Effective Means of Improving Email Communication

by

Anthony Keith Burgess

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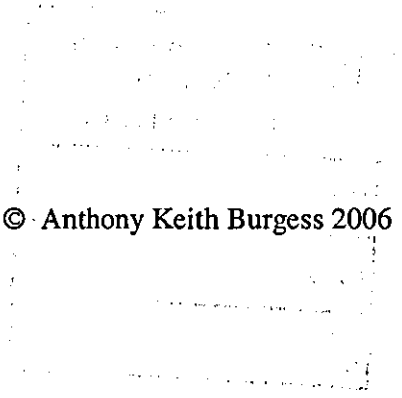

Abstract

Email communication has become an integral part of the communication structure within organisations, but the problems it can cause are rarely assessed. The defects associated with email, which are related to both the quantity and the quality of email need to be understood by employees for them to become more effective users of email. Email training within organisations tends to focus on how to use email as a software package, without looking at when it is appropriate to use email and how to get your message across effectively.

This thesis first explores email defects and how they impact on organisations. Four studies were carried out within separate organisations to discover how email was used and viewed by employees. The results showed that there were many defects with the way email was used within the four organisations. These findings were consistent with some of the common problems with email communication identified in the literature.

The second phase of the research was to determine the effectiveness of two training approaches to reduce the email defects identified from the initial studies and improve the way employees use email. One approach used traditional seminar based training, while the second used a combined seminar and computer based training approach to improving email use. The results showed that while the seminar based training approach lead to initial significant improvements in some areas of email use, these improvements were not sustained. However, the combined training approach (seminar based and computer based training) did produce improvements that were sustained.

The final phase of the research shows the cost of email use within 3M, LogicaCMG and Professional Development and is calculated from the total employee time spent using email. The financial impact of the seminar-based and computer-based training in reducing the cost of email use is calculated. Furthermore the research shows how the cost of email use can be further optimised by reducing the volume of irrelevant and untargeted email and by reducing the frequency an email application checks for new email.

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Contents

Chapter 1 Introduction

Chapter Preface

This chapter explores the growth of electronic mail (email) within the work place, and introduces the issues that are associated with email communication. The aims and objectives of the proposed research are detailed, together with an outline of the thesis.

1.1 Background

Email has been around since the 1970s, and has become one of the three 'killer apps,' along with Telnet and FTP that has contributed to the growth of the internet (Berghel, 1997). University researchers and the defence industry originally used email, before it emerged as a communications tool within business organisations (Peter, 2004). The international Data Corporation (IDC) predicts that 60 billion emails will be sent worldwide every day by 2006, up from 31 billion emails in 2002 (cited in PR Newswire, 2002). Email is not only used as a means of communication, but is increasingly being used for tasks for which it was not designed, such as personal archiving and task management (Whittaker and Sidner, 1996). This has lead to employees spending a considerable amount of time within email applications, which become their primary "electronic habitat" (Duncheneaut and Bellotti, 2001).

Email has several technical advantages over other forms of communication. With email, messages can be sent to multiple recipients anywhere in the world without geographical distance being an issue. The sharing of information between colleagues is easy, regardless of whether they are in the next office or a different time zone (Hein, 1996). Email is a communications tool that is cheap, fast and can be used to send the same message to various people at once (Robbins and Coulter, 1999). Email use is asynchronous, giving recipients the freedom to respond to a message at their own convenience. This enables the recipient to respond to a message once a reply has been considered (Sproull, 1986).

In spite of the benefits of email, its continuing growth has caused some users to become overwhelmed by the volume of emails they receive. Many email users, especially managers, receive too many email messages to read in the time available to them (Balter and Sidner, 2002). Kimble et al (1998) in their study within a large international organisation found that some managers were overloaded with emails because of the inappropriate use of the Carbon Copy function. Users are also bombarded by unsolicited email, which now accounts for 75% of email traffic and is predicted to rise to 95% by the middle of 2006 (Spamhaus, 2005). The amount of unsolicited email or SPAM can be reduced by using filters, although it is extremely difficult to define syntactic rules that reliably distinguish unsolicited from legitimate messages (Hall, 1998). Reducing the volume of unsolicited email may cut the number of emails received within an organisation, but even legitimate emails, often generated within the company, can cause problems. In an attempt to reduce the amount of email traffic, British Airways launched the 'daily email' with the clever headline 'Thousands buried in e-quake'. Email has become one of the top ten stresses of working life, and this also comes from the belief that emails need to be responded to immediately (Hogg, 2000).

Organisations are now becoming increasingly aware of the problems that are associated with email use within the workplace. These problems are not only limited to the volume of emails that are sent and received each day, but also to the quality of the email. Research has shown that more than 65% of all email messages fail to give the recipients enough information to act upon, and ambiguous and poorly written emails can lead to misunderstandings that can cause tension within the workplace and may lead to incorrect instructions being carried out (Frazee, 1996). Additionally poor use of grammar and the overuse of abbreviations can also make messages harder to decipher.

Technologies such as email are now predominant in organisations and their use is still rising (Duncheneaut, 2002). The relative ease of sending email has meant some messages are sent that would have been better suited to another communication medium. Lynne Markus (1994a) found that employees would often choose email in

place of other forms of communication in circumstances where they wished to avoid unwanted social interaction, such as when communicating with someone intimidating or someone they do not like. Davenport (1997) suggests that a variety of economic factors, such as patterns of information pricing, can greatly influence how often and how well people communicate. If internal email use is free, but the use of voicemail is charged to an employee's budget then it is likely that employees will use email more than the phone. One way to reduce email overload would be to charge individuals for the amount of information they send and the number of people to whom they send it (Davenport, 1997).

Email can be a distraction within the workplace. This is related not only to the volume of messages received, but also to the configuration of a user's email application. Jackson et al (2001) illustrate how employees can be more productive by setting their email application to check for new email at less frequent intervals, thus reducing the number of times they are interrupted by email each day. The fear of email being a distraction to workers can cause employers to ban or limit email use within a company. John Caudwell, Chief Executive of the British communications company Phones4U has banned his shop staff from sending internal email because he says workers were spending too much time using email (Best, 2003; Wray, 2003). Employees are still able to communicative with customers and suppliers via email, but must now rely on the phone or face-to-face contact when communicating with their colleagues. Other organisations that have limited the use of email by introducing 'email free days' include the UK unit of the Swiss food giant Nestle SA and Liverpool City Council (Thomas, 2003).

Managers often assume that because they have implemented an email system, employees will be more likely to share information, simply because the technology is available (Davenport, 1997). An email system may not be used as expected, or be as efficient as initially thought by management. The technology itself often magnifies the shortfalls in communication skills (Frazee, 1996). Email education within organisations tends to focus on the hardware and software issues without regard for the requisite communication skills (Hallewell, 2000). Most employees are not taught how to become effective electronic communicators (Nantz and Drexel, 1995). There

is a tacit assumption that because employees can read and write, they can use email effectively (Hallewell, 2000), but even the most educated of employees can lack the basic skills for expressing themselves effectively (Davenport, 1997).

The increased volume of emails that are sent and received within organisations has caused some employees to become overloaded by email. This is not helped by the apparent lack of training given to workers to enable them to use email more effectively. The problems associated with email, which are related to both the quantity and the quality of email need to be reduced for employees to become more effective users of email, which will, in turn, optimise employee time and reduce the cost associated with email use.

1.2 Research Aim and Objectives

While the author acknowledges that email is only one communication medium used within organisations, the focus of this thesis is limited to improving email communication within the workplace, without exploring other media. The author also acknowledges that in certain cases, more time spent using email may be an advantage for an organisation, rather than a problem, especially if conveys useful information and its use is effectively balanced with other media.

The aim of this research is to improve workplace communications by improving the way email communication is used within the workplace.

The research aim will be satisfied by achieving the following objectives:

1. Understand how email is used within organisations, specifically identifying the problem areas with email communication.
2. Determine the effectiveness of seminar-based training (SBT) at improving email use within the workplace.
3. Determine the effectiveness of a combined computer- and seminar-based training at improving email use within the workplace.

4. Determine the cost of email use within organisations and how it can be reduced.

The first objective is concerned with highlighting any problem areas in the way that email is used within organisations. This will be achieved by establishing how email is used within the organisational environment. These problems areas (or email defects) relate to the inefficient and ineffective uses of email within an organisation. They pertain to all aspects of email use, including the quantity and quality of emails generated within organisations, as well as the configuration of the email application itself.

The second and third objectives will determine the effectiveness of both a seminar-based and a combined, seminar- / computer-based training approach to reducing the deficiencies identified from the first objective. The author is keen to establish which training approach is the most effective at reducing email defects and if certain defects are more receptive to the training than others. The long term impact of the two training approaches will be analysed, to determine if any improvements in email use can be sustained.

The final objective is to determine the cost of ineffective email use and the financial impact of the two training methods. This will determine the financial saving in terms of employee time that organisations can achieve through implementing either training approach.

1.3 Research Environment

The research conducted for this thesis was undertaken within four organisations. This was because email use needed to be studied within its natural environment, to explore how real organisations use email and the problems they encounter. The four organisations are:

3M UK plc (3M) is a diversified technology company that has manufacturing, sales and marketing operations. It has approximately 2850 employees based at 14 office locations throughout the United Kingdom and Ireland.

LogicaCMG is an information technology company that provides IT solutions and consultancy. LogicaCMG employs around 20,000 employees in offices across 34 countries. Within the UK region it has over 30 office locations, of which 2 participated in the research for this thesis.

The third organisation, Danwood is a supplier of total office solutions that employs around 600 people. They operate from over 20 sites within the UK and Ireland.

The fourth organisation to participate in the research is the Professional Development (PD) Department at Loughborough University. Professional Development is a central support unit within Loughborough University that offers staff and students services to help develop their full potential. The PD department consists of 23 staff.

1.4 Thesis Outline

This thesis comprises eight chapters. The second chapter is the literature review that explores past and present research in the area of email communication. The literature review also highlights some of the gaps in the existing research that will be addressed by the author.

The third chapter consists of the methodology, which discusses the research approaches and methods available to the author. The chosen approach and methods are then justified, explaining why they are to be used over other methods.

