature to recognise and understand the general views on email use in the workplace

This objective was addressed in Chapter 2, where a thorough review of the literature presented a knowledge foundation from which the research could learn and build upon, ensuring the research conducted for this thesis added to, rather than duplicated, existing or other on-going work. Email's role in information overload was explored and identified the new challenges for the email worker. Several adverse effects of email use such as overload, addiction, interruptions, bullying and, more extensively, email related stress

were discussed. The challenge of how to manage or minimise these issues were also examined and a number of existing email management strategies, techniques and tools were recognised. As a result of the literature review a number of gaps in the literature were identified, which paved the way for new email stress theory and practical research.

8.4.2 Objective 2: To develop a research design to measure email stress in the workplace

This objective was met in Chapter 3, which began by exploring a variety of research philosophies, methods and data collection tools in order to determine those most suitable for measuring email stress in the workplace. The decision was made to investigate the different themes of email and stress that had been left unexplored by previous literature to date, as concluded in Chapter 2, and a unique two-phase research design was developed. This research design was a collection of methods used to determine email related stress in the workplace. The first phase used questionnaires to further understand email behaviour, email use, personality type, and well-being, to gather quantitative and qualitative data on the psychological effects of email stress. To complement the first phase, the second phase used observation to monitor stress through blood pressure, heart rate, cortisol secretion and diaries to gather quantitative data on the physiological effects of email stress. This research design, otherwise coined 'email stress measuring methodology' (as presented in Chapter 3), was an original contribution to knowledge, which had not been previously used and could be adopted by other researchers for future research in the area.

8.4.3 Objective 3: To conduct a series of detailed case studies to identify and examine the effect of email use on employee stress within the ▮▮▮▮▮▮▮▮▮▮▮▮

Based on achieving objective 2 of this research, which related to the research design for measuring email stress in the workplace, a study design was developed so that the first part of the research aim was achieved (*to determine whether email communication causes employees physiological and psychological stress).* The small-scale pilot study reported was used to test the two-phase research design in Chapter 3, which led to an enhanced and improved research design being implemented at the ▮▮▮▮▮▮▮▮▮▮ as presented in Chapter 4. This was used to identify and examine the effect of email on psychological and physiological employee stress in the workplace to achieve this objective.

The results revealed that email, as a workplace activity, was found to induce an increased stress response, i.e. caused increases in employees' blood pressure, heart rate and cortisol. In addition, some employees showed increased levels of stress when email was used alongside other communication mediums such as the phone and face-to-face meetings,

whereas decreased stress was observed when email was used alongside non-communication activities such as paperwork. In addition, results identified a number of adverse effects associated with email use to exist at the ███████████ such as email overload and addiction. However some of the issues raised had not been established in previous literature to date, e.g. managing staff via email, social detachment, blame and cover-your-back culture.

It is important to note that the results also identified a number of discrepancies between recorded physical and perceived stress measures, e.g. some employees displayed increased blood pressure and heart rate during email use however recorded low perceived stress during the same period, and vice versa. Whilst several causes for this are discussed in Chapter 4, it was believed that the inconsistency was largely due to the choice of research design. Lessons learned, from both the researcher and participants feedback, enhanced the original research design for future studies.

8.4.4 Objective 4: To evaluate the use of established email management strategies, such as 'email free time' and email filing, to manage email stress and related stressors effectively within the ███████████

This objective was linked with the previous one (objective 3) and the same study at the ███████████ as presented in Chapter 4 was carried out to achieve the second part of the research aim (*to investigate the impact of email management strategies in the workplace).* At the time of this study 'email free time' had received much media attention and was shown to be a growing trend in organisations such as Deloitte, Intel, US Cellular and Atos, to combat the adverse effects of email use. Based on the same research design used for measuring email stress in the workplace (as previously mentioned in sections 8.4.2-8.4.3), the results initially found employees to show a decreased stress response, i.e. decreased blood pressure, heart rate and cortisol, during periods of 'email free time'. Nevertheless, after further observation, it was revealed that those participants who returned to email directly after the period of 'email free time' went on to show an increased stress response, i.e. increased blood pressure, heart rate, cortisol and stress score, as a consequence.

It was concluded that 'email free time' was not a desirable strategy to manage email stress and related stressors. Email filing, on the other hand, had shown to be much more beneficial. Results found employees with high perceived stress tended to adopt spring cleaning or no-filing to their email inbox, whereas employees with low or neutral perceived stress tended to adopt a frequent filing approach. These findings, although only indicative, provide evidence to support Whittaker & Sidner's (1996) notion that a sense of well-being can occur for those who file and a sense of ill-being can occur

for those who do not. The use of email filing was thus considered an effective email management strategy within the ███████████.

8.4.5 Objective 5: To develop an epistemology associated with the conceptualisation of email stress in the workplace

This objective was addressed in Chapters 5, 6 and 8 and made an original contribution to knowledge in the form of a model of email stress and management strategies in the workplace as presented earlier in this chapter.

On achieving the previous objectives of this research, an initial conceptualisation of email stress was first addressed in Chapter 5 and 6. Two models in Chapter 5 were constructed, i.e. explanatory and action, which were later validated in Chapter 6. On return to the ███████████ a focus group was conducted, as a public review of results, to gather feedback on both models. Whilst an internal validation of the explanatory model was achieved, this was extended by carrying out an additional investigation to evaluate the effectiveness of recommendations prescribed as part of the action model in Chapter 7. After these were completed the researcher was then in a position to bring the independent models together to create a single integrative multidimensional model of email stress and management strategies. This model design was the last step taken towards the development of an epistemology associated with the conceptualisation of email stress in the workplace. It made an original contribution to knowledge in theory, i.e. conceptualising email stress, and practice, i.e. practical solutions to email workers.

Whilst the model was achieved, it is accepted that this objective remains unfinished. The development of any form of epistemology is larger than the works of one thesis alone and, according to pragmatic epistemology, consists of numerous data sources, empirical evidence and models in the attempt to represent the environment in such a way as to maximally simplify problem-solving (Heylighen 1993). Furthermore as the area of email stress progressively transforms and evolves over time so will the understanding and conceptualisation of the research problem and solutions. Nevertheless, this thesis has started the process of measuring, identifying and solving the phenomena of email stress in this era.

8.4.6 Objective 6: To critique the use of an email training intervention to manage email stress and related stressors.

This objective was achieved in Chapter 7. Lessons learned, from both the researcher and participants feedback, enhanced the original research design (as mentioned in section 8.4.3) for a final study at the ███████████. An email training intervention to include seminar based training and computer animation videos was designed and implemented to deliver the recommendations prescribed as part of the action model (as mentioned in

section 8.4.5). Whilst seminar based training had been highlighted in the literature review as a popular means to disseminate information and provide training in the workplace, the recorded use of computer animation videos to deliver the same message to workers had not been achieved in theory or in practice.

The results revealed some improvements to employees behaviour after the training intervention, e.g. improved writing style, email checked on fewer occasions each day, and less than half of participants continued to suffer email addiction. However, in some cases employees were found to show minimal, if any, changes after the training intervention, e.g. email consumption remained the same and employees continued to suffer from email overload. Similar to previous studies, discrepancies were also found to occur between and within most employees' stress responses (as mentioned in 8.4.3). Further examination on a case-by-case basis concluded other factors were likely in play, although none of these could be deemed causal. Although feedback suggested areas for improvement, the email training, overall, was not found to be detrimental to employees and did contribute to the improved email management for some employees. It was therefore concluded that both the seminar based training and animation videos were an effective email management strategy to manage email stress and related stressors in the workplace.

8.5 Limitations, reflections and further work
This section summarises the research limitations and advantages, reflects on the process of performing research in industry and, finally, offers recommendations for further work.

8.5.1 Research limitations and advantages
Throughout this thesis some of the research limitations and advantages were identified. There were however three outstanding issues considered relevant for discussion, i.e. researcher subjectivity, issues of longevity and undesirable, extraneous and confounding factors.

Whilst the research endeavoured to be objective, and a methodological approach to the research was unrestrictive, such attempts also presented certain risks. Subjectivity in research is a topic that has led several discussions and debates (e.g. Howe & Eisenhart 1990; Ratner 2002; Morgan & Drury 2003; Shapin 2012), and identifies issues of projection on behalf of the researcher (Kahn 1996), limitations due to the researcher's own blind spots (Drapeau & Letendre 2001) and a sometimes unclear demarcation between what belongs to subjectivity and what belongs to delusions (Brillon 1992). It is important to "own" subjectivity in research (Drapeau 2002) and it is acknowledged this would have influenced the research and subsequent conclusions drawn. The model of email stress and management strategies for

example, as presented earlier in this chapter, is bound by the knowledge and experiences of the researcher. Nevertheless, as argued by Peshkin (1988), subjectivity is the basis for the researcher's distinctive and original contributions to knowledge which comes from joining personal interpretations with the data that have been collected and analysed. Thus subjectivity is a necessary limitation and advantage in this research.

Furthermore, as mentioned previously in section 8.4.5, there were also issues of longevity involved with this research and the research problem. The email stress phenomenon progresses at such a rate that the permanence in understanding its adverse effects and management strategies changes over time. For example, issues concerning managing staff by email may become the norm in more growing disperse geographical workforces. Likewise it should be expected that email good practice, which appears reasonable and fair at this time, would need to evolve in order to accommodate new standards and behaviours in workplace culture. This research is therefore only valid for a relatively short period of time. Nevertheless the contributions made and conclusions drawn are valuable to future research.

Finally, the obvious advantage of experimental research is that it provides stronger evidence for causal claims (Price & Oswald 2008). From the beginning of this research it was accepted that there were many factors, specifically those that involve stress and human participants in natural workplace environments, which are often influenced by an array of environmental, intrinsic, organisational and natural factors (as first mentioned in section 1.5). It is accepted that this research is limited by undesirable, extraneous and confounding factors. However it became apparent that all types of research, theoretical or practical, could potentially suffer the same criticisms unless each and every factor is appreciated and reported. Researchers should thus take the stance that these extraneous and confounding factors are likely to affect all research or, alternatively, need to meticulously develop a study design that eliminates or controls these factors in a laboratory setting.

8.5.2 Reflection on performing research in industry
Performing research in industry has, overall, been a positive and productive experience. This thesis has demonstrated that applying a pragmatic theoretical approach to research in industry can produce significant results and original contributions to knowledge. Furthermore, the placement of an action researcher provided a very useful "insider's view". The insights generated from this approach would be hard, if not impossible, to replicate in a purely theoretical study.

It is also important to mention that performing research in industry required the researcher to perform a difficult "balancing act" – to gather research

evidence that would endure academic scrutiny while also placing reasonable expectations on participants in volunteer organisations. Time was also a constant constraint in the workplace environments under study and this had an impact on how research methods were applied within those organisations. Essentially this could have led to a simplification of the methods used, as it was better to use a simplified method in the available time rather than no method at all. In fact, it was noticed that the principle of simplification was an evident reality throughout this research.

8.5.3 Recommendations for further work

Fertile areas for future research has been purposively acknowledged throughout this thesis. In order to address the limitations identified in this section a number of recommendations are suggested.

Firstly, it is acknowledged that the development of any form of epistemology consists of numerous data sources, empirical evidence and models to represent the environment in such a way as to maximally simplify problem-solving (Heylighen 1993). Therefore it was accepted that the parallel existence of different models, even where some may seem contradictory, are necessary in culture to reach an ever more precise reflection of email stress. There is no one approach as to where the knowledge or models may come from, e.g. trial-and-error or built up from scratch by the subject knowledge, however it has offered a starting point for future research. It is also recommended that prospective researchers insure a valid use of subjectivity in their research endeavours, e.g. carry out the data analysis in groups to obtain consensus or make use of a "discussant" during the research process (Lincoln & Guba 1985 in Drapeau 2002) to provide researcher scope.

Fundamentally the research carried out in this thesis was limited by time. As the research area continues to progress, the wider research community will continue to find new or alternative measures and/or data collection tools to determine stress, or advancements in workplace communication technologies may extend the research problem to include other social networking or web applications. Furthermore, as first mentioned in section 8.5.1, the management strategies prescribed may inherently need changing or those deemed unworkable may become effective as organisational climates change. In whichever way the research area evolves, this research provides valuable techniques and presented results that can be directly applied to other industry sectors or can be used for comparative research studies.

Finally, research studies performed in laboratory settings could be carried out to examine email stress and management strategies "under the microscope". This would be advantageous in eliminating or controlling undesirable, extraneous and confounding research factors. These laboratory-based studies could validate measures of the research design, mimic some of the

adverse issues raised in this thesis or explore the effectiveness of alternative management strategies. New research evidence to support or refute this research's claims and in the future development of the email stress and management strategies model is welcomed.