Chapter Four explores how email is used and identifies the problems of email use within the four organisations. Chapter Five discusses the development of a computer based email training system used to address the third research objective. Chapter Six explores the effectiveness of the two training approaches to reducing email defects

and improving workplace communication. This chapter highlights which email defects are receptive to each style of training, and the long term effect of each training approach is also discussed to determine if the effect of the training tails off after a period of time or whether any improvement is sustained in the long term.

The penultimate chapter highlights the time employees spent reading emails within the four organisations. The time that could be saved is used to determine the cost of ineffective email use for each organisation. The impact of the two training approaches is also converted into economic values in order to determine the cost effectiveness of the training methods and to highlight how much organisations can save through implementing email training.

The final chapter summarises the research contained within the thesis and relates the findings back to the aim and objectives in Chapter One. This chapter also provides recommendations for other organisations on how to reduce the cost of ineffective email use. Recommendations and suggestions for further research in this area are also included.

1.5 Summary

This chapter introduced the author's research topic and provided a background of why such research is useful. The aim and objectives of the research were detailed, together with an explanation of the environment in which the research took place. This chapter concluded with an overview of how the thesis is structured, outlining the contents of each chapter.

Chapter 2 Literature Review

Chapter Preface

This chapter analyses the literature and studies relevant to the proposed research. The chapter begins with an overview of email communication and then focuses on the literature that is directly relevant to the author's research as specified in the aims and objectives.

2.1 Introduction

Email has, for serious users, become integrated so much into daily life that it has become a vehicle for informal communication (Patterson, 2002). Frazee (1996) cited a study that looked at a cross section of fortune 500 companies and found that it is common for employees to spend up to a quarter of their working day reading and responding to internal communications (email or other communication methods) and Mintzberg (1973) estimated, back in 1973, that up to 95% of a manager's time can be spent on written and verbal communication.

As employees and managers seem to be spending such large amounts of their working day communicating, it is important that they communicate effectively. Whetten and Cameron (1995) observed that verbal skills are on every list of skills needed by managers, while Bowman (1964) discussed factors that characterise promotion for executives as rungs on a ladder, stating that the ability to communicate effectively was the highest (out of 8 rungs).

A number of studies have looked into both the positive and negative effects of email (for those covered in this review see Figure 2.1). The continued growth in the use of email has caused some users to become overwhelmed by the volume of messages they receive. Named information overload, this can be described as:

"information received at such a rapid rate that it cannot be assimilated" (Sheridan and Ferrel, 1974).

Whittaker and Sidner (1996) use the term 'email overload' to describe how email has evolved beyond a communications application and is being used for additional functions which it was not originally designed for. Patterson (2002) suggests that email overload is a double edged sword, because although email allows you to seek help from others, you also receive requests for help from others, thus increasing the workload.

Authors	Focus	Sample size	Organisation
Patterson, 2002	How email affects daily work	20 employees	R&D of computer company
Duncheneaut, 2002	Social impact of email	Assessment of 669 email messages	Higher Education
Sumner, 1988	Impact / effects of email use	Interviews conducted with 3 groups. (12 in each) 1- managers. 2-technical professionals. 3-technical professionals dealing externally	Not specified
Whittaker and Sidner, 1996	Email overload	20 office workers representing all major job types	Software development firm.
Kimble et al, 1998	Information overload	567 survey respondents and 19 interviews	International organisation of knowledge workers
Mintzberg, 1973	Role of managers	5 executives	Not specified

Figure 2.1: Effects of Email

Much of the research into email communication has focused on comparisons between this and other forms of communication, and examined the circumstances in which a specific medium should be used. The first part of this review discusses research into media selection and matching communication media to the task at hand. This is relevant to this research because it will highlight any deficiencies in the choice of communication media and this relates to ineffective email use. The second section of this review highlights the problems or issues relating to email use that have been

identified. Such research, into email communication, is directly relevant to this research in order to establish the common defects of email with an aim to reducing them. Much of the recent literature on email communication focuses on the development of tools or suggestions of how to improve email use within the workplace. This body of research is then discussed with the aim of establishing the effectiveness of both seminar-based and computer-based training in reducing email defects.

This review does not represent a complete picture of all literature in the area of email communication. For example, much research has been undertaken into the organisational impact of email and how email affects the structure of organisations, (e.g. Duncheneaut (2002); Sumner (1988)). Literature in this area is out of the scope of this research.

2.2 Media Selection and Task Fit

A large proportion of the literature on email communication focuses on how email compares to other communication for pursuing specific tasks. This section explores the theory of media richness, discusses a few studies that agree and disagree with this theory (see Figure 2.2) and examines the circumstances in which a particular medium might be chosen in place of another.

2.2.1 Media Richness

Daft and Lengel (1984) in their theory of media richness suggest that communication media differ in their capacity to process rich information. The richness of a particular medium is given by the availability of instant feedback, the number of cues, the use of natural language and the personal focus of the medium. Daft and Lengel propose that face-to-face communication is the richest form, followed by the telephone, personal documents, impersonal documents and numerical documents (Daft and Lengel, 1986).

Media richness theory suggests that effective managers make rational choices when matching a particular communication medium to a specific task (Daft et al., 1987). Daft et al. argue that individuals will do this to reduce the uncertainty and equivocality (these are defined as two forces that influence information processing within an organisation and therefore influence choice of communication medium) of a communication task. Uncertainty has come to mean the absence of information (Daft and Lengel, 1986), and as information increases, the level of uncertainty decreases. Equivocality means ambiguity and the existence of multiple and conflicting interpretations about an organisational situation (Daft and Lengel, 1986). In other words, a 'lean' medium, such as a memo, may be sufficient for routine unequivocal communications, whereas a rich medium, such as a face-to-face meeting, would be more suitable to resolve an equivocal communication.

According to Kiesler and Sproull (1986), the critical difference between computer mediated communication and face-to-face communication is that computer mediated communication lacks the social context cues that make face-to-face communication favourable in many situations (Daft and Lengel, 1984; Daft and Lengel, 1986). This is clearly the case as face-to-face communication for example, provides multiple cues because of the use of body language and tone of voice, whereas communication via a computer (media of low richness) does not allow for this, processes fewer cues and therefore restricts feedback.

Authors	Focus	Sample size	Organisation
Panteli, 2002	Level of richness in electronic mediated communication	39 Staff from an academic department	Science department, Higher Education
Suh, 1999	Examination of media richness theory using lab experiment	320 undergraduate business students	Higher Education – Korea
Valacich, Paranka, George and Nunamaker, 1993	Media Richness	100 business students	Higher Education - Business

Figure 2.2: Media Richness

Media richness theory argues that individuals will choose the communication medium that best suits their needs. Choosing a medium that has too little media richness for

the task may result in miscommunication, however, a medium with very high media richness is likely to be wasteful.

2.2.2 Effective Media Selection

Several studies that have examined organisational email use support the media richness theory, suggesting that individuals will select the most appropriate communication medium for tasks. A number of authors have reported studies that report media selection techniques (see Figure 2.3). Sumner (1988) reported that many managers prefer face-to-face communication or using the phone when exchanging ideas with their peers, but prefer email for tasks such as providing routine information, checking on progress and scheduling activities. This is consistent with the media richness theory, as individuals are choosing a medium that has the right level of media richness for each specific task. Sumner (1988) found that face-to-face communication was the preferred communication medium when asking questions, while email was preferred for answering questions. Similarly Zack (1994) found that employees would use face-to-face communication for any task that required more than a simple exchange of information. Face-to-face communication was also rated by group participants of one study to be more effective than email for generating ideas, resolving conflicts and choosing solutions (Wilson, 2002). Wilson (2002) also stated that depending on the task, employees can become winners or losers when selecting email to communicate, suggesting that employees are more likely to win when using email for generation tasks such as sharing ideas and for low interaction context events, and are more likely to lose when using email in high interaction contexts (Wilson, 2002). Balter (2002) in his study of the introduction of email into a healthcare organisation, found that managers used email for short messages and the phone for messages that required discussion. Due to the nature of the organisation, (healthcare) employees would often be working in several different locations, which made them difficult to contact by phone. In these circumstances email would often be used to arrange a phone call (when a call was not answered), rather than repeatedly attempting to contact them by phone without any response. This would save considerable time, especially given that an estimated 70% of initial phone calls fail to

make the desired contact regardless of answering machines (Sproull and Kiesler, 1991).

It is argued that email is less effective than face-to-face communication when groups or a number of employees are trying to reach a decision. Research has shown that computer mediated groups take longer to reach decisions than face-to-face groups (Hiltz et al., 1986). Hiltz et al. suggest that this is because individuals are slow at typing, and therefore fewer messages are exchanged. However, as the use of computers in the workplace increases users become faster and more efficient at typing, and therefore, discussion via email can save employees meeting, which in turn saves time and costs of travel. Another explanation is that a lack of emergent leadership within the group may slowdown the decision making process. Taking it a step further, and in line with previous findings, Valacich, et al. (1993) found that email was more effective than face-to-face communication when used by groups for a task of low ambiguity. They suggest that face-to-face communication is better suited to tasks with high levels of ambiguity, with email better suited to tasks of low ambiguity (e.g., asking someone to confirm something, asking for a yes/ no answer, or asking for a fact such as someone's name).

While these studies report that email is appropriately selected for certain tasks (e.g., providing information, answering questions, scheduling activities), it does not address the fact that some users have reported feelings of being overwhelmed by the volume of messages they receive, and as discussed later (see 2.2.3), Markus (1994b) showed that managers often used email for complex communication tasks. This suggests that email is being used more than just for a limited number of tasks and is increasing workloads.

Interestingly, Rocco (1998) reported that individuals engaged in tasks using electronic communication do not have the same level of trust as those using face-to-face communication. However, they also found that the level of trust can be increased when using electronic communication if initial face-to-face contact is made beforehand (Rocco, 1998).

Any pressure associated with a particular task can also determine which communication medium is most appropriate to use. Research carried out by Wilson and Connolly (2001) found that participants in low and high pressure task groups rated the effectiveness of email and face-to-face communication differently depending on the pressure of the task. Members of the high pressure task group rated email as less effective than face-to-face communication for some task types, compared to members of the group that dealt with low pressure tasks.