8.6 Final comments

This research has satisfied the aims and objectives as stated in Chapter 1. Original contributions to email stress theory and practice were: (i) the unique research design, otherwise coined email stress measuring methodology, to measure email stress in the workplace and (ii) the model of email stress and management strategies used to conceptualise the problem-solution of email stress. These should not undermine the empirical research carried out at the ████████████████ and ████████████████, which gathered supportive evidence to determine physiological and psychological email related stress and enlightened the research area with fresh methods of delivering email training in the workplace. This research has made a sizable contribution towards the research problem and has identified opportunities for future research.

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Appendix A: Conference paper

Developing an Email Stress Measuring Methodology to determine the Impact Email Stress has on Employee Effectiveness

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Abstract

This paper is part of PhD research in progress to investigate the psychological and physiological measures of email related stress in workplace employees. The aim of the research is to ascertain 1) whether employee email experiences differ depending on employees choice of email filing strategy; 2) if employee choice of email filing strategy is a direct consequence of employee personality type; 3) whether physiological indicators of employee stress can be measured as a direct result of email communication; 4) if employees are indeed stressed from email communication, how this effects employee well being. This paper proposes an Email Filing Framework in an attempt to address the identified shortcomings of employee choice of email filing habits and the effect it has on workplace stress. Furthermore, this paper suggests the psychological and physiological research methods that would be used to measure email related stress. In order to validate the framework, profiles of employee email strategy, personality type, stress responses and well being, would be compiled to form a construct of associated email related stress. The Email Filing Framework is intended to provide guidance on evaluating information retrieval strategies in relation to email communication. It would also work towards understanding the effect of email related stress on employee well being in the workplace which undoubtedly impacts on effectiveness and quality of work.

1.0   Introduction

Electronic mail (email) is the most widely used Internet technology with 90% of Internet users actively using the Internet to send and receive email [1]. Email has redefined the way in which we communicate and is no longer just a method of communication, but a way of doing business. Whilst the Internet distributes information, email keeps us in touch with one another [2]. Individuals are becoming more dependent on email technologies as a means to transfer and receive information in the workplace. There are a number of reasons why people choose to communicate via email; it is relatively cheap, for no extra cost numerous people can

be copied in the same message, and messages can be sent and received whenever it is convenient from anywhere in the world [3].

The increasing use of email has changed the behaviour in which employees deal with their workload, and where it was once seen to be a relatively affordable and convenient communication tool, it is now seen as a source of workplace stress [3]. Work-related stress is the biggest occupational health problem in the UK with over half a million people experiencing stress at work to a level they believe is making them ill, costing organisations around £3.7 billion every year [4]. Excessive stress without the opportunity to recover can cause physical and psychological problems. The umbrella term, Personal Information Management (PIM), describes the collection, storage, organisation and retrieval of digital objects by an individual in their personal computing environment [5]. McFedries [6] argues "techno-stress", are the feelings of frustration and stress caused by having to deal with the change brought on by computers and other technologies.

The aim of the research is to bring together information retrieval strategies in relation to email communication, and the subsequent effects this has on employee stress and the impact that has on the quality of their work. By bringing this information together it will enable a methodology to be developed that can be used to obtain the data required to determine the impact of email stress on employees. The paper begins by reviewing the literature on email related stress, and then moves on to the factors that can affect stress. It then discusses the physiological measurements that can be used to obtain stress levels in employees and the most practical way this can be achieved. The next section poses research questions and provides a filing framework that will be used as part of the overall study. A proposed method on how this might be achieved is then detailed. The paper concludes by reviewing the proposed methodology and reviewing its limitations.

2.0   Current Literature on Email Related Stress

Email stress can be defined as email users' perceptions that their own use of email has got out of control because they receive and send more email than they can handle, find, or process effectively [7]. Dabbish & Kraut [7] illustrate the link between particular ways of interaction with email and broader aspects of work and productivity. Empirical data shows that although email was originally designed as a communications application it is now being used for additional functions that it was not designed for, such as task management and personal archiving [8]. As it becomes easier to store and manipulate documents electronically, the email folder system may become a store for a wide array of documents. It is generally true for email management tactics to ensure users remain aware of important incoming information [9].

Conversely, email overflow causes some users to answer only part of the incoming mail, to ignore incoming information systematically, and can result in the close of the email system [10]. As a result, some have expressed the need for email filing and organising [10, 11, 12], but employees' choice of strategy are often varied. Malone [13] suggests that people can be categorised in two typologies: filing and

piling. Similarly, Boardman & Sasse [5] indicate email management strategies can be conceptualised in two transition phases: (1) "pro organizing" transitions involving increases in filing tendency, and (2) "anti-organizing" transitions leading to less filing over time. Whilst these studies indicate that employee email related stress may be linked to choice of email strategy, i.e. filers are likely to be less stressed than those who do not file; little research has confirmed the relationship exists.

Nevertheless, the feelings associated with email communication have now led users to feel psychologically stressed. Previous studies found that 94% of people surveyed waste up to an hour each day reading, responding to or deleting email messages [14], 34% of people in a similar survey felt stressed by the volume of emails, and 50% checked their email every hour, where 35% checked their email every fifteen minutes. It concluded that one in three workers suffered from email stress [12].

3.0   Factors affecting Stress

The basic concept is that stress relates both to an individual's perception of the demands being made on them and their capability to meet those demands. A mismatch will mean that an individual's threshold is exceeded, triggering a stress response [15]. It is unsurprising that most research on email related stress has been cast in terms of the psychological impact it has on employees in the workplace.

3.1 Email Usage

Past researchers have often tailored their own email usage questionnaires to understand email behaviour. Russell, Purvis & Banks [16] used interview questions to discover characteristics of email usage, email strategies, and email load. Subsequently, this has led to the creation of several behavioural typologies of email use. Seeley [17] suggests, through observation, that employees can be 'Julie the Email Junkie' whom relies on email and is addicted to it; 'Ronny the Reliable Email Citizen' whom does not reply solely to email and uses email judiciously with other media; or 'Pat the Pen' whom rarely uses email because he prefers to talk or write. On the other hand, Hair, Renaud & Ramsay [12] contend, from their survey, that there were three types of underlying orientation towards email: (1) Relaxed: where email exerts no undue pressure; (2) Driven: where email exerts pressure; and (3) Stressed: where email exerts stress. Email usage questionnaires are often tailored to ensure the right information is captured for the research, and there are few questionnaires to further understand principally email related stress.

3.2 Personality Type

There is little research that uses existing personality questionnaires to determine email behaviour. Personality is often assessed using a set of questions that measure a variety of traits in human behaviour. The Jung-Myers-Briggs Type Indicator (MBTI) instrument is one of the most popular personality measures used, identifying people's preferences among sets of mental processes. The MBTI is counted on one of four scales; 1) Extraversion or Introversion; 2) Sensing or Intuition; 3) Thinking or Feeling; 4) Judging or Perceiving [18]. There are similar personality tests including Kincannon Mini-Mult, Minnesota Multiphasic Personality Inventory and

Eysenck Personality Questionnaire. However, all these questionnaires are based on the Big Five. The Big Five describes five fundamental traits including: extroversion/introversion, friendliness/hostility, conscientiousness, neuroticism/emotional stability and intellect/openness. In the case of most models, the five factor traits are encompassed at some level in all personality tests [19]. Due to the lack of research, it would be encouraging to find out if employee choice of email filing strategy is to some degree associated with their personality type.

3.3 Employee Well Being

Organisations use a variety of questionnaires to understand stress in the workplace, and to provide further insights into employee wellbeing. One of these questionnaires, is the Daily Stress Inventory (DSI), that asks employees about minor events occurring in the last two weeks. Similarly, the Stress Appraisal Measure was developed to assess the dimensions of primary appraisal (threat, challenge, and centrality) for a specific anticipated stressor. However, the most commonly used measure in both mental and physical health is the Perceived Stress Scale (PSS). The PSS is used to measure the degree to which situations in one's life are appraised as stressful [20]. In spite of their popular use, stress questionnaires by which organisations can make an assessment, do have some limitations. In particular there are concerns that the questionnaires often only capture a snap shot of employee stress at a single point in time. Therefore results from these measures could potentially be unreflective of employee wellbeing. Despite this, most are tested and reliable tools for measuring stress [21]. There is little research that extends the use of these tools in relation to email stress and employee well being.

4.0   Physiological Stress Measures

The nature of bodily changes during stress may be cast in a coping framework if one views stress as a process that unfolds as organisms encounter, appraise, and respond to situations that pose threat, challenge, loss or demand. That is, when an event or situation is stressful, a cascade of hormonal changes occurs that appears to work either to motivate or to support coping with the stressor [21]. There are a variety of physiological measures to test stress, including:

Intrusive Stress Measures
- Muscle tone
- Catecholamines using blood testing
- Endocrine systems using urine samples

Less-Intrusive Stress Measures
- Blood pressure
- Heart rate
- Saliva cortisol
- Galvanic skin response

Due to the nature of these physiological indicators, some are highly intrusive and could be seen as potential stressors, i.e. blood testing, urine samples. In order to remove unnecessary stress reactions from the choices of indicators chosen, less invasive stress measures are more appropriate [22].

4.1 Blood Pressure

There is considerable evidence to suggest that high blood pressure is linked to persistent stress and the way in which people cope [23]. Evidence for work-stress effects comes from ambulatory blood pressure studies which show increased blood pressure levels in subjects with high work stress. Casual measurements of blood pressure have shortcomings, and at times are unrepresentative; therefore superiority of multiple measurements rather than a single measurement in the prediction of stress responses underlies the value of blood pressure [24].

4.2 Heart Rate

Widespread use of heart rate monitoring is due to its ease of measurement. Heart rate is a reflection of the relative stress placed on the cardiopulmonary system based on the linear relationship between oxygen uptake and heart rate. Heart rate can also be elevated by emotional stress, which is independent of any change in oxygen uptake [25]. The relative delay in heart rate response to changes in movement suggests that heart rate monitors may mask potential information; therefore heart rate monitoring as a singular use of measurement may not reflect accurate results.

4.3 Saliva Cortisol

Cortisol is often termed the stress hormone because it is secreted in higher levels during the body's 'fight or flight' response to stress and is responsible for several stress-related changes in the body. Normally, it is present in the body at higher levels in the morning and at its lowest at night. Higher and more prolonged levels of cortisol in the blood stream, like those associated with stress, have been shown to have negative effects [26]. Medical groups that have studied adrenal-cortisol testing by saliva samples, have determined this type testing to be accurate, as well as less intrusive and more convenient than blood sampling [27]. However, cortisol secretion varies among individuals and people are biologically 'wired' to react differently to stress so where one person may secrete higher levels of cortisol in the same situation another may not [28].

4.4 Galvanic Skin Response

Galvanic skin response monitors one's stress levels by translating tiny tension related changes in skin pores into a rising or falling tone, using a unidirectional electric current derived from a chemical battery [28, 29]. As a result, galvanic skin response is non-obtrusive and users feel at ease. However, little literature exists to support the use of galvanic skin response in medical and health practices. Furthermore there is no validation or reliability of galvanic skin response as a stress measurement tool. Despite these shortfalls, galvanic skin response is often used as a stress management device, to calm down those who feel under stress [30].

5.0   Research Questions

The aim of the research is to develop an Email Filing Framework to further understand:
   ▪ How employee email experiences differ depending on employee choice of email filing strategy.

- If employee choice of email filing strategy is a direct consequence of employee personality type.
- What physiological indicators of employee stress can be measured as a direct result of email communication.
- If employees are indeed stressed from email communication, how is this effecting employee well being and does this impact upon their effectiveness and quality of work?

6.0 Proposed Email Filing Framework

In the absence of a single framework that addresses all the issues concerning email communication, important aspects of the current models in email filing strategies and workplace stress will be integrated. This will go towards defining a new model that will ensure the effective evaluation of email related stress.
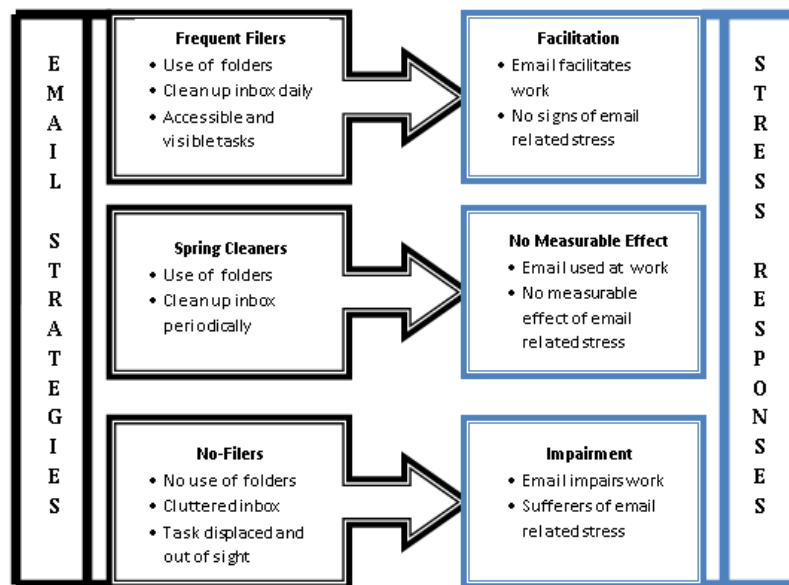
Figure 1: Email Filing Framework

The proposed Email Filing Framework postulates that those who file are less stressed than those who do not file their email inbox (see Figure 1). Based on the observed email management strategies from Whittaker & Sidner [8], the Email Filing Framework includes three filing strategy choices: frequent filers (folder users who try and clean up their inbox daily), spring cleaners (folder users who try and clean up their inbox only periodically), and no-filers (users who use no folders). As Lazarus [31] recognises, stress can be depicted into three kinds of results: no measurable effect, impairment of performance and facilitation. The proposed framework attempts to bring together these conceptions to develop a new model. It is understood that this framework is not a standardised progression, and could be affected by external contextual and organisational variables.