In relation to preferences of communication methods, a number of studies have found that employees have different preferences that they choose to use in the workplace. While back in 1995, Zeffane and Cheek could find no evidence to suggest that computer mediated communication was preferred over traditional forms of communication, they reported that verbal communication was the dominant form of information exchange. More recently, Marold and Larsen (1997) found that the chance of preferring email over voice communication is likely to be greater if the user is computer literate and Brandenburg (1999) reported that email was preferred in comparison to the telephone for reasons of convenience. Users from Marold and Larsen's (1997) study did not indicate a preference for either voice communication or email, instead users viewed the two media as being appropriate for different purposes. Connell et al (2001) found that employees preferred the telephone over other forms of communication and stated this was because the telephone has the right balance of media richness and social presence, enabling employees to feel informed without worrying about inhibition. These somewhat conflicting studies show that while some employees prefer to use email, others prefer voice mediated communication, which shows that there is not a common communication preference and acceptance amongst communicators.

The choice of media selection may not be solely determined by the message itself. Rowe and Struck (1999) reported that media choice is associated with different cultural values such as hierarchical distance, individualism and task orientation. Other research has shown that individuals may purposefully decide not to use a certain communication medium for a given task if they wish to avoid unwanted social contact (Markus, 1994a).

Authors	Focus	Sample size	Organisation
Zack, 1994	Media selection / usage	18 managers	Editorial group of a major newspaper
Wilson, 2002	Media selection, task fit, social impact of email	Multiple studies - undergraduate students and employees	Higher Education
Rocco, 1998	Level of trust associated with different media	6 students	Higher Education
Wilson and Connolly, 2001	Effects of group task pressure on perceptions of media effectiveness	150 students	Higher Education
Brandenburg, 1999	Media selection / organisational email use	Fortune 500 companies	Wide range of companies
Marold and Larsen, 1997	Media selection	331 respondents	Higher Education employees
Connell et al, 2001	Effectiveness of different communication media	280 students	Higher Education
Rowe and Struck, 1999	Cultural values and media use	300 respondents	Distribution and servicing of computers
Hiltz et al, 1986	Media selection	8 groups of 5 respondents	Higher Education students

Figure 2.3: Media Selection

2.2.3 Ineffective Media Selection

While media richness theory suggests that email should be used for tasks of low equivocality and low uncertainty, Markus (1994b) showed that managers often used email for complex communication tasks. She suggested that her findings did not match the expectations derived from information richness theory because factors other than people's perceptions of information richness were responsible for their behaviour. Markus (1994b) found that the choice of media selection is strongly influenced by social processes such as sponsorship, socialisation and social control.

Sproull and Kiesler (1991) suggested that email has several attributes that could make it a richer form of communication than suggested in media richness theory because email has the ability to reach many people simultaneously, and is richer than often claimed. Panteli (2002) also agreed and found that even though email is often presented as a lean form of communication, the way that email messages are constructed can convey social cues that are traditionally used to determine status differences within organisations. The results showed that more senior employees were more likely than junior employees to write short, unstructured and concise messages. This shows that email messages can signal, rather than alleviate, hierarchical differences within an organisation. Suh (1999) concluded that the media richness theory is not well supported. While he acknowledged that the structure of the theory is correct, he suggested that the communication media employed in the study of media richness theory are too similar in terms of richness to differentiate their effects on performance. Rowe and Struck (1999) showed that media choice is associated with different cultural values, and that this may be why the ordering of media richness is not stable across organisations.

This section of the literature review has discussed Daft and Lengel's (1984) media richness theory and studies that have shown both effective and ineffective media selection. Media richness theory suggests richer communication media (such as face-to-face communication or the telephone) are more suitable for complex communication tasks than leaner communication media (such as email). It is important that users select the most appropriate medium for their communication task as ineffective media selection can lead to negative outcomes. Choosing a lean form of communication (such as email) for a complex communication task would increase the likelihood of the message becoming ambiguous and could lead to a delay in actions being carried out or incorrect actions being administered. Over reliance on email in place of other forms of communication can also add to the volume of email received within an organisation, which can lead to email overload and a delay in actions being carried out.

2.3 Identified Problems with Email Use

A number of studies have highlighted problems with organisational email use (see Figure 2.4). Many of these relate to the technical aspects of email use. Sillince et al (1998) found that users were worried about the potential security of email systems. Berghal (1997) noted the potential threat posed by viruses and that many legal and privacy issues relating to email need to be addressed. Cushing (2002) also reported on the potential security risks that viruses and careless email use can bring to organisations. Other technical problems identified with email use include limited storage and bandwidth issues (Cushing, 2002), and the increasing cost of usage that arise from the growing use of email (Duane and Finnegan, 2004). What this doesn't cover, however, are the costs saved by organisations through the use of email.

The growth in email use has caused it to become more than just a communications tool. Other uses include:

- Archiving of information (Mackay,1989)
- Prioritising and delegating tasks (Mackay, 1989), (Whittaker and Sidner, 1996)
- Time and task management (Gwizdka, 2002b), (Whittaker and Sidner, 1996)

Ducheneaut and Belloti (2001) suggested that email has become more like a habitat than an application as users spend a considerable amount of their working day within their email application. The quantity of messages and attachments that email delivers to users each day has led to the use of email applications as personal information management tools (Duncheneaut and Bellotti, 2001). However, these may be seen as advantages of email applications rather than disadvantages.

Both Whittaker and Sidner (1996), and Duncheneaut and Bellotti (2001) concluded that email has become overloaded, as it is used for additional functions that it was not designed for. This creates problems for users trying to rationalise their cluttered inboxes, which often contain outstanding tasks, partly read documents and conversation threads (Whittaker and Sidner, 1996). Whittaker and Sidner (1996) found that participants were generally highly positive about email as a communication

tool, while a number experienced major problems in reading and replying to email in a timely manner. The inability to effectively manage communication means lost information and reduced responsiveness, which have clear negative outcomes for both individuals and corporate productivity (Whittaker and Sidner, 1996).

Whittaker and Sidner (1996) suggest that inboxes become cluttered because email is being used as a task manager and people find it hard to file information away into folders. Their study showed that email does not follow a 'one touch' model where messages are either deleted or filed way after being dealt with. According to the 'one touch' model, email messages can be in two possible states, either unread or filed. Yiu et al (1997) also rejected the 'one touch' model by stating that current email systems are designed around the assumption that messages are informational, are read upon arrival, and that important messages are filed.

Yui argued that the filing and maintenance of email is very time consuming and cogitatively intensive (Yiu et al., 1997). Users may often have difficulty filing email because they are unsure of which folder to use, or whether a new folder is required. Gross (2002) raised a valid point stating that messages can relate to more than one topic and can only be placed in more than one folder if the message is duplicated Many emails within a user's inbox also form part of larger discussions. Sorting email into folders can later be problematic because it can be harder to trace the thread of a particular discussion (Lewis and Knowles, 1997). Users have to ensure that they are able to effectively retrieve messages that are filed, however, Balter (2000b) suggests that extensive and deep filing of email is not as efficient as a simple flat filing structure because the time spent searching for messages outweighs the time spent filing.

Depending on the email application, filters can be used to categorise incoming email and help users manage their inbox, although the proportion of a user's email that can be automatically filtered effectively is likely to differ from individual to individual and from organisation to organisation. Ducheneaut and Belloti (2001) found that 60 percent of participants did not use filtering and those that did said that around two thirds of their email was impossible to filter automatically.

Several studies reported significant diversity in the way employees adopted the use of folders to manage their inbox (Mackay, 1989; Whittaker and Sidner, 1996; Duncheneaut and Bellotti, 2001). Whittaker and Sidner (1996) identified three distinct strategies for filing email: those that did not file, those that dealt with the overloaded nature of their inbox every few months and those that made frequent efforts to minimise their inbox. Mackay (1989) identified three extremes of how individuals managed their email. One is described as a 'prioritiser', who uses email to prioritise incoming tasks, another is described as an 'overwhelmed archiver' who has difficulty in tracking messages so they can be located at a later date, and the third extreme is a manager- secretary team that share an inbox. Duncheneaut and Bellotti (2001) found the number of folders used by subjects in their study ranged from just the inbox to 400 folders. These findings suggest that individuals often have a personalised strategy for managing their inbox. It is therefore inappropriate to generalise how individuals manage email.

The use of email in place of other forms of communication adds to the volume of email generated within an organisation, and leads to more messages being received. Inappropriate media selection, as identified earlier by Markus (1994a) found that employees would purposefully communicate via email in place of other forms of communication in circumstances where they wished to avoid social interaction (e.g., dealing with someone they did not like or found intimidating). The author wanted to determine how employees within the four organisations under investigation viewed the balance of email use and whether it was felt that email was used too much in place of other media. The results of this can be seen in Chapter Four. As identified earlier, inappropriate media selection can result in miss-communication that can have a negative effect on an organisation (Davenport, 1997). Inappropriate use of the 'reply to all' or the carbon copy (cc) functions can also add to the number of emails that are generated and received within the workplace. Kimble et al (1998) found that some managers were overloaded with emails because of the inappropriate use of the cc function (i.e., employees may often copy emails to their superiors simply to "cover their back"). The cc function is also often used to send emails that are for information purposes only and do not require action; however, the recipient does not know this and has to spend time processing the message and assessing if action is required upon their part. The author also wanted to determine the extent of inappropriate carbon

copying within the four organisations under investigation. The results of which are discussed in Chapter Four.

Unsolicited email (also referred to as SPAM) has been identified as one of the negative aspects of email use in a number of studies (Sillince et al., 1998; Brandenburg et al., 1999; Balter, 2002). Others have also acknowledged the problems caused by unsolicited messages and suggested ways to limit the volume of unsolicited messages (Neumann and Weinstein, 1997; Cranor and LaMacchia, 1998; Hall, 1998). While unsolicited email can be annoying and can waste employees' time, it can also pose security threats to both individuals and organisations. Unsolicited email can contain a virus, which can spread throughout an organisations' network. Individuals are at risk from receiving more unsolicited email if they respond to any of these messages or if they click on any links within them. The content of these unsolicited emails can also be a cause for concern (e.g., pornographic material or links). A report by the British Broadcasting Corporation (BBC) quotes a study conducted by an organisation called 'Clearswift' and stated that while the proportion of SPAM that contains pornographic material is reducing, the proportion of SPAM offering financial or pharmaceutical products or services in on the increase (BBC News, 2004). Increasingly unsolicited email is also being used for scams, where 'spammers' try and obtain personal information and money from recipients by pretending to be banks or other bogus organisations (BBC News, 2005). While unsolicited email is a significant problem, the focus of this study concentrates on how to improve emails that are generated within an organisation. Although the authors research was not explicitly concerned with reducing spam (since it is generated externally), the author still wanted to determine the proportion of spam received within the four organisations under investigation to give a complete picture of the volume of email received.