In essence the Email Filing Framework proposes how the choice in email filing strategies could subsequently result in a degree of stress, suggesting that:

(1)   Frequent filer users are able to capitalise on the fact that, when they view

incoming unread email, they are reminded of the majority of outstanding tasks because these are visible and immediately accessible. Therefore it is suggested that this choice of filing strategy will facilitate employees, and will not induce email related stress.

(2) Spring cleaner users are the intermediate to the two other strategies. As with no-filers, their inbox gets large, but the feelings about the disorder of their inboxes motivate the need to clean up. They do occasionally go through their inbox, meaning that outstanding unprocessed messages are often detected. Thus this choice of email filing is generally manageable, and will therefore result in no measurable effect of email related stress.

(3) No-filers stand in direct contrast to frequent filers. The inbox is cluttered, with partially read and unread mail. As a consequence, outstanding tasks are not easily visible and are quickly displaced and out of sight. It is proposed that this choice of filing habit will result in the impairment of employee performance and result in higher email related stress levels.

7.0 Methods

7.1 Data Collection Tools

The data collection process would consist of two phases. The first phase would be to collect psychological qualitative information on employee email usage, personality and workplace well being, through completion of questionnaires. Firstly an Email Usage Questionnaire based on similar interview questions adopted by Russell, Purvis & Banks [16], would give us an overview of each employee's email habits, strategy and general impressions of email in the workplace. The Email Usage Questionnaire is designed to focus on the areas surrounding email communication in the workplace, as oppose to email use in general. Then to further understand personality type, the Big Five Questionnaire, would be used to assess employee personality traits. Finally, an Employee Well Being Questionnaire would be formed based on the 10-item version of the Perceived Stress Scale, to develop an understanding of the employee's feelings in the workplace. The latter questionnaires on personality and employee well being are recognised, validated and verified techniques in their own areas.

The second phase would collect physiological quantitative data over a 48-hour monitoring period. As justified in Section 4, less intrusive indicators of stress are more appropriate to eliminate any additional potential stressors. In addition, reliable existing techniques to measure stress are more sought after to eliminate concerns of validity. For this research the proposed choice of stress indicators include blood pressure, heart rate and saliva cortisol. Blood pressure and heart rate would be measured using an ambulatory machine, and saliva mouth swabs to test cortisol levels. To complement these physiological measures, email log book diaries would be completed to try and associate the stress responses to email during the monitoring period. To overcome some of the issues concerned with each stress measure tool, as understood in Section 4, a combination of methods is vital in order to provide the most accurate results. The monitoring period will be spread between two 24-hour periods to remove issues of singular sample testing. It would also be

necessary to take multiple saliva swabs during the monitoring period to ensure equal cortisol results are attained.

7.2 Verification of Email Filing Framework

After all results are collected, a unique profile will be created for each employee. The unique profile would contain the combined details of all the stress measures. This would include the employee's email strategy choice, personality type, stress responses (blood pressure, heart rate and cortisol) and score for employee well being. These profiles would then be mapped to the Email Filing Framework. Patterns amongst the group of employees would be used to validate the proposed model. Based on the results, the Email Filing Framework can be extended to include employee personality in relation to the email strategy chosen, and the effects of the stress response on employee well being.

8.0 Conclusion

As this is research in progress and at an early stage of development, no conclusions can be drawn yet, but some of the expected limitations and expected contributions to the field are discussed.

Limitations of the study include those inherent to physiological testing; "all studies in this area bear witness to environmental and experimental aspects of diagnostic procedures considered as potential stressors themselves, where individuals experience different levels of discomfort and anxiety during testing" [22]. There is also limited generalisation beyond the specific conditions studied, and whether the stress observation during the data collection period is typical of email related stress responses. Initially, some of these limitations will only be acknowledged but others will be addressed by selecting the least invasive stress measures. Furthermore, stress responses will be analysed psychologically and physiologically to give more insight into email related stress responses.

The research may promote understanding in the domain of information overload within the Information Science field. Furthermore, as stated by [5, 8] given user uncertainty about the value of incoming information and the overload phenomenon, understanding the related effects is essential in the successful design and testing of information retrieval techniques. Moreover, these techniques may be able to satisfy user's needs, in particular strategies to improve the collection, organisation, and retrieval of email messages in users' inboxes. In workplace health related areas, this study would help bridge the gap of literature that assumes the link between email communication and stress is simply psychological. Physiological stress reactions, particularly measures of blood pressure, heart rate and cortisol are by no means new techniques; however with regard to email communication as a stressor, the combination has not been methodically applied. This research would allow organisations to have a better understanding of employee health information needs, in a way that they would be able to design more effective strategies to improve employee well being in the workplace, and subsequently improve workplace productivity.

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Appendix B: Email Behaviour Questionnaire

Email Behaviour Questionnaire

Dear Participant

The initial part of this study relates to the use of email in the workplace. Exploring and understanding the way in which email is used will provide insights into effective ways to support and control email in the workplace. I understand that your time is precious but I hope that you will be able to assist me in this study by completing this questionnaire. It should take about ten (10) minutes to complete. If you have any questions about the research or this questionnaire please call Laura Marulanda-Carter on 07709827226 or email at L.Marulanda-Carter@lboro.ac.uk.

Strictly Confidential and Anonymous

All responses will be treated in the strictest confidence. Participant identity will remain anonymous. The research findings will be made available in generic instances, and disseminated in conference and journal publications. In no circumstances will any employer or individual be identified.

Instructions

Overleaf are a number of questions that ask you about your feelings and thoughts during the last month. In each case, please indicate with a check (tick or cross) or brief explanation where space is given on how often you felt or thought a certain way. There a total of 19-questions.

About you and your Email

1. How many emails do you **send** in an average work day?

   ☐ None   ☐ Up to 20   ☐ Up to 40   ☐ Up to 60   ☐ Up to 80   ☐ More than 80

2. How many emails do you **receive** in an average day?

   ☐ None   ☐ Up to 20   ☐ Up to 40   ☐ Up to 60   ☐ Up to 80   ☐ More than 80

3. Please describe how you would typically use your email inbox during the working day (e.g. leave inbox open on desktop, check email by alert noise, notified of new email on Blackberry, regularly check email four times per day)

   ....
   ....

4. In what circumstances are you glad to have new email?

   ....
   ....

5. In what circumstances are you annoyed to have new email?

   ....
   ....

6. In what circumstances, if at all, would you choose not to send an email (i.e. use another method)

   ....
   ....

Email Habits and Strategies

7. Which best describes your typical email filing habit?

☐ Do Not File ☐ Sometimes File ☐ File Daily

8. Do you adopt any strategies that you use to deal with email you send and receive at work?

☐ Yes - *Go to Q.9* ☐ No - *Go to Q.10* ☐ Cannot Answer- *Go to Q.10*

9. Do these strategies differ when you are under stress?

☐ Yes ☐ No ☐ Cannot Answer

10. Have you ever felt overloaded by the amount of email you have in your inbox?

☐ Yes - *Go to Q.11* ☐ No - *Go to Q.12* ☐ Cannot Answer - *Go to Q.13*

11. In your own words, what do you do to relieve overload of email?

………
………
………

12. In your opinion, why do you think you don't feel overload of email?

………
………
………

Overall Impressions of Email

13. Compared to your colleagues, do you think you get stressed easily at work?

☐ Yes ☐ No ☐ Cannot Answer

14. Given the option, would you rather be with or without email at work?

☐ With Email ☐ Without Email ☐ No Preference

15. In your own words, what do you think are the good things about having email at work?

....
....
....

16. In your opinion, what do you think are the bad things about having email at work?

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....

17. If you had to set a policy for the use of email in your organisation, is there anything you would recommend and/or suggest?

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Additional Comments

Feel free to add anything else about your current use of email in the workplace.

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Email Behaviour Questionnaire [Post-testing]

Dear Participant

The final part of this study relates to the use of email in the workplace. Exploring and understanding the way in which email is used will provide insights into effective ways to support and control email in the workplace. I understand that your time is precious but I hope that you will be able to assist me in this study by completing this questionnaire. It should take about ten (10) minutes to complete. If you have any questions about the research or this questionnaire please call Laura Marulanda-Carter on 07709827226 or email at L.Marulanda-Carter@lboro.ac.uk.

Strictly Confidential and Anonymous

All responses will be treated in the strictest confidence. Participant identity will remain anonymous. The research findings will be made available in generic instances, and disseminated in conference and journal publications. In no circumstances will any employer or individual be identified.

Instructions

Overleaf are a number of questions that ask you about your feelings and thoughts *since the previous monitoring session*. In each case, please indicate with a check (tick or cross) or brief explanation where space is given on how often you felt or thought a certain way. There a total of 13-questions.

About you and your Email

18. How many emails do you **send** in an average work day?

☐ None   ☐ Up to 20   ☐ Up to 40   ☐ Up to 60   ☐ Up to 80   ☐ More than 80

19. How many emails do you **receive** in an average day?

☐ None   ☐ Up to 20   ☐ Up to 40   ☐ Up to 60   ☐ Up to 80   ☐ More than 80

20. In light of the recent training, have you changed the way you use your email inbox during the work day?

☐ Yes - *Go to Q.4*   ☐ No - *Go to Q.5*   ☐ Cannot Answer - *Go to Q.6*

21. If yes, what do you do now that you didn't do before?

....
....
....
....

22. If no, why do you feel that nothing has changed?

....
....
....
....

23. Which best describes your email filing habit now?

☐ Do Not File   ☐ Sometimes File   ☐ File Daily

Overall Impressions of Training

24. Do you currently feel overloaded by the amount of email you have in your inbox?

☐ Yes - *Go to Q.8*   ☐ Cannot Answer - *Go to Q.9*   ☐ No - *Go to Q.10*

25. Has the training helped you to relieve any of this overload feeling? *Go to Q.10*
....
....
....

26. Have you used any information from the training to help minimise email overload? If so, what have you found most useful?
....
....
....

27. Have you used any information from the training to help manage email at work better? If so, what have you found most useful?
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....
....

28. Have you used any information from the training to help minimise email addiction? If so, what have you found most useful?
....
....

29. Would you recommend the seminar training or video training to your colleagues or others? (Please tick one)

☐ Yes – Both seminar and video training   ☐ Yes – Seminar training only   ☐ Yes – Video training only   ☐ None

30. Given the option, would you rather be with or without email at work?

☐ With Email   ☐ Without Email   ☐ No Preference

Additional Comments

Feel free to add anything else about your current use of email in the workplace or opinion/feedback of the email training (both seminar and video).

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Appendix C: Email usage questionnaire

Loughborough University
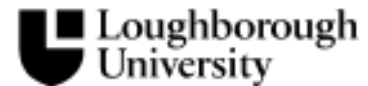
Email Usage Questionnaire

Dear Participant

Developing the way in which email is used by workers will provide insights into effective ways to support and control email behavior in the workplace. This questionnaire is part of an investigation to identify worker email behavior. Research in this area will assist in providing practical support and guidelines in relation to email use. If you have any questions about the research or this questionnaire please contact Laura at L.Marulanda-Carter@lboro.ac.uk.

Strictly Confidential and Anonymous

All responses will be treated in the strictest confidence. In no circumstances would an employer or individual be identified. Each questionnaire is numbered only to record returns. All responses are anonymous, if however you would like to receive your results of this questionnaire then please complete the *Disclosure of Results* section found at the end of this questionnaire. The research findings will be made available in generic instances and disseminated as part of a PhD thesis and conference/journal publications.

Instructions

This questionnaire is designed to identify behavior of email use among workers. Please note that responses are relevant to work email only. The questions ask you about your feelings and thoughts about email during the last month. There a total of sixteen questions and it should take no longer than five (5) minutes to complete. This questionnaire is designed to be scanned and marked by computer. **Please do not bend or crumple the paper.**

Email Usage Questionnaire

Demographic Information	
Date	
Occupation	
Years in Employment	

Criteria 1: Email Evaluation Criteria		
Fill in the circles (Y) like this ● with a pencil		

Question	Response	
	Yes	No
1. Do you feel preoccupied with emails?	(Y)	(N)
2. Do you feel the need for more time to read your emails?	(Y)	(N)
3. Have you repeatedly made unsuccessful efforts to control, cut back, or stop email use?	(Y)	(N)
4. Do you feel restless, moody, depressed or irritable when attempting to cut down or stop email use?	(Y)	(N)
5. Do you stay on your email account longer than originally intended?	(Y)	(N)
6. Have you jeopardized or risked the loss of significant relationship, job, educational or career opportunity because of email?	(Y)	(N)
7. Have you lied to work members, friends or others to conceal the extent of involvement with email?	(Y)	(N)
8. Do you use email as a way of escaping from problems or of relieving a dysphoric mood (e.g. feeling of helplessness, guilt, anxiety or depression)?	(Y)	(N)

Criteria 2: Scale of Interruptions					
Scenario	**Response**				
	Most often				Least often
9. You open your email first, before doing anything else…	①	②	③	④	⑤
10. You stop what you are doing to answer an email, even though it might not be the most important task…	①	②	③	④	⑤
11. You keep more than 100 items in your inbox at all times…	①	②	③	④	⑤
12. You email the person sitting next to you, rather than turnaround to ask a question…	①	②	③	④	⑤
13. You get upset / annoyed if you don't receive a response to your email message in an hour…	①	②	③	④	⑤
14. You look up EVERY time your computer announces a new email…	①	②	③	④	⑤
15. You leave your email program open on your screen between sessions…	①	②	③	④	⑤
16. You check for emails on an hourly basis (or less)…	①	②	③	④	⑤

Disclosure of Results	
Name	
Email Address	
Signature	

Appendix D: Personality Questionnaire

Personality Questionnaire

Dear Participant

The initial part of this study focuses on the relationship between email use and personality profiles so as to provide insights into the relationship between your personality type and email behaviour in the workplace. I understand that your time is precious but I hope that you will be able to assist me in this study by completing this questionnaire. It should take about ten (10) minutes to complete. If you have any questions about the research or this questionnaire please call Laura Marulanda-Carter on 07709827226 or email at L.Marulanda-Carter@lboro.ac.uk.

Strictly Confidential and Anonymous

All responses will be treated in the strictest confidence. Participant identity will remain anonymous. The research findings will be made available in generic instances, and disseminated in conference and journal publications. In no circumstances will any employer or individual be identified.

Instructions

Overleaf are a number of statements that may or may not apply to you. Please write a number next to each statement to indicate the extent to which **you agree or disagree with that statement.** There a total of 44-statements.

1	2	3	4	5
Disagree Strongly	Disagree a little	Neither agree nor disagree	Agree a little	Agree strongly

I am someone who...

1. _____ is talkative

2. _____ tends to find fault with others

3. _____ does a thorough job

4. _____ is depressed, blue

5. _____ is original, comes up with new ideas

6. _____ is reserved

7. _____ is helpful/unselfish with others

8. _____ can be somewhat careless

9. _____ is relaxed, handles stress well

10. _____ is curious   about many things

11. _____ is full of energy

12. _____ starts quarrels with others

13. _____ is a reliable worker

14. _____ can be tense

15. _____ is ingenious, deep thinker

16. _____ generates a lot of enthusiasm

17. _____ has a forgiving nature

18. _____ tends to be disorganised

19. _____ worries a lot

20. _____ has an active imagination

21. _____ tends to be quiet

22. _____ is generally trusting

23. _____ tends to be lazy

24. _____ is emotionally stable

25. _____ is inventive

26. _____ has an assertive personality

27. _____ can be cold and aloof

28. _____ perseveres until finished

29. _____ can be moody

30. _____ values artistic, aesthetic experiences

31. _____ is sometimes shy, inhibited

32. _____ is considerate to almost everyone

33. _____ does things efficiently

34. _____ remains calm in situations

35. _____ prefers work that is routine

36. _____ is outgoing, sociable

37. _____ is sometimes rude to others

38. _____ makes plans and follows through

39. _____ gets nervous easily

40. _____ likes to reflect, play with ideas

41. _____ has few artistic interests

42. _____ likes to cooperate with others

43. _____ is easily distracted

44. _____ is sophisticated in art or music

45. _____ is politically liberal

Appendix E: Employee Well-being Questionnaire

Employee Well-being Questionnaire

Dear Participant

The final part of this study focuses on the issue of workplace stress and employee wellbeing. Exploring and understanding these issues will provide insights into effective ways to support and control workplace stress. I understand that your time is precious but I hope that you will be able to assist me in this study by completing this questionnaire. It should take about five (5) minutes to complete. If you have any questions about the research or this questionnaire please call Laura Marulanda-Carter on 07709827226 or email at L.Marulanda-Carter@lboro.ac.uk.

Strictly Confidential and Anonymous

All responses will be treated in the strictest confidence. Participant identity will remain anonymous. The research findings will be made available in generic instances, and disseminated in conference and journal publications. In no circumstances will any employer or individual be identified.

Instructions

Overleaf are a number of questions that ask you about your feelings and thoughts over the ***last month***. In each case, please indicate the extent to which you never or often felt or thought in a certain way. Please check only one item for each question. There a total of 10-questions.

0	**1**	**2**	**3**	**4**
Never	Almost Never	Sometimes	Fairly Often	Very Often

1. _____   How often have you been upset because of something that happened unexpectedly?

2. _____   How often have you felt that you were unable to control the important things in your life?

3. _____   How often have you felt nervous and "stressed"?

4. _____   How often have you felt confident about your ability to handle your personal problems?

5. _____   How often have you felt that things were going your way?

6. _____   How often have you found that you could not cope with all the things that you had to do?

7. _____   How often have you been able to control irritations in your life?

8. _____   How often have you felt that you were on top of things?

9. _____   How often have you been angered because of things that were outside of your control?

10. _____   How often have you felt difficulties were piling up so high that you could not overcome them?

Appendix F: Salivary-cortisol assay procedure

The following section outlines the collection, materials and steps taken to transform saliva samples into cortisol measurements using the Salimetrics cortisol kit. After the assay procedure was complete, samples were measured and recorded using the Revelation Quicklink program.

Sample Collection

Sample collections were avoided within 60 minutes after eating a major meal or within 12 hours after consuming alcohol. Participants were also pre-warned on the effect of bovine hormones, acidic, and high sugar foods on assay performance. All samples recorded time and date of specimen collection due to diurnal variation in cortisol levels.

Sample Handling and Preparation

After collection the samples were kept cold in order to avoid bacterial growth in the specimen. Samples were refrigerated within 30 minutes, and frozen within 4 hours after collection. Frozen samples on the day of assay were thawed completely for 15 minutes at room temperature before adding to assay plate.

Materials Supplied with Kit
- Microtitre plate
- Cortisol standards
- Cortisol controls
- Wash buffer concentrate (10x)
- Assay diluent
- Cortisol enzyme conjugate
- TMB substrate solution
- 3 M Stop solution
- Non-specific binding (NSB) Wells

Materials Needed But Not Supplied
- Precision pipette to deliver 15 and 25 µL
- Precision multichannel pipette to deliver 50 µL and 200 µL
- Vortex
- Plate rotator with 0.08-0.17 inch orbit (if unavailable, tap plate to mix)
- Plater reader with a 450 nm filter
- Log-linear graph paper or computer software for data reduction
- Deionized water
- Reagent reservoirs
- One disposable tube capable of holding 24 mL
- Pipette tups
- Serological pipette to deliver up to 24 mL

Assay Procedure Summary

1. Reagents brought to room temperature and mixed before use
2. Prepared 1X wash buffer
3. Plate brought to room temperature and prepared for use with NSB wells
4. Prepared tube with 24mL of assay diluents for conjugate dilution
5. Pipette 25 µL of standards, controls, and unknowns into appropriate wells
6. Pipette 25 µL of assay diluents into zero and NSB wells
7. Made final 1:1600 dilution of conjugate (15 µL into 24 mL assay diluents), mixed, and immediately pipette 200 µL into each well
8. Mixed plate for 5 minutes at 500 rpm. Incubate for an additional 55 minutes at room temperature.
9. Washed plate 4 times with 1X wash buffer. Blotted.
10. Added 200 µL TMB solution to each well
11. Mixed plate for 5 minutes at 500 rpm. Incubate in dark at room temperature for 25 additional minutes.
12. Added 50 µL stop solution to each well. Mixed for 3 minutes at 500 rpm.
13. Wiped plate bottom clean and read within 10 minutes of adding stop.

Appendix G: Email Log Diary

Loughborough University

Email Log Diary

Dear Participant

The initial part of this study relates to the use of email in the workplace. Exploring and understanding the way in which email is used will provide insights into effective ways to support and control email in the workplace. I understand that your time is precious but I hope that you will be able to assist me in this study by completing this questionnaire. It should take about ten (10) minutes to complete. If you have any questions about the research or this questionnaire please call Laura Marulanda-Carter on 07709827226 or email at L.Marulanda-Carter@lboro.ac.uk.

Instructions

Overleaf are a number of questions that ask you about your feelings and thoughts during the 24-hour study. In each case, please indicate with a check (tick or cross) unless stated otherwise. Please check only one item for each question.

There a total of seven (7) questions to be completed, each hour during the monitoring period.

Key Terms

Activity Log: Please write, as you see relevant, your activities for that period of time.
Access: How many times have you accessed you inbox to check your email? [Indicate with number]
Reading: During this time have you been reading emails?
Sending: During this time have you been sending / writing emails?
Filing: During this time have you been filing emails?
Stress Score: On a scale of 1 to 10 [Low = 1, High = 10], how stressed have you felt over that time period?
                  [Indicate with number]

DATE: _____

	Activity Log	Email Use					Health
Time	*[In brief, please log any activities as completed during each time period, e.g. eating lunch, watching television, on desk computer, on the phone, checking email, etc.]*	**Access**	**Reading**	**Sending**	**Filing**	**Finding**	**Stress Score**
8am – 9am							
9am – 10am							
10am – 11am							
11am – 12pm							
12pm – 1pm							

Activity Log		Email Use					Health
Time	*[In brief, please log any activities as completed during each time period, e.g. eating lunch, watching television, on desk computer, on the phone, checking email, etc.]*	**Access**	**Reading**	**Sending**	**Filing**	**Finding**	**Stress Score**
1pm – 2pm							
2pm – 3pm							
3pm – 4pm							
4pm – 5pm							
5pm – 6pm							

DATE: _____

| Time | Activity Log [In brief, please log any activities as completed during each time period, e.g. eating lunch, watching television, on desk computer, on the phone, checking email, etc.] | Email Use | | | | | Health |
		Access	Reading	Sending	Filing	Finding	Stress Score
8am – 9am							
9am – 10am							
10am – 11am							
11am – 12pm							
12pm – 1pm							

Activity Log		Email Use					Health
Time	*[In brief, please log any activities as completed during each time period, e.g. eating lunch, watching television, on desk computer, on the phone, checking email, etc.]*	**Access**	**Reading**	**Sending**	**Filing**	**Finding**	**Stress Score**
1pm – 2pm							
2pm – 3pm							
3pm – 4pm							
4pm – 5pm							
5pm – 6pm							

Appendix H: Ethical clearance endorsement for ▮▮▮▮▮▮▮▮▮▮▮

Ref No: R10-P24

LOUGHBOROUGH UNIVERSITY

ETHICAL ADVISORY SUB-COMMITTEE

RESEARCH PROPOSAL

INVOLVING HUMAN PARTICIPANTS

_____

Title: **Investigation into Email Displacement and Related Stress**

Applicant: **Dr T Jackson, Dr G Ragsdell, L Marulanda-Carter**

Department: **Information Science**

Date of clearance: **26 March 2010**

Appendix I: Interview guide, focus group transcript and notes

███████████████ Focus Group

24th November, 2011

Facilitator: Laura Marulanda-Carter
Department of Information Science, Loughborough University

Interview Guide

The focus group aimed to cover the following topics: *reflection of previous study*, *reflection of results*, *reflection of additional findings* and *reflection of email stress*. The following illustrated diagrams were also used consecutively for the first three discussion points: explanatory model, revised explanatory model design and action model.