Several issues relating to the quality of written email messages have been identified. In order to achieve both speedy and understandable communication, elements associated with quality content and format must be considered when writing email messages (Brandenburg et al., 1999). Factors that contribute to the quality of the content of email messages include (Brandenburg et al., 1999):

- Tone,

- Courtesy,
- Conciseness,
- Clarity and
- Correctness

Factors that contribute to the quality of format include (Brandenburg et al., 1999):

- Personalisation,
- Paragraph and sentence length and layout

These factors identified by (Brandenburg et al., 1999) contribute to well written email messages. Several earlier studies have identified instances in which these factors have not been adhered to, leading to ineffective email use. Frazee (1996) reported that 65% of all email messages fail to give the recipient enough information to act upon. Participants in Whittaker and Sidners (1996) study commented that some individuals failed to take into account the context of their message before they sent it. The participants said they would often receive one line replies to messages without knowing what it refers to. Balter (2002) discovered that some email users within his study acknowledged that they were poor email writers and that they had trouble expressing themselves in writing. This was due to the fact that they had secretaries that would write everything for them, and would not usually write documents themselves. Messages that are of poor written quality are likely to be difficult to read and may take longer to read and understand (Brandenburg et al., 1999). Poorly written emails containing misspelled words and typing errors are also likely to create a negative impression on the reader (Lea and Spears, 1992). The socially detached nature of email also means that individuals my write things they would not normally communicate verbally (Alonzo and Aiken, 2004). Brandenburg et al (1999) suggest that email is often abused because it is easy to use. Taking into account the factors identified by Brandenburg et al (1999) and the findings from (Whittaker and Sidner, 1996; Frazee, 1996; Balter, 2002; Lea and Spears, 1992), the author wanted to determine the written quality of emails generated and received within the four organisations under investigation, in terms of message clarity, conciseness and ability to convey what actions are required. These findings are reported in Chapter Four.

Research undertaken by Jackson et al (2001) found that email can be a distraction within the workplace, and that once a distraction occurs there is an interrupt recovery time associated with email. They also found that the amount of time it takes employees to recover from an email interrupt, and to return to their work at the same rate at which they left it, was found to be, on average, 64 seconds (Jackson et al., (2001). The author wanted to determine if the employees in the four organisations under investigation felt that email was a distraction within the workplace and whether it distracted them from more important work. The results can be seen in Chapter Four.

This section of the literature review has identified the common problems and issues that can lead to ineffective organisational email use. Poorly written emails can leave a negative impression on the reader (Lea and Spears, 1992) and can have a negative impact on the reputation of an organisation. Poorly written emails can also take longer to read and understand Brandenburg el al, 1999) and can lack sufficient information for the recipient to know what is expected of them (Frazee, 1996). Reducing these deficiencies can improve the written quality of email generated within an organisation and reduce the chance of emails being misunderstood or misinterpreted. Unnecessary use of the carbon copy function and the growth of SPAM adds to the volume of email received within an organisation and can lead to email overload. These issues need to be addressed to reduce the volume of unnecessary email, therefore reducing the time spend dealing with irrelevant non-value email.

While there are many problems and issues associated with email use, what needs to be addressed is how to both improve its use, and thus make organisational email communication more effective.

Authors	Focus	Sample size	Organisation
Balter, 2002	Introducing email to an organisation	7 managers and their staff (184)	Medical service organisation
Brandenburg, 1999	Media selection / general organisational email use	500 fortune 500 companies	Fortune 500 companies
Markus, 1994a	Email use within large organisation	29 interviewees 375 respondents to questionnaire	Risk management
Markus, 1994b	How and why managers use email	375 respondents	Risk management
Sillince, 1998	Email use within small organisations	360 companies responded	Range of companies
Mackay, 1989	Email use	23 respondents	Research laboratory
Alonzo and Aiken, 2004	Ineffective use of email	160 business students	Higher Education
Watson, 2001	Monitoring email use	26 firms	Management consulting
Zeffane and Cheek, 1995	Patterns of use of written, computer based and verbal information	1300 completed questionnaires (response rate 56%)	Telecommunications
Duane and Finnegan, 2004	Monitoring and security of email systems	5 HR and 5 IT managers from 4 organisations	2 financial services, 1 telecoms, 1 manufacturing
Ducheneaut and Bellotti, 2001	Use of email in relation to information management	28 interviews at 3 organisations	Research centre, Multimedia production company, design consulting firm
Yiu et al, 1997	Email use and task management	5 respondents	Computing
Gross, 2002	Managing email and improving email use	12 interviews	IT sector and non-technical fields
Lea and Spears, 1992	Email use and writing emails	2 groups of 24 respondents	Undergraduate students and technical workforce from telecoms company

Figure 2.4: Email Use

2.4 Improving Email Use

There are several approaches to improving organisational email use. Some authors suggest that organisations need to implement policies on how individuals use email within the workplace (Cushing, 2002; Duane and Finnegan, 2004). For example, Dudman (2005) goes so far as to suggest that organisations have policies on the retention and deletion of email. Watson (2001) goes even further and suggests that organisations should monitor employee email use to ensure that policies are adhered to. Some organisations have taken a step banning email communication at certain times, in an attempt encourage employees to work without email (Cushing, 2002; Best, 2003; Wray, 2003). While this approach will force employees to communicate without email for one day a week (or in the case of *Phones 4U* stop employees using email for internal communication (Best, 2003)), it does not address the issues associated with ineffective email use, it simply avoids them.

As mentioned in the Introductory chapter, Davenport (1997) suggests that a variety of economic factors such as patterns of information pricing and available subsidies can greatly influence how often and how well people communicate. If internal email use is free, but the use of voicemail is charged to an employee's budget then it is likely that employees will use email more than the phone. One way to reduce email overload would be charge individuals for the amount of information they send and the number of people to whom they send it (Davenport, 1997).

Hallewell (2000) suggested that employees need training on the 'human side' of email, not just on how to use email. He argued that email training seems focus on how to send and receive email messages, without being taught when it is appropriate to do so. There also exists articles that explain how to write email messages effectively (Cuciniello, 1998; Galbreath and Booker, 1998). While these articles touch on the circumstances in which email should be used, and explain how to get your message across effectively, they do not provide empirical evidence to show the effectiveness of training or the effectiveness of email best practice guidelines.

Jackson et al (2003a) suggests that the distractive nature of email can be reduced if users increase the time between when their email application checks for new email, although this will not reduce the volume of email or prevent users from feeling overloaded. 'By taking a "typical" employee and making some hypothetical assumptions it is possible to determine the amount of time that can be saved through changing the way employees check for email. For example, if an employee has set up the email application to check for email every 5 minutes then it is possible, if (s)he is a heavy user of email, that there could be 96 interruptions in a normal 8-hour working day. However, if the mail application was set up to check for email every 45 minutes then the amount of possible interruptions is reduced to 11 per day. For example, if it takes on average 1.5 minutes to read and recover from an email and the employee is interrupted every 5 minutes, then this would only leave the employee 3.5 minutes before the next interrupt. However, if the employee was interrupted every 45 minutes and the emails had accumulated to a total of 9, then it would take on average 6 minutes to read all 9 emails and recover from the interruption. This would then leave 39 minutes before the next interruption, allowing the employee more time to get on with "real" work' (Jackson, 2003a).

Authors	Focus	Sample size	Organisation
Jackson et al, 2001	Improving use of email to increase employee productivity	16 employees monitored over 28 days	Digital Print Solutions
Jackson et al 2003a	Improving email effectiveness	15 employees	Office workers
Balter and Sidner, 2002	Testing tool that aims to improve users control over their inbox	10 users	Software company
Boone, 1998	Testing Tool for managing email	Software tested on 1210 emails	
Segal and Kephart, 1999	Tool for organising email	Software tested on the inboxes of 6 individuals	
Isbell et al, 2002	Managing email	5 users	
Becker et al, 2000	Tool to enable users to search for items within their email	Usability test with 11 users	Regular email users – company not known
Farnham, 2002	Visual overview of inbox	15 participants	Office workers
Camino et al, 1998	Using structured responses to email	Outboxes of 8 users in 1st study. 125 participants in second study	Communications company
White and Zhang, 2004	Reducing email interruptions	14 respondents	Microsoft research
Gross, 2002	Managing and improving email use	12 interviews	IT sector, 5 and non-technical fields

Figure 2.5: Improving Email Use

2.4.1 Software Tools for Improving Email Use

Much of the recent literature that focuses on improving email use within organisations looks at the development of new software tools that are embedded within or replace existing email applications. These tools are designed primarily to aid the user in managing their mailbox, by providing additional functions such as search facilities, enhanced user interfaces and the ability to track conversations.

Many managers receive too many emails to read in the time available to them and that the solutions to this often require programming skills to allow the user to define rules

for prioritising messages or moving messages to folders (Balter and Sidner, 2002). As a result of this many tools have been developed that help users manage their mailbox by aiding in the filing and management of email messages (Boone, 1998; Segal and Kephart, 1999; Mock, 2001; Balter and Sidner, 2002; Bergman et al., 2002; Gross, 2002; Isbell et al., 2002). Some examples are as follows:

- The Bifrost Inbox organiser (developed by Balter & Sidner, 2002) categorises messages in the inbox by predefined rules that can be customised by the user. The Bifrost Inbox organiser breaks down a user's email into categories of interest and allows the user to quickly find an email that is relevant to a particular task.
- Mailcat (developed by Segal and Kephart, 1999) encourages filing using an adaptive classifier that learns from the user and will present three folders that are most likely to be appropriate for a particular message. Mailcat was found to be 80% accurate when suggesting three folders in which a message could be filed (Segal and Kephart, 1999).
- Gross (2002) developed a message store, where emails are stored in a database with a full text index. The benefit of this method is that users do not have to create folders, and it is easier to reconstruct conversations without flicking between the inbox and sent items folder (Gross, 2002).