Illustrations

Explanatory model
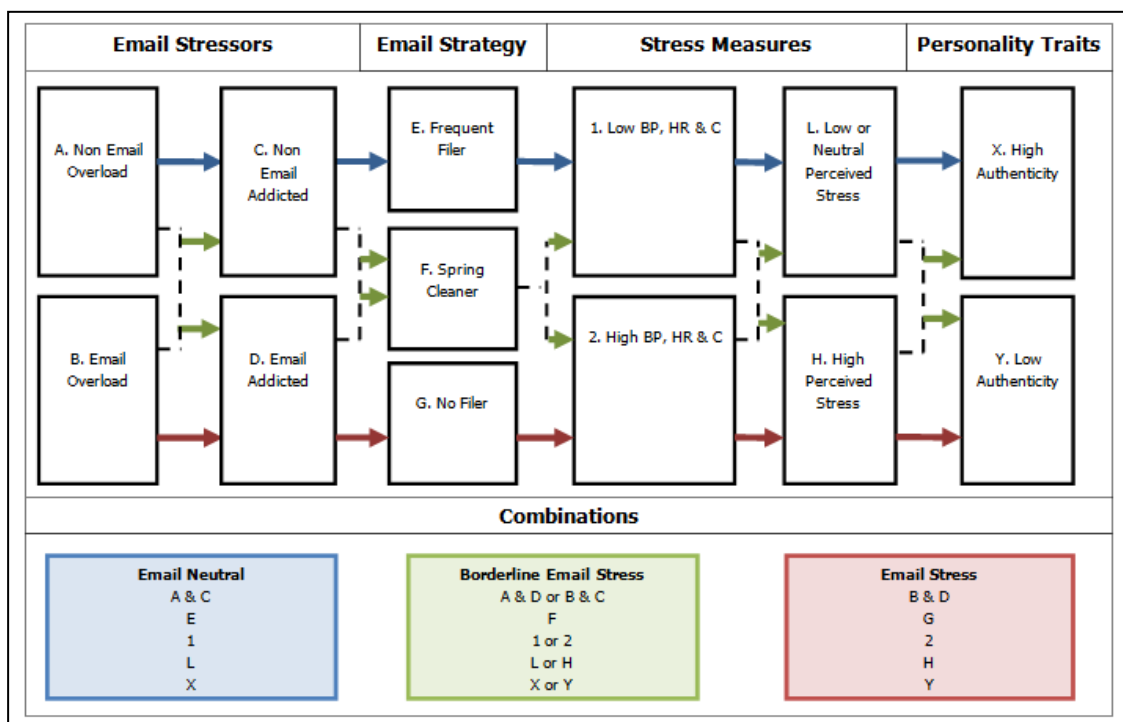
Revised explanatory model design (part 1)
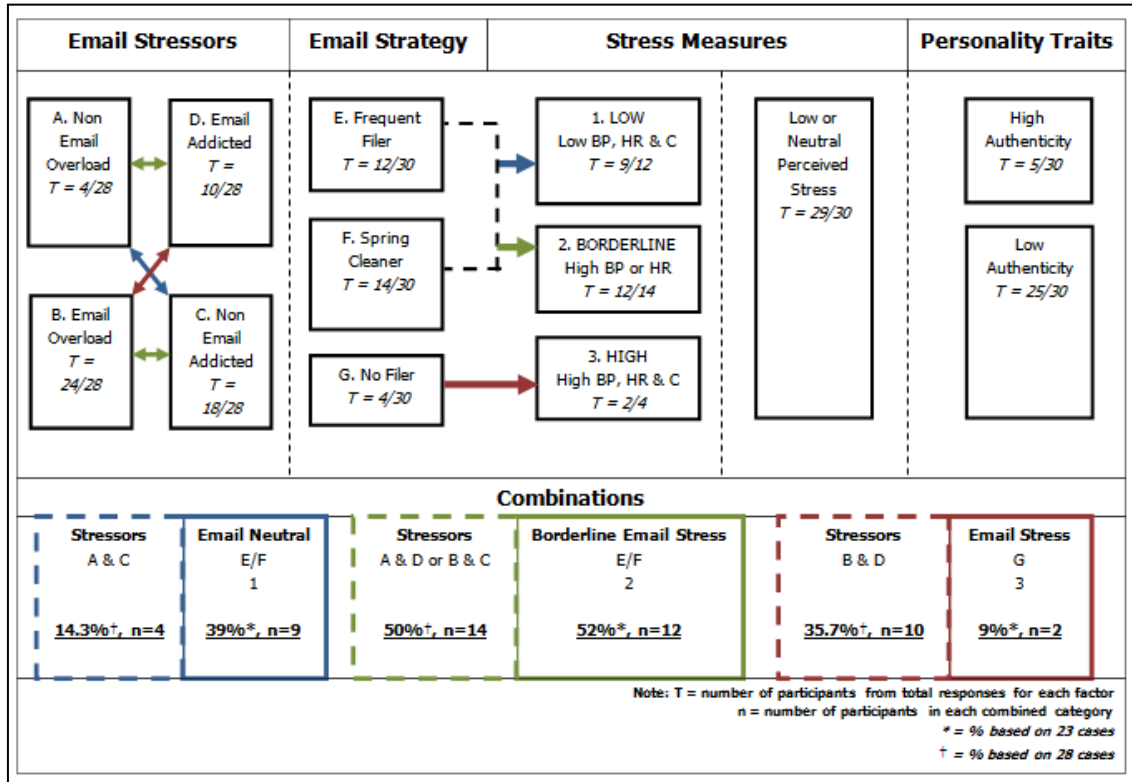
Revised explanatory model design (part 2)

Action model

Recommendations to Manage Email Stress @ Work
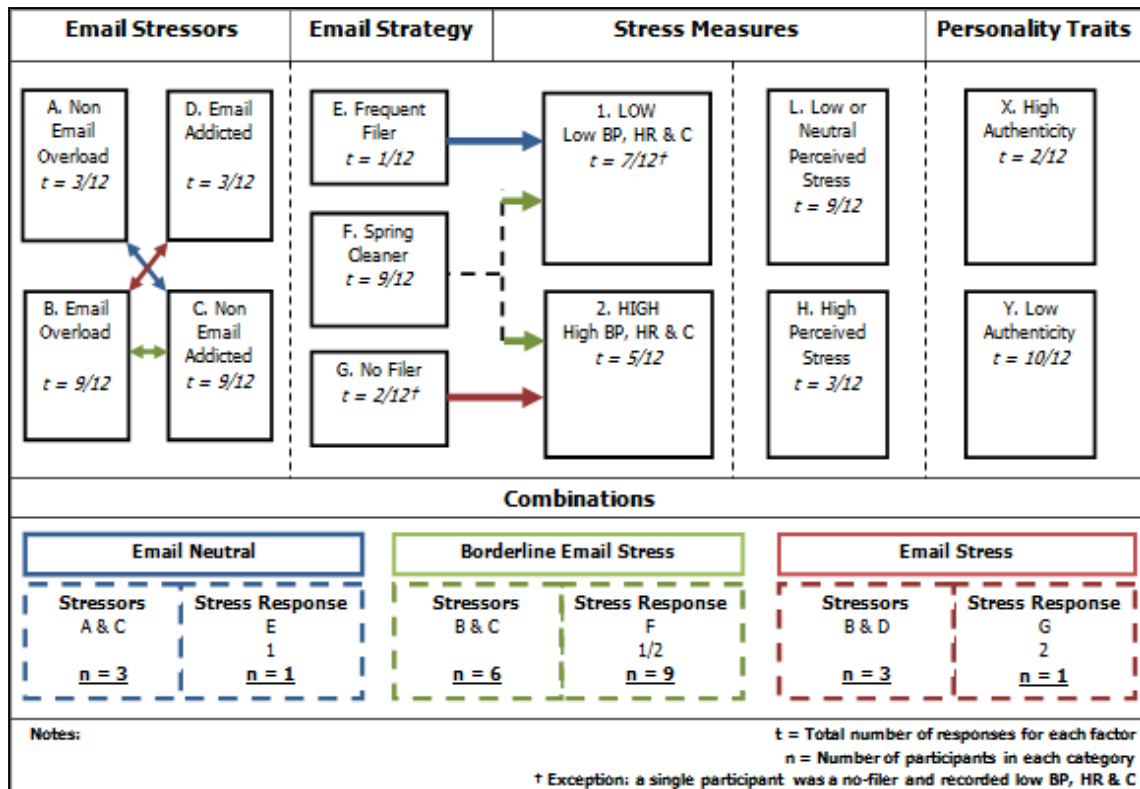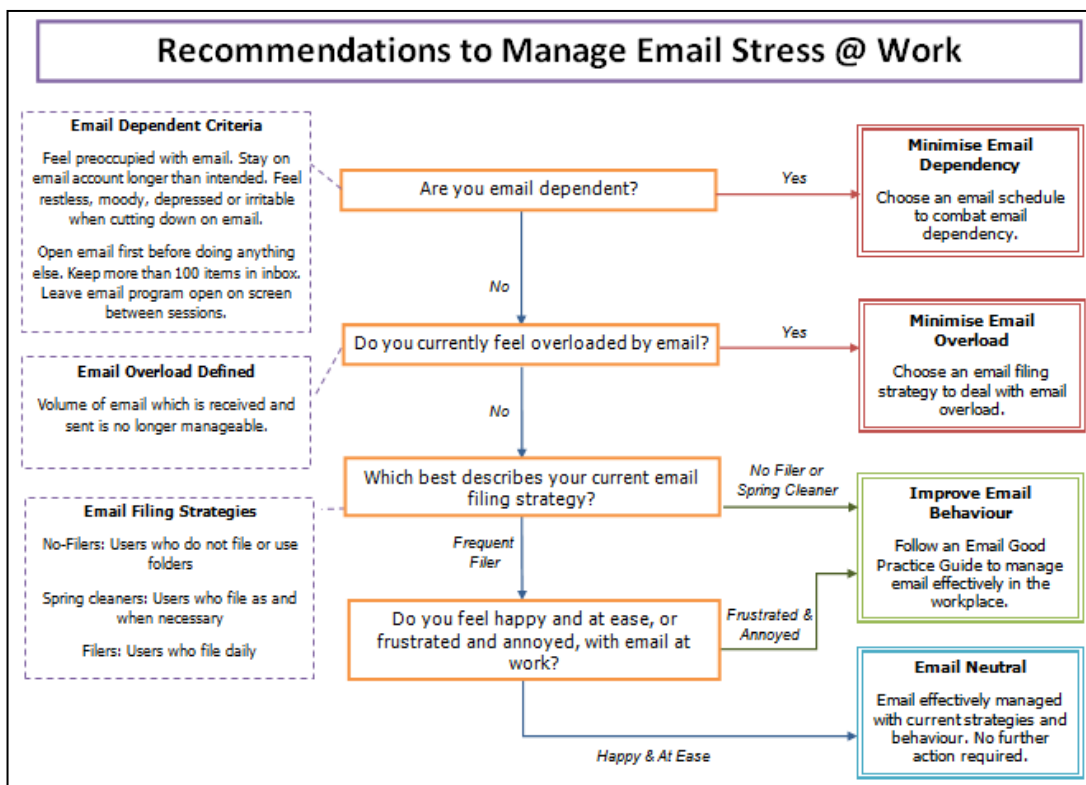
Focus Group Transcript

2:00   All

Discussion included welcome, set-up of equipment, and general conversation around icebreaking and form filling.

Recording started.

2:05   Facilitator

We are going to start. You obviously all took part in the study [Study 1] and also all got your results as well. The main things that we were going through is actually the generalised results to start off with so if you can look at the first page [all shown image: Explanatory Model]. This is framework 1. This is what we thought would happen. Just to run you through it, we will then take some feedback afterwards.

Every single category is what we looked at. The first was email overload, you can read it down in a row with the boxed underneath matched to it as well. So we thought that people who weren't overloaded wouldn't be email addicted and then were likely to be frequent filers and people who manage email well, and subsequently

they would have low blood pressure, heart rate and cortisol as a result. And naturally their perceived stress in the workplace would be lower, as they didn't feel they had a problem, and likewise would have high authenticity, these were their personality types we looked at, and basically high authenticity indicated that people were happy in the workplace.

On the back end of that we also thought that people who were email overloaded could potentially be email addicted, or might not have been, and also likely to have a spring cleaner filing approach that they would file as and when they found necessary, or, didn't file at all, which would end up causing them some level of stress which would indicate high blood pressure or heart rate or high blood pressure, high heart rate and high cortisol. Naturally we thought these people would have high perceived stress in the workplace because they were obviously stressed out with what they were doing in their work tasks and then they would naturally have low authenticity personality types.

So these are the combinations at the bottom here of what we thought could happen so we could group people. Obviously this was all prior to when we came and took the results. So looking at that now, would any of you agree or disagree with what I have gone through, what you thought might have been expected.

<div align="center">(pause)</div>

2:07   Participant 20

I think that is a reasonable assumption.

<div align="center">((pause))</div>

2:08   Participant 3

I know that, the people I was looking at, their main fear was that they didn't file but didn't appear to be stressed. But they knew that they had to keep electronic records and the stress they got was when it came to the spring cleaning and the filing. Now, then they made the decision and up until that point they were quite happy to allow the inbox to get bigger and bigger and bigger, and then it was deciding at what, cause emails have changed, ok so at this I will keep this one and will delete all the previous ones. So that was the point they made an official record and put it onto our iShare or electronic database.