Several interfaces have been developed that aim to provide users with a richer picture of their email inbox and email usage (Heckel and Hamann, 1997; Yiu et al., 1997; Miller, 2002). Some of these include:

- Timestore, (developed by Yiu et al, 1997) is a prototype email system that uses the time of arrival as the principle arrangement to display email. The user interface displays a calendar on the 'x' axis and a list of names on the 'y' axis. Dots are used to indicate on what days email has been received from a particular sender. If the user clicks on this dot then the details of all messages from that sender for that day are displayed at the bottom of the screen. This information includes the

subject line, time received and if the message has been read. The developers tested Timestore on a group of individuals with positive results. The users liked the idea of being able to see trends in the email they received.

- Email Radar (developed by Miller, 2002) is a visual interface designed to assist in managing email messages as a supplement a user's email application, not a replacement. The Email Radar is designed to run constantly in the corner of the user's screen, where it provides graphical information about their inbox, such as who has emailed them and the urgency of the message.
- EmVis (developed by Heckel and Hamman, 1997) is a visualisation tool which can be used by managers to understand how information moves through their organisation. The tool is mapped onto a company specific hierarchy that provides a graphical layout of email exchange. Each node represents an individual with links representing streams of information between individuals.

EmVis is more likely to be used by management to understand how email is used within their organisation, whereas Timestore and Email Radar are more likely to be used by individual employees.

Many emails within a user's inbox form part of larger conversations that can involve more than two participants. These messages would be easier to manage if they were aggregated into conversations rather than appearing as independent messages (Belew and Rentzepis, 1990; Cockburn and Thimbleby, 1993; Lewis and Knowles, 1997; Yee, 2002; Kerr, 2003; Venolia et al., 2003). Several email applications have been developed that take this functionality into account:

- Mona (described by Cockburn, 1993) is a novel conversation-based email platform that provides a hypertext representation of conversational content without any additional effort from the user.
- Zest is a prototype email browser that processes email folders and displays a conversation-like view of the discussion in progress (Yee, 2002).

- Taskmaster is an email tool that focuses on the task within an email rather than the message text (Bellotti et al., 2003). This tool groups together messages or attachments that relate to a specific task. Each task is referred to as a 'Thrask'. Taskmaster was evaluated by a small group who used it for two weeks, and findings showed that users liked to use email as a task management system (Bellotti et al., 2003). The evaluation showed that it is possible to significantly and positively affect the experience of email users by embedding task management resources directly within the inbox.

Several other authors have developed tools or suggested ways in which current email applications can be improved. Examples include:

- 'Mail-By-Example' is a visual query interface that can be added to email applications that enables users to retrieve information from a large volume of email (Becker et al., 2000). This tool allows users to retrieve messages, folders and any information contained in folders or messages using simple queries similar to SQL (Structured Query Language). This was tested by the developer on a small sample of users who reported high satisfaction with the functionality of the application. The majority of problems associated with Mail-By-Example were in defining the search query (Becker et al., 2000).
- 'Personal Map' (developed by Farnham, 2002) is a tool which can be embedded into Microsoft Outlook and provides a visual overview of a user's online social network. This tool analyses whom the user targets messages toward, and suggests individuals that a particular message could be targeted to, based on previous experience.
- In order to prevent unsolicited email, Nguyen (2003) proposed a 'token' system where individuals can only contact each other via email if the recipient has given the sender a 'token' to do so. Individuals are allowed to contact a new recipient via a third party, providing the third party knows both the new recipient and the sender. While this system can reduce unsolicited email and increase privacy, it can prevent those outside the 'social hub' from gaining access to an

individual. This system may therefore only prove to be useful for an organisation with a centralised internal communication hub, and not for organisations or individuals that communicate with a wide range of external contacts.

- Camino et al (1998) found that more than half of email messages are requests or answers to questions, and suggest that a significant proportion of these can be expressed using structured response objects. Structured responses include buttons, fields and formatted areas that require a specific response from the recipient. A second study found an overall preference for structured response objects although this was reduced in accordance with media richness theory for personal or complex messages (Camino et al., 1998).
- Kimble and Abu Bakar (2001) suggested that email overload can be reduced by implementing a system of tags into email messages so that only relevant recipients can see certain parts of an email message. This system would force email senders to consider who the recipients are.
- Hudson and Smith (1996) proposed a tool that provides users with information about their email by using a series of non-speech audio sounds. Here users would receive an overview of their email aurally rather than visually.
- As many email messages contain times and dates that relate to tasks and activities, Stern (2004), presented a user interface which allows users to keep track of their calendar related email messages. The interface also allows users to perform searches for specific dates. This interface is currently being developed.
- White and Zhang (2004) examined the proportion of email that is deemed worthy of interrupting the recipient, with the aim of reducing the number of interruptions an employee receives. They studied pairs of individuals who shared email communication, with the aim to find if the sender and recipient agreed on what messages could be classed as interruptions. Results showed that a sender-initiated email notification system could be viable, although the small number of instances in which there was serious disagreement about the urgency

of a message between sender and recipient is significant enough to generate considerable concerns.

- Rohall et al (2004) designed a prototype email system that allows the user to visualise their messages by conversation threads and provides a message map to allow the user to quickly see the relationships among messages in a folder. Users can also view their email messages through a correspondence map that groups messages by the sender. This email prototype also allows users to search for dates and times within email messages.

The tools mentioned in this section all aim to enable users to better manage their email. Some tools use alternative interfaces that allow users to see how their email messages thread together, while others provide the user with search facilities that make it easy to find specific information buried within their email application. While these tools may be aiding users to manage their email on the recipient side, they do not help users to write effective emails. None of the tools identified within the literature tackle any of the issues identified in section 2.3 solely on the sender side before an email is sent. There is, therefore, a gap in the literature that needs to be addressed. This gap will be addressed through the development of a 'real-time email trainer' that assists users by identifying potential problems with their emails before they are sent. The development of this tool is discussed in Chapter Five and the effectiveness of the 'real-time email trainer' is discussed in Chapter Six.

2.5 Effective Training

This section focuses on training and will consider two methods of training: seminar based training (SBT) and computer based training (CBT).

Training is an integral part of many organisations and often viewed as a necessary requirement. Read and Kleiner (1996) stated that the driving forces behind the need for training are changing work environments and the desire to stay one step ahead of the competition. These factors compel organisations to invest heavily in the training of their employees.

While training is important and necessary, it is also costly.

> "Like anything else firms should seek to maximize the return on this investment and in order to achieve this, training must be as effective as possible. This means that, after training, the employee should be able to do what he was trained to do and the benefits to the organization must exceed the costs" (Read and Kleiner, 1996).

There are many training methods available and the method selected depends on different factors. Such factors include the organisation size and set-up, the nature of the organisation and it's trade / business, the systems and processes that are used. Sims (1990) argued that the following factors must be considered when determining the best method for training:

- The nature of the material to be presented.
- The number of persons to be trained.
- The background and ability of the trainees.
- The kind and amount of equipment available.
- The time that can be devoted to training.
- The results to be achieved.

Lakewood Research and Training Magazine reported the top ten training methods adopted by businesses in 1995. The top ten, listed in order from highest to lowest use, were as follows: videotapes, lectures, one-on-one instruction, role plays, games / simulation, case studies, slides, computer based training, audio tapes, and films (Joinson, 1995). While this reported the training most commonly used in 1995, technology for training has since altered significantly, and therefore those training methods will have also altered significantly.

Read and Kleiner (1996) stated that it is vital that methods are selected that encourage active participation by the trainee and provide adequate feedback, arguing that this increases the likelihood that what is taught in training will be retained and later applied. They argued that methods such as, one-on-one instruction, role plays, games/simulation, case studies, and computer based training all rank high in both active participation and feedback. Read and Kleiner continue by stating that before a

method can be selected the needs of the organisation must be analysed and understood, leading to goals and objectives of the training programme being established and ultimately met (Read and Kleiner, 1996).

For the author's research seminar-based and computer-based training will be discussed. Seminar based training (SBT) refers to traditional classroom training, taught by one trained in the skills required. ComputerBasedTraining (CBT) (also known as computer aided instruction and computer assisted learning) is the use of the computer for training and instruction, and is commonly used for acquiring skills in the use of computer packages or acquiring specific knowledge (Whalley, 1998).

> "CBT programs are called "courseware" and provide interactive training sessions for all disciplines. Using graphics extensively, CBT was originally introduced on LaserDiscs, then CD-ROMs and, later, online. CBT courseware is typically developed with authoring languages that are designed to create interactive question/answer sessions" (Answers.com, 2006)

While the creation of CBT requires significant resources (i.e., hardware and human), the increase in both computing power and prevalence of computers in the workplace, as well as the ease with which CBT programs can be conducted (e.g., no teacher required), has meant that CBT has become a more viable and popular option for the training of employees in organisations of all kinds. Lawson (1999) argues that computer based training is an effective tool that can help a company in achieving it's training goals.

Henke (1996) stated, back in 1996, that computer based training was a fast growing field. Even earlier, Filipczak quoted that 43 percent of all U.S. organisations with more than 100 employees were using CBT as part of their training programmes (Filipczak, 1993). However, around the same time Russ-Eft, stated that only 40 percent of companies surveyed used CBT (Russ-Eft, 1994). For over ten years ago this is still a high figure.

Many authors discuss both the advantages and disadvantages of CBT. Some of these are as follows:

Advantages:

- Self-study.
- Flexibility in learning – when and where.
- Classroom/travel costs eliminated and less time spent away from the job (Lunt Crossman, 2004).

  "Short, targeted learning segments with simulation or how-to scenarios let employees take classes when they have time or when they need the help. It's far less disruptive than taking a week-long seminar" (Lunt Crossman, 2004).
- Trainees progress at their own pace/individualised instruction (Cloete, 2003), (Lawson, 1999). Control of the learning process is shifted to individuals (Thomas, 1996).
- Effective for training people to use computer applications as trainees can practice using the application as they learn.
- Constant learner interaction (Thomas, 1996).
- Self-tests help to identify strengths and deficits (Thomas, 1996).
- Extra time can be taken on certain parts if required, other parts can be skipped over (Thomas, 1996).
- Feedback is non-judgemental (Thomas, 1996).
- Allows employees to access learning at anytime and any place (Wagner and Flannery, 2004).
- Can make employees more self-reliant (Lunt Crossman, 2004).