2:08   Facilitator

So you think it came more down to

2:08   Participant 3

The stress arrived when it

2:08   Facilitator

Between making the choice of how when they filed or not

Ok, any other points.

((pause))

Now we flick over to the next page [all shown image: Research Framework 2]. This is actually how the results sat when we put them inside the framework. So I will quickly talk you through this and how we looked at it, and then this is where I definitely want as much of what you think, of whether it matched what you thought would happen or actually if it didn't.

We originally looked at the email stressors and in the end decided to look at them separately, so we looked at how many people were email overloaded and how many people were email addicted, and whether they had any of the problems or one of the problems or if they had both. When we actually matched it up, we found that ten of the people who were email addicted, all of them suffered email overload but apart from that, it was only a small handful of people who were non email overloaded and generally people weren't email addicted. There was only a third in total who were email addicted in the end.

And then we had a look at the filing strategy and the stress. The interesting thing we found was taken, in this map here, we have taken out all anomalies of one or less, so if there was one person that crossed over we took them out but only if it was one. Actually as it went, the majority of the no filers had high stress and the frequent filers, and the spring cleaners, they tended to overlap between having low stress or borderline stress. Now as it happens, the majority of people fell how we thought they would so spring cleaners were borderline, the majority were, and the frequent filers, the majority had low blood pressure, heart rate and cortisol, but there was some cross over there between those two. But the no filers showed quite an indication to having high stress.

And then we came to looking at the low and neutral perceived stress, that didn't match up in any way. We found no cross over between people that had high stress and when they were looking at emails or if they had high or low stress in the workplace in general. So we couldn't find a correlation there and the majority of people, twenty-nine out of the thirty, came back with low or neutral perceived stress.

And then likewise when we looked at the personality traits, in terms of high authenticity and low authenticity, that showed nothing either. We couldn't find a relationship.

2:10   Participant 3

Perceived stress, what, the person themselves feel or what people say

2:11   Facilitator

No, it's how they themselves felt they would be. So they themselves felt that they had low/neutral stress. But actually there was a handful that high blood pressure, heart rate and cortisol

2:11   Participant 3

Unaware that

2:11   Facilitator

Totally unaware of it being there, and likewise, the only one person I can tell you, that was our only anomaly, out of the 29 out of the 30, the one that was left out, had borderline stress. So it wasn't even high stress

2:11   Participant 20

How much do you think that is due down to the conditioning linked to the problems you looked at

2:11   Facilitator

Exactly. At the end of the day the study was done aware that there was additional factors that we weren't looking at apart from email, however what we have gone on to do, later which is something I will follow up with you at the very end, is how we ended up looking at the results now. And generalise them from a total out of the box, not looking at email but everything in general. But for the time being in terms of email, we couldn't find a relationship with workplace stress and nothing to do with their personality types, not even giving an indication of what type of strategy that they would use. We did have

an inclination would no filers have a certain personality trait but we showed nothing at all.

2:12   Participant 3

What was your R^2 value, when you done the stats on them, there was basically no

2:12   Facilitator

Nothing. We got nothing significant.

2:12   Participant 3

I think there are other stress factors at work here I presume

2:12   Facilitator

Your initial thoughts of this framework, knowing what you know now, of how it sat, do you think that we saw anything when it came to email stress specifically? Did we find anything? Just knowing what you got in front of you right now.

2:12   Participant 23

I'm finding it hard to follow everything on these boxes.

2:12   Facilitator

Ok sorry. You will see in a second why, on the next page, why we have the arrows there but that is how they just sat. Were there any surprises there?

((pause))

2:13   Participant 20

I do have a more general question, in the report you give recommendations, if you are not sure of the relationship between stress, how valid are those recommendations

2:13   Facilitator

You'll find out in a minute. They weren't created on the off chance, we did find some things. But this was just the initial framework when we mapped with the results and what we thought would happen.

What I would like to do now is if you turn over the page [all shown image: Revised Explanatory Model 1 & 2]. As I think it will help you understand and make sense.

Basically when we tried to do the combinations again, obviously we were limited, because we had to take out the stressors and we took out the perceived stress and then we took out personality, that we were really left with the main focus of looking at people's blood pressure, heart rate and cortisol and that is what really dictated to us whether they were email stressed.

2:13   Participant 3

Yes because you are asking them for their own opinions, which is pointless. A colleague at work who is half my age, when we all went and got our blood pressure checked recently here, and he was flabbergasted because it was right through the roof. They were like ah. So he went back two hours later to get it checked again and then they said it wasn't white coat syndrome, he had high blood pressure. But he was completely unaware of it.

2:14   Facilitator

That kind of brings us into the debate then of when we are looking at results like this, about, are you looking at people's psychological side, how they feel in themselves, in their head almost, or do you go straight actually into the physical response. So when we are looking at email stress, we do have that balance, of what do we look at. Do we say that, down to your heart rate, blood pressure and cortisol they dictate that are you email stressed or not? Is that true?

2:14   Participant 3

I would say the cortisol, yeah, I don't know. Is perception half the battle, I don't know. I know that some people love it, they feed on stress, and other people are working on the trade union side and I've noticed a huge increase in stress and anxiety related, I am not sure if that is job security or just the extra workload that's up to your staff. But some people at work stop feeling it and coming in, but we are not giving them biometric tests to find out.

2:15   Facilitator

Exactly. I think the interesting thing is if you think about it yourselves and if you think about email, do you feel like you're getting stressed when dealing with email, ever?

2:15   Participant 23

I think if you don't. And again I'm not really into looking at boxes, I thought it might be text, I'm not, I'm just saying. I think if you don't look at email, some of your recommendations [unauthorised ███ ██████████ report brought into room] ((pause)) minimising email overload, and set times in the day, I think that's very difficult because some, people do send urgent things on email and I think you would be more stressed if you didn't take a handle on what was coming in.

2:15   Facilitator

Ok

2:15   Participant 23

I'm not convinced that having set times in the day would map to reality because if people are sending things which are urgent on email, because I know you make reference to people elsewhere, inform you they don't, the reality is they don't. And if you didn't check your emails then I think you'd be more stressed.

2:16   Facilitator

Bearing that thought in mind, and moving onto, the next framework on the next page [all shown image: Action Model]. When you look at the framework slightly differently, taking out all the other frameworks, what you do find is all the grouped filers, frequent filers and spring cleaners together, and then you have your no filers, all the filers were email addicts. All of them were. They all showed addictive tendencies towards email and they were all the people that filed email. Now interestingly as well, as you can see the break down, majority of filers generally had low stress. That is where the recommendations came from to email file, as we can show that. Likewise people who didn't file, 50%, had high stress hence filing advocated.

2:17   Participant 23

I think now coz your email get archived after a certain amount of time, filing becomes redundant, because I file stuff that I think is important and that you know your inbox is going to be cleared out after two months, and you can still search for it in the archives. So I think it is a bit misleading, and I don't like the boxing of things.

2:17   Facilitator

The other interesting point I wanted to make was that people who have borderline and high stress, all of them collectively suffered from being distracted and interrupted by email. That was the one thing that

all of the people within those categories all associated themselves to be with. Obviously saying that people do send emails, which are urgent, and they do need to be sent, on the same token it was a disruption it caused on the back end that potentially caused the stress. So looking at it from the other side, actually how we are managing email, is that really the way

2:18   Participant 3

So what you are saying is ignore them? But as you say you can't do it. But ignore them and they'll ring if it's super urgent.

2:18   Facilitator

That is the question

2:18   Participant 23

But you can't do that. You would get a bit of a hiding for doing that.

2:18   Facilitator

Exactly

2:18   Participant 23

Well that's reality isn't it. You can say people should phone but they won't.

2:18   Participant 3

But we transfer the phone. I tend to pick up the phone on behalf of people when they are in their zone and [they say I need an hour and a half to do this, if its super urgent let me know otherwise deal with everything. Now we've come up with a way to stop. Basically the head of branch was at the top of the bottleneck and he was getting 100 emails per day, especially around this time of year as its settlement, so we've come up with a generic mail box and put subfolders underneath that so if they're not around then someone will go into their folder and deal with them. You can't get access to someone personal inbox but you can, if you're going to put everything through, with all the settlement stuff (pause) because things fell through and he missed a couple of dates on, but he is basically the bottleneck for everything. And he didn't want to measure his blood pressure and stuff, but its only for a month of the year but it was just out of control so we brought in this artificial generic mail box where we can all hound each other then and can see what other people have on the tasks and stuff.

But it doesn't get around the fact that all those emails will arrive and what is left.

2:19   Facilitator

I think there is a definite gap between theory, like what I can say here on paper, to what we can actually implement in the culture, and I think that's the huge factor,

2:19   Participant 3

It is

2:20   Facilitator

Coz it just doesn't work like that, it's a luxury to say people can look at their email, and like you said for an hour and a half and somebody else will pick up the phone if its urgent, but actually in reality it can't happen.

So really it is just more of a discussion, I guess, on your thoughts. I know there seems to be a gap between reality and the culture side of it, but how else, if you were head of the ████████████, how would you change the culture, is there a need for cultural change

2:20   Participant 23

I don't think it will change. I think there are far more disruptions than having to check your emails.

2:20   Participant 15

Hold on a second, they don't disappear though.

2:20   Participant 23

Checking that, I find the process of checking that though is less stressful than some of the other distractions that go on

2:20   Participant 15

I find that it comes up on the box at the bottom and if I'm reading something else, it just won't go away till you open it. And for me that is a distraction. Coz I could be in the middle of reading something, and I need to get through that.

2:20   Participant 23

We work in a distractive environment.

2:21   Participant 15

I find it irritating

2:21   Participant 3

Telephone, is one.

2:21   Participant 15 & Participant 20

Discussion digressed quietly whilst Participant 23 spoke.

2:21   Participant 23

We work in an open plan, and it's just mayhem. You can't concentrate, it's very hard to concentrate and emails are just a small part of the problem.

2:21   Facilitator

Do you think there is the same problem with the telephone?

2:21   Participant 23

In a way

2:21   Facilitator

Do you have the same thoughts as you have with email? As that distraction?

2:21   Participant 3

We do pick up. And sometimes the phone will ring and someone will put their hand up and say quick someone pick it up, coz I can't pick it up, as I'm juggling four things. So somebody takes the call on your behalf. But, yeah, any interruption like that

2:21   Facilitator

Ok. And things which are more scheduled such as meetings, do you find those as stressful, looking back at when you were monitored that day, now when you think about how stressed you were

2:22   Participant 20

I think that comes down to personality. I find speaking in public somewhat stressful so I find meetings in general difficult than email correspondence. Public speaking isn't really my thing.

2:22   Facilitator

Because what I was going to say is one of the other findings was that we did look at email on its own, and then we looked at emails and meetings, and emails and the telephone, and there was a significantly higher levels during those times than when you put email with paperwork, which seemed to go more hand in hand. So people were actually showing a decline in stress when using email and paperwork. Do you think that makes sense when you look at yourselves?

2:22   Participant 20

Yes I would. It's not as urgent is it paperwork, as you can work through it slowly

2:22   Participant 15

I agree

2:22   Facilitator

Do you think the sense of urgency

2:22   Participant 20

That is sometimes an issue in itself.

2:23   Participant 3

Discussion digressed to that day events prior to meet.

2:23   Facilitator

This was just an opportunity to discuss these results. Is there any other thoughts you would like to make when you think about it?

2:23   Participant 3

I think we live in an information age. And I am probably the only one around this table who doesn't have a mobile phone but everybody I know has a mobile phone and is always playing with it.

2:23   Participant 20

Always using it

2:23   Participant 3

Always checking it. That's just the world we live in now. And, I'm not sure, the tv generation or whatever they want to call it, we like information, we like to be able to respond quickly to things and the whole idea of writing a hand written letter to somebody now is official,

but not how we communicate to our friends and family anymore. So I think that's the world we're in.

2:23   Participant 23

In that way you could say is less stressful. And ways that are more foreign to people like the phone, coz they don't use it as much, could actually cause more stress.

2:24   Facilitator

I was going to say, if you could come up with a definition of email stress would you? Is there a definition, how would you describe it, if you chose too?

((pause))

2:24   Participant 3

As a concept

2:24   Facilitator

As a concept in itself

2:24   Participant 3

Email texting

2:24   Facilitator

Would you categorise more in general communications that we deal with now?

2:24   Participant 3

I wouldn't give it a special (pause) name. But I would put in a description, coming back from your holidays and there is three hundred emails, you know that some of them are super urgent but hopefully they'll be picked up by other people, as often, or if something that came in two days after you left and then nobody's chased it up for whatever reason would

2:24   Participant 15

You still got to get through them though don't you

((pause))

2:25   Participant 23

It's interesting to see, coz like you say a lot of people, I do as well, check your mobile phones because if you get a text then you certainly, that I think is more stressful. Coz then you have to juggle that, and you know you shouldn't really be texting someone back during the day too much but if it's something that is an issue that needs to be dealt with, I think that is certainly a lot more stressful than checking your work emails. Coz you have to do that in the context of (pause) people know they shouldn't really be checking their personal mobiles unless its work related.