Disadvantages:

- No teacher/tutor on hand for difficulties that may arise or if questions need answering. Lack of teacher-student interaction which helps make abstract or confusing concepts clear (Lunt Crossman, 2004).
- Cultural resistance (Lunt Crossman, 2004).
- Not suited for reflection and study needed to learn difficult concepts (Thomas, 1996).

- Cost – both the hardware and software required can be expensive (Read and Kleiner, 1996).
- One terminal is needed for each trainee (Read and Kleiner, 1996).
- Lack of personal interaction (teacher/instructor or peers) (Cloete et al., 2003), (Lawson, 1999).
- Computer skills required (Cloete, 2003).
- Fear of technology.

Both Hequet (1997) and Rand (1996) discuss four primary advantages of CBT. These are: self-paced learning, reduced training time, cost savings and knowledge retention. Lunt Crossman (2004) argued that those who were trained via shorter e-learning segments appeared to have higher retention levels and he also reported that:

> "Experienced e-learning practitioners have found that it's better to shorten the lessons into digestible bites and deliver them to employees' desktops so they can apply their new knowledge right away" (Lunt Crossman, 2004).

There has been, to date, limited research that compares CBT and SBT. A number of studies however, have looked into the selection of training methods or have assessed the use and quality of CBT for a variety of purposes.

A number of authors (Shelbourne, 2002, Boheln and Ferratt, 1993) argue that the method of instruction selected for training should be determined by the learning style of the trainees, and that in order to understand why one method may be more effective than another it is important to have a basic understanding of how people learn.

Bohlen and Ferratt (1993) used Kolb's four learning styles to classify 120 students taking an introductory computer course module. The aim was to examine the effect of end-user learning style and method of instruction (seminar-based and computer-based) on end user learning outcomes, (i.e., achievement, efficiency, and satisfaction). Kolb theorised that people learn in different styles (Kolb, 1984) namely, accommodator, diverger, converger and assimilator:

- Accommodator emphasises concrete experience and active experimentation. Strengths lie in carrying out plans and tasks.
- Divergers prefer concrete experience and reflective observation. Strengths lie in imaginative ability and awareness of meaning and values.
- Convergers prefer abstract conceptualization and active experimentation. Strengths lie in problem solving, decision-making and the practical application of ideas.
- Assimilators prefer abstract conceptualization and reflective observation. Strengths lie in inductive reasoning and the ability to create theoretical models.

The students in Bohlen and Ferratt's (1993) were then separated by learning style and assigned to one of two teaching methods: half taught by traditional seminar training techniques and the other taught by CBT techniques. The two groups were taught the same material and given the same assignments. At completion of the module all students were required to take a fifty-minute computer based test to determine their ability to use the program, and following the test a questionnaire was given to each student to assess satisfaction with the learning method.

Results showed that the students taught by the computer based method did significantly better on the computer-based test (tested by number of keystrokes to perform each task) and did equally well on the written test even though they did not attend the lecture sessions. In relation to learning style the authors reported that divergers, convergers and accommodators performed better using the computer based training method, while assimilators performed approximately the same regardless of the training method. The questionnaire measuring satisfaction showed that students taught by CBT were significantly more satisfied with the method of instruction than those learning the software by the lecture method:

> "This may be due to the fact that the students were actively involved in the learning process when using the computer based package as opposed to being more passively involved when attending a lecture and having the instructor demonstrate the concepts and techniques involved in learning the software" (Bohlen and Ferratt, 1993).

Overall, Bohlen and Ferratt (1993) argued that computer-based training was more effective than traditional seminar training for all learning styles except assimilators who learn equally well under each method.

Lawson (1999) reported similar results from a study with 46 higher education students which were divided randomly into two groups. Again, one group was taught using traditional classroom instruction and the other using CBT. Both groups completed a multiple choice test before training began, then completed the training sessions, which was also followed by a post-test. A follow-up test was also given to the students three weeks after the training (the same as the other two tests) to identify long-term learning and retention levels. Results demonstrated that for both groups the pre-test results were similar. Following the training, the post-test results revealed a higher level of statistically significant improvement among those who were taught using CBT. Interestingly, the follow-up test showed similar decrease in scores for both groups, demonstrating that retention levels are not necessarily higher when taught using CBT. Lawson also measured training times and pointed out that the CBT group required half the time to teach the same material in comparison to the classroom instruction group (Lawson, 1999).

While the above mentioned studies favour CBT techniques, Cloete et al. (2003) reported a study into the use of different media and technologies for the training of cataloguing students for a distance course in South Africa and reported different findings. The aim was to discover if students would learn from traditional paper-based correspondence courses as well as they would from using other media and technologies and looked at the implications of using a mix of both. Findings showed that both training methods produced the same learning results and that students were satisfied with the mix of resources.

While Cloete et al. (2003) reported no significant change in learning results due to the training method and format of material, they did report that the CBT stimulated students and promoted positive attitudes to learning. A number of other studies show that those being trained often prefer using CBT. For example, Davies (2000) reported a study that identified and created a computer based case study, workbook and spreadsheet for the learning of practical auditing techniques. The trainees used the

computer training packages as part of their taught module and completed a questionnaire evaluating their use. The overall results indicated a general preference to using a computer-based case study to learn practical auditing techniques (Davies, 2000).

McDonald's (2004) findings disagree with those above. McDonald examined the implementation of a multimedia based training system within the Holiday Inn organisation, and compared the attitudes and performance of those that used the multimedia based training and those that had traditional training. Findings showed that users' attitudes were poorer when trained with the multimedia CD-Rom than users who had traditional training.

As mentioned earlier (in the definition of CBT from Answers.com) CBT can encompass all types of computer-based training such as multimedia CD-Roms, interactive websites and stand alone programmes. McDonalds (2004) specifies multimedia CD-Rom as the method of CBT used within his study, whereas Bohlen and Ferratt (1993) and Lawson (1999) do not specify the type of CBT used in their study. Cloete et al. (2003) used a mix of CBT technologies in their study, that included CD-Roms and internet based facilities.

Russell (1999) compared and listed hundreds of media studies (from 1928 – 1999) and discovered that there were very few comparative studies that found any measurable benefit to learning attributable to technology, and that there was nothing inherent in the technologies that elicited improvement in learning. He reported that there were a vast number of studies that showed no significant difference (i.e., regardless of who or what is being taught various media uses will produce the same learning outcomes). However, he also stated that the differences in outcomes can be made more positive by adapting the content to the technology, and that the studies provide substantial evidence that technology does not denigrate instruction. While the studies covered span a wide number of years, Russell stated that these results seem to be equally attributable to new 'cutting edge' computer based technologies.

While some studies show no significant difference in learning outcomes, there are clear benefits to using CBT. For example, it has been reported that e-learning

applications save Dow Chemical $34 million a year by eliminating travel expenses, reducing course material costs and automating record keeping (Lunt Crossman, 2004).

In terms of usability Sambrook (2001) reported a UK study that explored learners' perceptions of the quality of computer based learning materials. A total of 159 respondents (of a wide range of ages, experience and employment) completed questionnaires at the conclusion of two modules using a computer based learning package. The questionnaires asked respondents to identify factors that influenced their perceptions of the quality of the material. Results showed that the most important aspect of CBT material was the extent to which the material was perceived as user-friendly (reported as a positive factor in 93 percent of comments). Other factors considered important in influencing learners' judgements of quality (in descending order of importance) were presentation, graphics, engagement, information, knowledge, understanding, level, type of learning, language and text (Sambook, 2001). Cloete et al. (2003) also reported that user-friendly aspects were vital to any CBT programme and reported other factors such as: support being available, performance measurement, and visual appeal.

Wagner and Flannery (2004) identified a number of factors from existing literature that influence learners' acceptance and use of a computer based training system. They reported a number of factors that affected user acceptance of CBT, these included:

- Demographic variables (e.g., age, gender, education).
- Computer training and experience.
- Organisational information support.
- Management support.
- Perceived usefulness.
- Perceived ease of use.
- Self determination.
- Self management.
- Computer anxiety.
- Software anxiety.
- Attitude.
- Behavioural intentions.

From these factors they developed a questionnaire to measure how these might affect user acceptance of the system. A total of 446 employees (giving a 46% response rate) working at a government agency in Maryland, U.S.A. completed the questionnaire. All respondents had used the computer based training system at least once (the training system delivered over 400 on-demand Web-hosted CBT products to employees' personal computers). Results showed that the most important factors influencing the perceived usefulness of CBT were individual and organisational characteristics. Software anxiety and information support were also strong predictors, demonstrating, again, that support and training in the use of any training program is essential.

In support of this, research by Shayo and Olfman (1994) into software training indicated that some end-users do not transfer learned skills to their jobs, and suggested that the reason for poor transfer of skills is due to a lack of organisational support as well as poor training. However, Schein (1972) stated that the effect of traditional forms of training decay over time, with results proving temporary, and users often reverting back to their previous actions or attitudes. In order to ensure the effectiveness of training programmes, Tracy and Tews (1995) stated that managers should look beyond the usual factors such as programme design and needs analysis, and also focus on external factors such as the employee work environment. Even though the training itself may be effective, if employees cannot transfer what they have learned, the training is wasted (Joinson, 1995).

The use of any specific training method clearly depends on what is being taught. Read and Kleiner (1996) stated that computer based training is best suited for training courses with a large enrolment and stable content. Dean and Whitlock (1988) argued that CBT is most appropriate for practical training. It is also obvious that CBT is well suited to individuals training at their own pace. CBT is also well-suited for training in computer packages, and therefore, training in the use of an email system may prove more successful through the use of CBT than through seminar based training. For example, Dow Chemical used CBT when the company encountered inappropriate employee e-mails. The learning application developed for the majority of the

company's training requirements, Learn@Dow, was used to train more than 20,000 employees within 30 days on the company's e-mail policy (Lunt Crossman, 2004).

When implementing a CBT program, Jones and Kirkup et al. (1992) discussed the barriers that need to be overcome in order to provide efficient use of such training. These include technical and installation difficulties, networking and providing the required access. In terms of increasing the effectiveness of training, evaluation is vital (Read and Kleiner, 1996). Kirkpatrick (1994) identified four levels of evaluation which organisations can adopt to document the effects of investment into training, which are reaction, learning, behaviour, and results. Phillips et al. (1998) added a fifth level which goes beyond looking at the results of training and tries to determine if the training had an effect on the bottom line of the business and if it had a significant return on investment.