2:25 Facilitator

Are you distinguishing then between getting personal information from work information?

2:25 Participant 23

Well I just thought, as you mention, as you go around (pause) as you walk around a lot of people are checking their mobile phones quite regularly and I think that must be giving them more stress coz their aware, obviously more aware, that it's not work, is it so

2:25 Facilitator

What about people then who have blackberry's or iPhone's where their email messages come straight to their phone? Equivalently the same as a text message but obviously

2:26 Participant 3

Work-related yeah

2:26 Facilitator

Work-related

2:26 Participant 23

I think those people who have those blackberrys are probably people less likely to be as adept to using them as well so

2:26 Facilitator

Ok

2:26 Participant 23

I think it's more realistic than just looking at it (pause) use of office email system, I think it's just the general understate cultural environment and the immediacy of everything, juggled up together

2:26   Facilitator

And what you know now in terms of the recommendations, obviously we did recommend that you should email file and email schedule to deal with overload and also the twenty do's and dont's for the culture, thing, in light of those, do you think they would tackle email stress, which I will still call it for the purpose of the focus group, so do you think that will actually manage the problem

2:26   Participant 3

For people who don't, the no filers, any advice that will help will y'know, but the correlation here is that if you do file or be an addict or not an addict, if you do file, that does, it should be your stress measurements rather than how you proceed. Any system is better than no system so we have put in a generic mail box but y'know which have some folders, but you can set these things up, but to use them properly is all (pause) fun

(pause)

2:27   Facilitator

Do you think though that if you go to the other extreme, that filers were constantly on their email box and then they're having these addictive tendencies, so do you think

2:27   Participant 3

Obviously interfering with their job

2:27   Facilitator

Yeah, do you think there needs to be some kind of distinguishing between how much is filing too much then?

2:27   Participant 3

Well (pause) I think that people are almost frightened to delete stuff here because I think of it as a record. I would imagine 75% of the emails I get every day are not official records and there is an awful lot of thank you's and this and that, and clarification

2:28   Participant 15

It's an awful lot of (pause) it is a terribly polite world as well

2:28   Participant 3

There's an extra sentence going back

2:28   All

Discussion digressed from topic around issues of record keeping

2:28   Participant 3

From the environmental point of view, I hate the disclaimer at the end and I often see people print out emails, with two words but because it's at the end, long chain of emails, it's the same disclaimer five times

2:28   Participant 15

Maybe you should take that off coz

2:28   Participant 3

Well we shouldn't be printing out emails full stop now

2:28   Participant 15

It shouldn't be allowed

Recording ended.

2:29 – 2:35   All

Discussion digressed around current issues of the ████████████*, iShare, future follow-up studies and stress in general.*

<u>Facilitator's Notes (after recording ended)</u>

Participant 3 – No raised issues with iShare, and comes from a science orientated background and advocate for use of cortisol. Often referred to his line manager who he believes is stressed and would have been suited for Study 1.

Participant 15 – Raised problems but now resolved issues with iShare. Generally feels overwhelmed with email after holidays and causes a distraction when icon appears on screen.

Participant 20 – No raised issues with iShare or the ability to file email. Suggested he would be more stressed to not file.

Participant 23 – Raised issues of stress when dealing with managers messages and misinterpreting people's use of "wooly" language in email messages. Raised one problem with iShare, in particularly that it was time consuming. Also raised concern

of Study 1 recommendations which he feels don't fit and would be better suited if looked at results of psychological data only.

All - When asked if stress should be based on either psychological or physiological perspective responses included:

> Participant 3 – "The science in me says psychological but my heart says its how it makes you feel, so psychological, or both."

> Participant 15, Participant 20 and Participant 23 all agreed it should be psychological.

Appendix J: Ethical clearance endorsement for ████████████

Ref No: R11-P161

<u>LOUGHBOROUGH UNIVERSITY</u>

ETHICAL ADVISORY SUB-COMMITTEE

<u>RESEARCH PROPOSAL</u>

INVOLVING HUMAN PARTICIPANTS

_____

Title: **Email stress and training**

Applicant: **Dr T Jackson, Dr G Ragsdell, L Marulanda-Carter**

Department: **Information Science**

Date of clearance: **24 October 2011**

Appendix K: ███████████████ **organisation structure**
The following figures outline the ████████████ organisational structure (see Figure K.1 for list of departments and directors) and hierarchy by job band (see Figure K.2, seniority from top to bottom).

████████████████ **(2011) organisational structure**
████████████████ **hierarchy (by popular job bands)**[29]

SENIOR CIVIL SERVICE
- Senior Civil Service
  Band 2
- Senior Civil Service
  Band 1

EXECUTIVE
- Executive Band 2
- Executive Band 1

MANAGEMENT
- Management Band 1
- Management Band 2
- Management Band 3

ADMINISTRATION
- Team Support
- Personal Assistant

Appendix L: Email good practice guide

Email in the Workplace

A Good Practice Guide

By

© by Laura Marulanda-Carter

May 2011

Contents

1. Introduction

Email should be used to exchange information in a clear, concise and appropriate manner. In doing so, this will improve the communication, management, and culture, both internally and externally of the organisation.

The purpose of this Guide is to provide a practical and collective understanding of how email can be used and managed effectively in the workplace. More specifically it provides details on the expectations and appropriateness of email use.

The Guide elaborates on seven key areas of email use, namely:

- Using email at work
- Writing effective email
- Exchanging information by email
- Email retention
- Management by email
- Dealing with spam and corporate email
- Email culture

To begin, an approach to email use and writing effective email is advocated. This is followed by guidelines on how to ensure email exchanges the right type of information and how it is stored for effective retrieval in the future.

An approach to email use can equally be determined by management and colleagues. It is essential therefore to set the benchmark of email use both on a management level and corporate level. This is followed with advice on how to deal with unsolicited email, such as spam and corporate newsletters.

The Guide advocates that the culture of email is an important determinant of its use in the workplace. In such circumstances it is important to be aware of ways to increase positive email behaviour. Finally the Guide summarises twenty DOs and DONTs of email best practice.

For more information on email good practice guides contact author Laura Marulanda-Carter at email: *L.Marulanda-carter@lboro.ac.uk*.

2. Using Email at Work

You might receive emails daily and in some cases spend up to several hours a week managing them. The Parkinson's Law states that work will expand to fill the time available for completion. This equally applies for email. If you let email take over the whole day, it will.

It might be justified to use email when:

- You are expecting urgent or important information; or
- Email is central to your job role.

However it is not justified to use email if:

- You have a fear of missing out on important information;
- You use email to avoid other tasks that require more concentration or time;
- Your corporate culture encourages immediate viewing and response to email.

To maximise your day, it is important to determine a plan for when and how often email is dealt with, and how much time is necessary to manage email effectively.

Your job will have its own unique requirements for how frequently email needs to be viewed and responded. But as a general rule, you can check email as few as two or three times a day – e.g. in the morning, after lunch, and before leaving at the end of the day. You may schedule more or fewer times for managing email, but the important quality is to follow a regular and consistent pattern.

An email schedule to fit personal preferences allows you to take control of your workday, rather than allowing email to control you. The goal is to avoid spending the entire work day reading and responding to emails. During unscheduled email time, you should consider turning off new email alerts, or closing your inbox entirely to focus attention on other tasks.

If email correspondents are accustomed to getting an immediate response from you then ensure they are aware of your new email schedule, i.e. send a drafted email of expected response time and alternative contact details if message is urgent [1. pp134-136].

3. Writing Effective Email

Time is often wasted reading and responding to poorly written or ambiguous email messages. It is important when you are composing emails to be clear, concise, and to write in a manner that encourages the recipient to read and respond to messages quickly. The art of effective composition is vital to maximising yours and the recipients' time [1. p136].

To set the standard of messages sent and received you should adhere to the following Seven Point Test before sending an email, and always:

▪ Describe the key content in an email subject line;
▪ Write concise and easy-to-read messages;
▪ Clearly outline the response needed.

The organisation should equally promote the importance of appropriate email content, in order to ensure correct information is exchanged and to convey a professional image [2. pp26-27].

The Seven Point Test

Email should pass the test before it is sent:-

1. Email is the most suitable communication medium for this message.

2. The email you have written is easy to read.

3. The email you have written is straight to the point.

4. The email is relevant to all of the recipients.

5. If your email requires action:

▪ It states what action is expected of the recipient; and
▪ It states when the action must be completed.

6. Your subject line contains sufficient detail for the recipient:

▪ To assess the importance of the message; and
▪ To know what the message is about.

7. The email takes less than 40 seconds to read.

4. Exchanging Information by Email

Email is well suited for delivering straightforward messages and information. Furthermore, with email accessible at the office, at home and on the road (by laptop, phone or web-based email) you can use email to stay in touch from anywhere, at any time.

Email is the fastest growing form of communication in organisations primarily because of its convenience and speed, e.g. you can read six times faster than you can listen, so you can read 30 email messages in as little as 10-15 minutes [3. p389]. However you can easily miss visual clues and expressions for it is difficult to accurately interpret the meaning behind the words.

Email is well suited for sending short messages and information. It is not well suited to convey complex, ambiguous, or emotionally laden messages, which are better delivered through oral communications, such as phone, face-to-face

meetings or video conferencing [3. p389-390].

Misunderstandings are much more likely when email is used inappropriately and any offence caused, either intentionally or un-intentionally is likely to escalate [4]. This is often followed by conflictual reply messages. Responses such as "flames" are messages that show attributes of hostility, aggression, intimidation and offensiveness [5].

At all times you should aim to be as polite in emails as you would face-to-face, and more so. Keeping this in mind you would be well advised to [4]:

- Stop communicating over email in the heat of the moment. Either wait 24-hours before replying or contact face-to-face;
- Avoid using CAPITALS, as it is considered shouting;
- Never criticise or defame people by email, speak to them about the issue;
- Avoid blind copy unless justified. It often raises suspicion and provokes hearsay.

5. Email Retention

Unlike other forms of communication, email has a tendency to encounter service interruptions, disruptions and outages. As IT departments simultaneously wrestle with email availability, they also battle with spam and viruses threatening the organisation. Information security managers on the other hand are grappling with email leaving and entering the organisation.

It has been suggested that over half of an organisation's critical information could be stored in the corporate email repository. Most users now view email as a filing system, and a way of keeping everything forever. The result is that the management, storage, archival and retrieval of this information is an onerous task.

When it comes to managing email for compliance, some best practices and standards have been established. There are four key areas that you must consider in order to ensure compliance:

- Email must be tamper proof, password protected, non-delete-able, encrypted, digitally signed, and exist in a closed system online and offline;
- Email must follow the defined policies of the business, i.e. what email is archived, where email is archived, how long email archives are retained and how email is protected.
- Email must have full audit ability of access and movement, with the capability to be audited by a third party.
- Email must be fully indexed and provide full search capacity. Specifically, archiving must be indexed based on standard header information.

You must therefore ensure that email is regularly archived and backed-up accordingly. All email messages must be easy to access. Likewise it must be consistently available and readable regardless of time and technology. Where necessary audit trails exist from origin to disposition to meet security requirements [6. pp107-111].

6. Management by Email

The overuse of email can lead to a great deal of time spent sifting the important from the unimportant. In all cases you should ensure that messages are necessary, or necessary copies, are sent. Unnecessary email use only leads to problems and frustration for recipients.

The whole issue is so important and relatively undocumented that it is essential to identify your email approach, and ensure it is the most effective for communicating with staff and colleagues alike [7. p197]. Often you might find yourself using email in one of four ways [8]:

o The Pen – Rarely uses email. Prefers to talk or to write. Generally does not respond to email in a timely manner.
o Email Junkie – Relies on email and is addicted. Prefers technology to people, and often micromanages.
o Just Online – Uses email to obtain and send information. Logs into inbox when possible.

o Email Citizen – Relies on email in conjunction with other media. Takes time to ensure email is communicated clearly and effectively.

You should always be striving to be as much like an Email Citizen as possible, especially when using email to communicate with others.

When email is used to avoid people, delegate, or to discuss confidential matters, one's reputation and leadership capabilities can be placed in disrepute. To avoid such complaints you should [4]:

▪ Recognise your email management style and consider how you choose to communicate with others;
▪ Never avoid people or "hide" behind email;
▪ Never delegate tasks by email, unless you have the time to follow up and check recipient understands;
▪ Avoid discussing confidential matters by email that are best discussed in person or by phone.

7. Dealing with Spam and Corporate Email

Untargeted email messages arrive in your inbox every day. These messages vary, where some might contain advertisements, others provide winning notifications, and sometimes messages contain executable files which often emerge as malicious codes and viruses. These unsolicited bulk emails are termed 'spam' [9. p1]. In much the same way organisations often generate untargeted internal corporate messages or newsletters. Often they are received and the content is irrelevant or necessary.

As sophistication of email increases, the short-comings of these types of messages become more apparent. In particular, how time-consuming it is for you to monitor new email, especially when new messages may not be of interest or relevance [10. p33]. In either case they waste valuable time to read and delete on a daily basis.

Rules and filters can be useful tools in managing unwanted messages. Users can choose to:

- Reduce spam or unsolicited email – creating rules or filters to delete emails from certain addresses or containing certain subject headings.
- Sort email sent through distribution lists – moving emails that are company updates and newsletters into an email file folder called 'Newsletters' or 'To read'.
- Manage projects – emails related to project communications and updates that require no action can be moved to a project file folder [1. p145].

Furthermore organisations must try and avoid mass-mailings unless they are absolutely sure that everyone would like to be a recipient. It should not be assumed, thus the onus is to ask employees first so they can decide (i.e. opt-in vs. opt-out). If weekly corporate messages are necessary then they should contain only a selection of announcements and news items [11, 12].

8. Email Culture

Just as your email inbox says a great deal about how you manage email, it also speaks volumes about the organisation's email culture [13. p177]. It is not unheard of that email can promote a long hours working culture, as it is easier to manage email out of hours or at home. In other instances email enables employees to push out information to everyone regardless of whether or not they need or want it. These examples show how the culture of the organisation can influence the use of email and vice versa [13. P176].

Likewise there is evidence [13] to suggest that men are more likely than women to boast about the size of their inbox. Some employees boast about the quantity of daily emails they receive, thinking of it as a sign that they must be really busy and important. However, what really is important is the ratio of 'noise' to 'information' [13. p7].

'Noise' are those emails received which are of no interest or importance (see section 7 on dealing with spam and corporate email). 'Information', by contrast, is represented by the emails that enable you to perform your role more effectively, i.e. by being informed of a work task by a colleague. As well as improving decision making, information also enhances co-worker relationships [13. p9]. In all cases email should promote 'information' rich content and zero 'noise'.

There are a number of practices that you can instil to create a positive email culture. It requires strong leadership and change management efforts, but by following these methods, managers and employees alike will be able to reclaim more time and improve their surrounding culture [14].

- Never use email as an urgent delivery system. If the matter is of urgency use face-to-face meetings or phone.
- Move all messages into file folders to organise information for easy reference.
- "Reply to all" and "carbon copying (cc)" should be used sparingly and only when necessary.

9. Conclusion

In summary the Guide recommends twenty DO's and DONT's of email good practice in the workplace.

1. DO use the Seven Point Test before sending email.
2. DO ensure email is tamper proof.
3. DO ensure email follows defined policies of the organisation.
4. DO use audit trails to record messages going in and out the organisation.
5. DO ensure email archiving and backing up is done regularly.
6. DO rely on email in conjunction with other media, e.g. Face-to-face, meetings, phone, etc.
7. DO ensure email is communicated clearly and effectively.
8. DO create rules and filters to manage SPAM and corporate messages.
9. DO create an email schedule that stipulates when, where, and how often email is accessed during the work day.
10. DO make use of file folders to organise information received and sent.
11. DONT send email in the heat of the moment. Wait 24 hours before replying.
12. DONT use CAPITALS, as it is considered shouting.
13. DONT criticise or defame people by email.
14. DONT blind copy unless it is necessary, to avoid suspicion and hear say.
15. DONT avoid people or 'hide' behind email.
16. DONT delegate via email unless time is made to follow up and check recipients understanding.
17. DONT discuss confidential matters by email.
18. DONT send corporate email messages and newsletters without ensuring relevance or if the recipient wants to receive it.
19. DONT use email as an urgent delivery system, use alternative mediums instead.
20. DONT use "reply to all" or "cc" unless message is relevant to all recipients.

You should always consider the way in which you use email and how you can encourage more effective email practice in the organisation for yourself, staff and colleagues alike.

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Appendix M: Feedback survey

Feedback Survey

1. Did you attend the email logic training?

   ☐ Yes   ☐ No- *Go to Q.3*

2. Since the seminar, have you adopted the use of any of the following... (tick all that apply)

   ☐ IMPACT   ☐ Subject Lines   ☐ Subject prefixes   ☐ Email Audit

3. Have you watched any of the video links (tick all that apply)?

   ☐ Jukebox Subway   ☐ Star Trek Enterprise

   ☐ Talking Email with Barack   ☐ None

4. Of those interventions, which have you found most useful?

   ☐ Seminar & Video   ☐ Seminar Only

   ☐ Video Only   ☐ None

   (Content, Presentation, Practicality)

   ....
   ....
   ....
   ....
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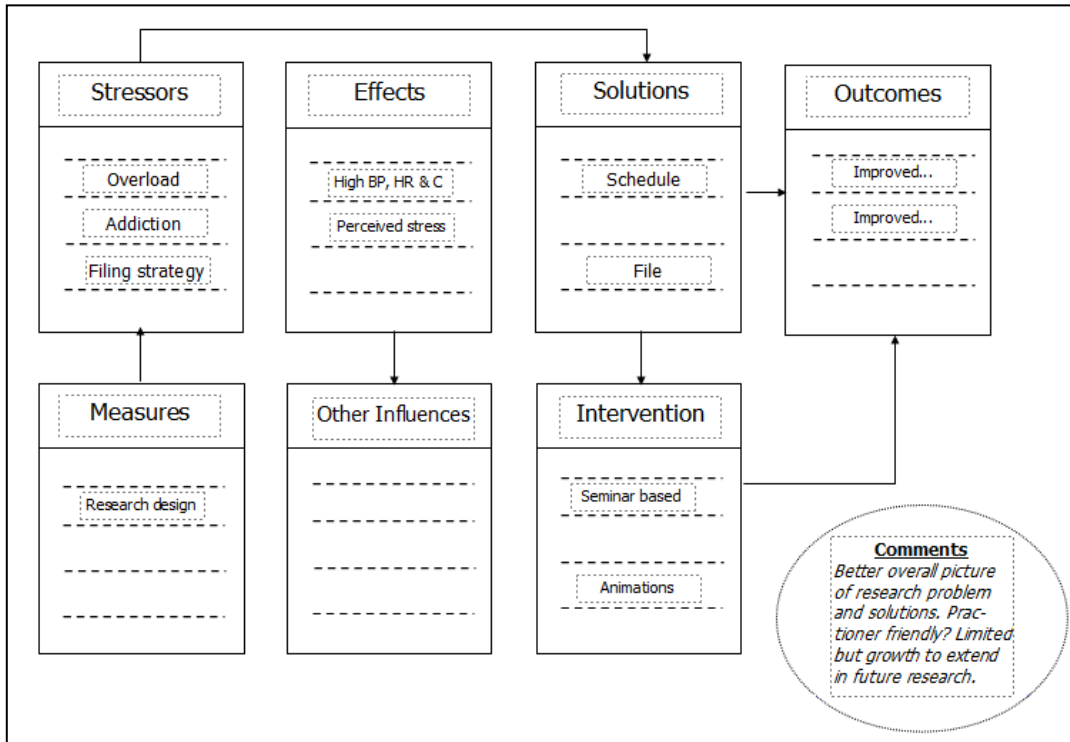   ....

5. Do you feel you have changed your email behaviour since the intervention?

   ☐ Yes   ☐ No   ☐ Cannot Answer

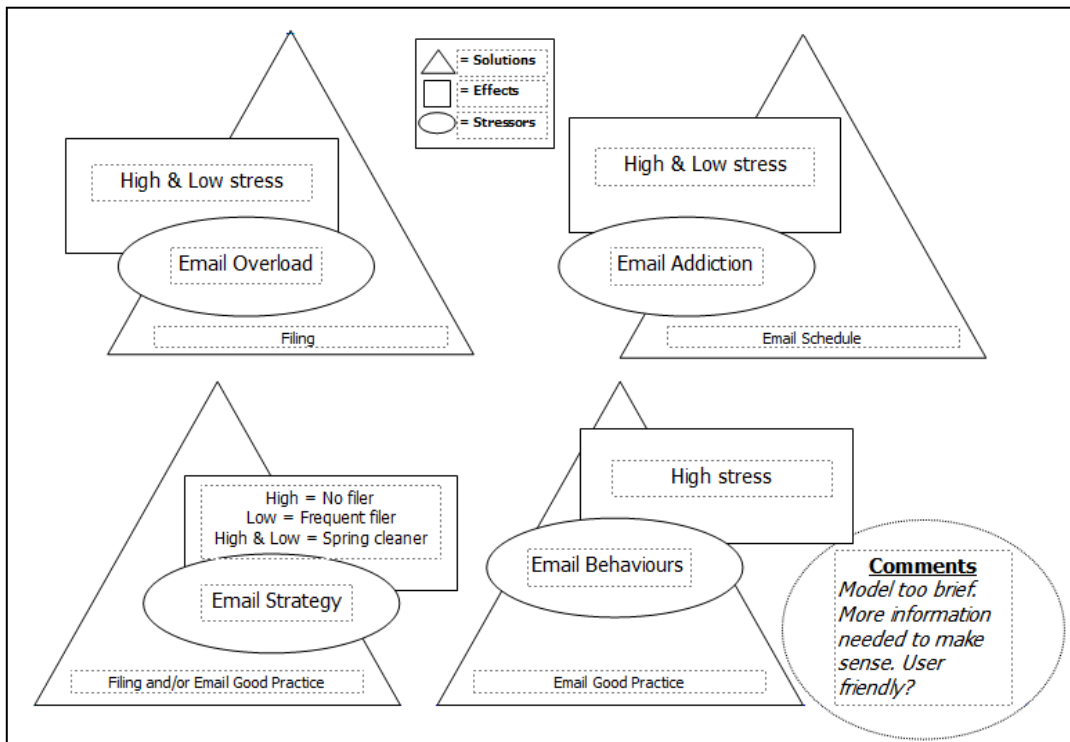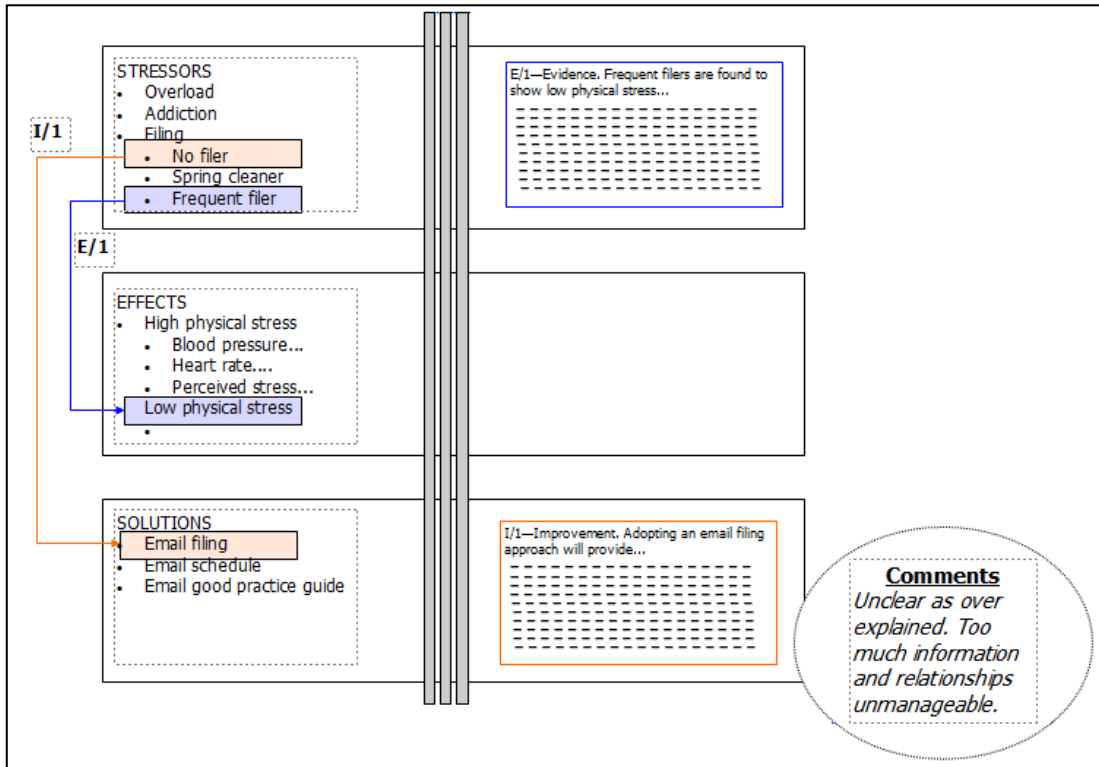## Appendix N: Alternative designs and researcher's notes

Model Design #1

Model Design #2

Model Design #3

Model Design #4