While the use of CBT has been documented, what is lacking is evidence of whether computer-based training has longer lasting effects compared to seminar-based training, and whether computer-based training is more effective for training employees in the use of email. Part of the author's research is to evaluate the effectiveness of both computer based and traditional seminar based training on improving email use within the workplace. The development of the training programme is discussed in Chapter Six. The author also wishes to discover any financial saving that will result from either seminar or computer-based email training. This section of the literature review has discussed the advantages and disadvantages of CBT compared to traditional seminar based training and identified a number of studies that have compared the outcome of the two training approaches. This section has also highlighted the need to take into account the learning style of those to be trained and identified factors that must be considered when determining the best method for training. In order for training to be effective, these considerations need to be taken into account, otherwise the training may not be as productive as initially expected. A training programme is more likely to be successful if it is effectively administered and takes into account the needs of the organisation and its employees, than if it is poorly administered and fails to take into account the needs of the organisation or its employees. After the training the employee should be able to do what they were trained to do and the benefits to the organisation must exceed the cost

of the training (Read and Kleiner, 1996), otherwise the cost of the training outweighs the benefits.

This chapter has highlighted existing literature and studies relevant to the author's research. This chapter has shown how the growth of email use has caused it to be used increasingly for functions that it was not originally designed for, such as personal information management. The potential problems with email identified in the 1980/90s are still relevant today, given much of the more recent literature on email communication describes the development of tools to help users to manage their inbox, given the growth in email use and the potential to be overloaded by email.

While this chapter has examined the identified problems associated with email communication, it has not addressed organisational communication as a whole. As mentioned in Chapter One the focus of this thesis is limited to improving email communication within the workplace, although section 2.2 of this chapter has identified several factors associated with the choice of media selection and situations where email can be the most effective medium. While Daft and Lengel (1984) argue that managers select the most appropriate medium to reduce the uncertainty and equivicality of a message, Rowe and Struck (1999) reported the choice of media is associated with different cultural values such as hierarchical distance and individualism. Markus (1994b) also found that the choice of media selection is strongly influenced by social processes such as sponsorship, socialisation and social control. These studies show that the choice of media selection is not always determined by the message itself, and users may purposefully choose an inappropriate medium for their own personal reasons. Email has many technical advantages over other forms of communication (as identified in Chapter One) and was found to be more effective than face-to-face communication for tasks of low ambiguity (Valacich et al, 1993).

The literature presented provides an argument for the author's research as it highlights the potential problems and implications of ineffective email use. The author's research set out to establish whether issues identified in sections 2.2 and 2.3 of this chapter exist within the four organisations taking part within this research. Once identified, can certain defects be reduced either through seminar and/or

computerbased training. It is possible that organisations will have a variety of different problems with email use, as will individuals within organisations (Mackay, 1989), therefore it is important to establish the problems before using customised training to reduce them.

While many tools have been developed that aim to help users manage their inbox, these tend to focus on the recipient, rather that focusing on the sender. The author hopes to fill this gap in the literature by training email users in successful methods of creating appropriate email messages. This will be done by examining the effectiveness of a computer-based email trainer that aims to improve email messages before they are sent. The effectiveness of using this training software will be compared to traditional training methods to see if there is any measurable difference.

2.6 Summary

The existing literature on email communication has shown there are many potential problems with email use within the workplace. The first section has shown that some communication media are more suitable for certain tasks than others, although users do not always choose the most effective medium for their message. The second section of this review highlighted and identified problems or issues relating to email use, such as those relating to the quantity and written quality of emails received. These two sections of this chapter help towards satisfying the first research objective of understanding how email is used within organisations and identifying the problem areas of email use. While these sections have identified potential problems with email, the author still needs to research the extent of these problems within the workplace, and plans to do this by studying email use within four organisations.

Much of the recent literature on electronic communication focuses on the development of tools or suggestions of how to improve email use within the workplace, as shown in the third section of this chapter. This section was included as it relates to the overall aim of the authors research to improve workplace communications by improving the way electronic communication is used within the workplace. The final section of this chapter has focused on both seminar and

computer-based training approaches, as the author intends to determine the effectiveness of both approaches at improving organisational email use, and fulfilling the third and fourth research objectives.

Chapter 3 Methodology

Chapter Preface

This chapter outlines and discusses the methods that could be used to undertake the planned research. Two main research philosophies are explored in relation to the author's research, followed by the investigation of a number of research taxonomies. The chapter then focuses on the research strategy undertaken in order to meet the research objectives and fulfil the aim of the research.

3.1 Research Philosophy

In the field of science there are two major research philosophies: interpretivist and positivist (Galliers, 1992). Positivists believe that all true knowledge obtained is based on observation or experience of real phenomena in an objective and real world (Cornford and Smithson, 1996). The positivist theory aims to prove objective facts, viewed as timeless, and without social cues attached, that cannot be disputed. The philosophy reflects the methods of natural science, as items can be measured without being disputed, without social interference in a laboratory setting. Research that has adopted the positivist philosophy typically generates data that is referred to as quantitative. Quantitative research collects data that can be 'quantified' and measured precisely without being refuted. Such data allows hypotheses to be tested following the application of statistical techniques.

Those who reject the positivist philosophy are known as anti-positivists or interpretivists. An interpretivist does not accept a clear distinction between facts and values, viewing them as intertwined. Interpretists contend that only through the subjective interpretation of and intervention in reality, can reality be fully understood. While interpretivists believe that phenomena should be studied in its natural environment, they also acknowledge that scientists affect the phenomena they study

(and that this cannot be avoided). Research of this nature generally leads to the collection of rich, qualitative data. Qualitative data provides a richer more meaningful picture to the reader than pages of summarised numbers (Miles and Huberman, 1994) and has been described as:

> *"... a source of well-grounded, rich descriptions and explanations of processes in identifiable local contexts" (Miles and Huberman, 1994).*
> *".... not merely the reporting of events; rather, the context, description, process and participant perspective must be analysed in a meaningful and coherent manner" (Gorman, and Clayton,1997).*
> *"Developing a detailed understanding of individuals' views, attitudes and behaviour" (Moore, 2000).*

Qualitative research is associated more with the interpretive rather than the positivist perspective, and involves the use of methods such as interviews, documents, and participant observation, to understand and explain phenomena.

The author's research falls into the interpretivist camp, as the research takes place within an organisational environment, and although the research was both qualitative and quantitative the author's research focuses on capturing information within a social environment in an organisation rather than a laboratory. The research had to take place within the natural environment of an organisation in order to obtain the most realistic results possible. It would be difficult to obtain such results under laboratory conditions, since the participants would not be working within their natural work environment.

3.2 Research Approach

Research can be categorised as theoretical or empirical. Theoretical research is concerned with developing and refining an understanding of an abstract phenomenon. This can be undertaken using existing models based on what is known, or purely through a set of mental procedures. Empirical research, however, is more concerned with observing and making sense of events in the real world. Even though these

approaches differ in the reality of the phenomena under investigation, they interact, as the theoretical approach gives motivation to empirical research, and empirical research provides evidence to drive the process of theory development (Cornford and Smithson, 1996). This thesis starts with a hypothesis to improve email communication and all empirical data gathered will prove or disprove this.

Within the field of information systems, various authors have categorised research approaches and methods in different ways. Galliers (1992) uses the word 'approach' rather than method, in order to distinguish a particular style of research (rather than a specific technique). One particular approach can use many different methods (e.g., questionnaires, interviews), likewise, the same method can be used within different approaches (e.g., a questionnaire can be used within a case study approach and also within futures research). In the context of the positivist and interpretivist philosophies, Galliers (1992) summarised information systems research approaches as shown in Table 3.1, although used the term 'scientific' to refer to the positivist philosophy.

Positivist / Scientific	Interpretivist
Laboratory experiments	Subjective / argumentative
Field experiments	Reviews
Surveys	Action Research
Case studies	Descriptive / interpretive
Theorum proof	
Forecasting	Futures Research
Simulation	Role / game playing

Table 3.1 Information systems research approaches in the context of the positivist / scientific and interpretivist philosophies.

Galliers described scientific philosophy as being broadly based on the fundamentals of positivism (Cornford and Smithson, 1996), as the phenomena under study can be described and observed in an objective manner, with the results obtained repeatable and undisputable. The positivist and scientific philosophies can therefore be regarded as the same philosophy. Galliers (1992) second class of research approaches, those under the interpretivist philosophy, view the world of information systems as

something that can only be interpreted and never fully theorised or understood. This is because of the human presence within the field of information systems research, as humans do not always act in an objective manner.

Iivari (1991) suggested that research methods can be classified into three broad styles of research; constructive, nonothetic and ideographic. The last two categories are based on Burrell's and Morgan's (1979) classification of research approaches into either objective or subjective perspectives. The first style, constructive research, is concerned with pursuing technical developments, refining concepts and developing frameworks. Nomothetic research is concerned with developing laws and theories that can be universally applied to a number of cases. This involves exploring empirical data in order to test hypotheses. For example, formal mathematical analysis and surveys are examples of methods using this style. Idiographic research aims to understand a particular phenomenon in context and aims to provide the richest picture of what transpires. The idiographic approach is based on the assumption that one can only understand the social world by obtaining first-hand knowledge of the subject under investigation. Case studies and action research are examples of research methods that fall under the ideographic umbrella.

According to Iivari's (1991) classification of research methods, the author's research follows the ideographic style of research. This is because the phenomena under investigation, namely email use within organisations, needs to be studied within its natural environment. The research involves interacting with employees from several organisations. The constructive style would be inappropriate for this research because the author does not plan to develop frameworks or refine existing concepts as part of his research. Likewise the nomothetic style of research would also be inappropriate, as although the author was keen to develop ideas and theories relating to organisational email use, the research would not provide complete empirical data sets because of the socially subjective nature of the area under investigation.

3.3 Research Strategy

This section provides an overview of the research strategy adopted for data collection. This strategy must produce appropriate results specific to the aims and objectives, ensuring validity of the research. Validity refers to:

> *"The degree to which a measure assesses what it should / is supposed to"(Fink, 1998).*

A research strategy was required to ensure that the aims and objectives identified in Chapter One were achieved. This would outline the necessary steps to be undertaken during data collection and analysis. The methodology was therefore designed around the following aim and research objectives, which also have been detailed in Chapter One:

The aim of this research is to improve workplace communications by improving the way email communication is used within the workplace. While the author acknowledges that email is only one communication medium used within organisations, the focus of this thesis is limited to improving email communication within the workplace, without exploring the use of other media.

The research aim will be satisfied by achieving the following objectives:

- Understand how email is used within organisations, specifically identifying the problem areas with email communication.
- Determine the effectiveness of seminar based training (SBT) at improving email use within the workplace.
- Determine the effectiveness of a combined computer and seminar based training at improving email use within the workplace.
- Determine the cost of email use within organisations and how it can be reduced.

An abbreviated Table (see Table 3.2), based on Oppenheim (1992) lists issues that need to be addressed, along with the information required to address them, in order to aid the selection of appropriate research methods.

Issue to Address	Information Required
- Identify the problem areas with email use.	- Determine how email is used within each of the four organisations. - Find out what problems employees have with email.
- Reducing email defects.	- Determine what problems employees have with email and use to develop training programme
- Computer based training versus seminar based training.	- Conduct both seminar-based and computer based training to improve email use and obtain results on the effectiveness of each method.
- Determine the cost of email use in an organisation and how it can be reduced.	- Determine cost from previous research undertaken. - Discover how many emails are received and the effect this has on work flows and productivity.

Table 3.2: Issues found in literature that need addressing and the information required to address them

It is vital that the research design be kept simple and clear with methods selected that are most likely to achieve the objectives of the research (Moore, 2000). To study in depth the defects of email in a number of organisations and how to overcome those defects, both qualitative and quantitative methods were judged to be appropriate.

Qualitative data are collected in a natural setting and offer flexibility. In this study the qualitative aspects consisted of a small number of open-ended questions. Research

questions should be general enough to permit exploration while remaining sufficiently focused to delimit the study. Quantitative data, in this context, were also collected in a natural setting, and consisted of closed questions allowing easy analysis of a large number of responses.

The primary reason for adopting both a qualitative and quantitative approach was the need for in-depth exploration. This also provides greater reliability in the research findings.

Using a number of methods, allows triangulation, and adds variety and reliability to the research. Reliability is the extent to which the procedure would produce the same results regardless of the situation or time (Fink, 1998). This offers cross-validation (comparing one result to another and examining the correlation), with the aim to complement rather than overlap (Gorman and Clayton, 1999), (Moore, 2000).

> *"The best option is for a range of approaches that will allow flexibility in understanding problems and offering multiple insights into their solution" (Gorman and Clayton, 1998).*

The methods adopted for this study consisted of a literature review and a series of surveys and field experiments undertaken within case studies. While these approaches may be predominantly used by the positivist community, they can also be applied to research that follows the interpretivist philosophy. Galliers (1992) classified the case study as a positivist approach, whereas Walsham (1993) argued that case studies are the most appropriate method for conducting research in the interpretive tradition. Cavaye (1996) argued that case study methods can be applied and used in many different ways, and as such can be undertaken from a positivist or an interpretivist stance.

Stake (1994) regarded the case study as a choice of what is to be studied, rather than a choice of methods. For the author's proposed research, the survey and field experiments were the research methods adopted and were used within a case study approach. Yin (1994) stated that various research strategies are not mutually exclusive and that more than one strategy can be used in any given study (triangulation).

Yin (1994) suggested that case studies are the most appropriate research strategy when 'how' or 'why' questions are being asked about a contemporary set of events over which the investigator has little or no control. Yin (1994) defines a case study as:

> *"...an empirical inquiry that investigates a contemporary phenomenon within its real life context , especially when the boundaries between phenomenon and context are not clearly evident" (Yin, 1994).*

According to this definition, the case study is an appropriate strategy for this study because of the nature of the research to be undertaken. The study of email communication within organisations, particularly the reduction of email defects can be regarded as a 'contemporary phenomenon' as there is limited existing research in this area. It is also vital that the research is undertaken within its natural environment, (e.g., within the organisational setting).

The main strengths of the case study are enabling the capture of reality in considerably greater detail, and the possibility of analysing a greater number of variables than other approaches (Galliers, 1992). Case studies can enable the researcher to collect rich data by a number of means (Cornford and Smithson, 1996). The weakness of the case study approach according to Galliers (1992) is that it is difficult to make generalisations or draw statistically meaningful conclusions from a single case or organisation studied. In order to make the results more meaningful for the research, the author decided to use four organisations as separate case studies.

In the use of all methods, the ethics of research were considered and appropriate action taken, i.e., the promise of anonymity to all respondents.

3.3.1 Identifying Email Defects

In order to achieve the first research objective of identifying the potential problem areas with email use, it is necessary to determine how email is used within the four

organisations. The author considered various methods through which this could be achieved, these being interviews, questionnaires and participant observation.

In order to obtain the data required it was deemed necessary to contact email users from each organisation. While data relating to the volume of email traffic could be obtained from the organisations email servers, this would not provide rich data about how email was used in each organisation. Individual email users need to be involved, as the users can provide further details regarding use and misuse within the organisation.

Possible methods to obtain this information include:

- Interviews: a series of semi-structured interviews could be conducted with every employee to obtain the data required. This would have provided a rich source of both quantitative and qualitative data regarding how email was used within the organisations, but due to the large number of employees required to gain this data it would be very time consuming to interview each employee. It was also believed that the use of interviews would be too disruptive and time consuming for the employees and their organisations.
- Observation: while observing employees in their daily use of email would provide vast amounts of rich data, it would be impractical to physically monitor employees to capture the data needed. The Hawthorne study, conducted in the 1920s, detailed the effects of how monitoring individuals can influence the outcome of an experiment. The study found that employee productivity increased whenever a researcher was present (Mayo, 1933). This was later coined as the 'Hawthorne Effect'. The observation of employees using email would not provide further detail in relation to the employee feelings and opinions.
- Questionnaires: a large number of questionnaires can be distributed to employees without causing too much distraction to a daily workload. Questionnaires also have the ability to reach employees that are dispersed over a wide geographical area (Oppenheim, 1992). While questionnaires do not allow for a detailed log of events, they do allow for respondent opinion. Questionnaires are also inexpensive and easily distributed.

None of the participating organisations permitted the author to observe or interview their employees as they regarded these methods as too disruptive and time consuming. It was therefore decided that the most efficient way to capture the information required would be to use a questionnaire. The ability to distribute the questionnaires to a wide geographical area was vital as a number of employees were based at different locations throughout the United Kingdom. The use of questionnaires meant the data collected would not be as rich, as it would have been if the author was allowed to interview or observe the employees. This limitation was compensated for by including open ended questions within the questionnaire where the employees could express their views about email within their organisation.

Although questionnaires were selected as the most appropriate method, it is important for the author to be aware of the limitations of using questionnaires. The following lists cover the advantages and disadvantages of using questionnaires (Powell, 1985):

Advantages:

- Encourages frank answers
- Researcher does not need to be present
- No interviewer bias
- Can be completed at the leisure of the participants
- Data is easily collected and analysed
- Relatively inexpensive to administer

Busha and Harter provide a few more advantages (Busha and Harter, 1980):

- Can target a larger sample
- Fixed format helps eliminate variation in the questioning process

Disadvantages (Powell, 1985)

- Elimination of personal contact
- Lack of control for the researcher
- Respondent cannot ask questions about possible ambiguous questions
- Not all may be motivated to complete and return the questionnaire
- No control over incomplete responses

Again Busha and Harter add to the list with the following (Busha and Harter, 1980):

- Difficult to obtain responses from a representative cross-section of the target population
- May lead to non-response bias as some respondents may be more interested in the research topic than others
- Does not allow in-depth exploration

Given the advantages and limitations of using a questionnaire, it was vital that the questionnaire be easy for the respondents to complete, while still providing meaningful data for the researcher. Questions therefore should be kept simple, unambiguous and avoid the use of double negatives. The answer fields should also be clear to the respondents. Oppenheim (1992) noted that closed questions are easier and faster for respondents to complete than open questions, although closed questions lack the expressiveness of open questions.

The questionnaire for this email research is based on a greater number of closed-ended questions and only a few open-ended questions to try and elicit potentially useful information from the employees. The data would be analysed from the frequency of responses for each question. The closed attitudinal questions would be analysed by examining the proportion of respondents that agreed, disagreed or were neutral in their answer. The design and implementation of the questionnaire is covered in Chapter Four.

3.3.2 Reducing Email Defects

The second and third objectives involved determining the effectiveness of two training methods (seminar and computer-based training) in reducing email defects. Again, a number of different approaches were considered for this part of the research.

It was important that any reduction in email defects could be measured and enable statistical techniques to be applied to determine the significance of each method. In order to obtain the quantitative data required for this analysis, the use of laboratory

experiments or field studies were considered. However, it was inappropriate to use a series of laboratory experiments because of the environment in which the research took place. There would have been little point in placing employees within a controlled laboratory setting to determine the success of the experiments as this would not reflect the natural environment in which the employees operate. While a laboratory experiment would have enabled the author to control the number of variables studied and isolate external variables (Galliers, 1992), this would not have been an accurate reflection of the employees natural working environment.

Field experiments are an extension of laboratory experiments (Galliers, 1992) and this approach is more relevant as experiments are undertaken within a 'real' environment, without the controlling restrictions and artificial environment of a laboratory. It was decided that the series of field experiments would be repeated across four organisations, to increase the validity of the results.

The action research approach was also considered in order to achieve the second research objective. This approach was dismissed because the author did not actively associate himself with the practical outcomes of the research, nor did the presence of the author deem to influence the results. The author would be involved in setting up the experiments, but not in an overt manner while they are running. It was therefore decided that a series of field experiments was the most effective way to pursue the second and third research objectives.

The success of a training programme can depend on the content and delivery of the programme. To maximise the success of a training programme many of the issues identified within section 2.5 of Chapter Two need to be acknowledged. It is important that the needs of the organisation are analysed and understood, so that the objectives of the training programme can be met (Read and Kleiner, 1996). This will also ensure the training is relevant to the organisation. The learning style and competences of the individuals should also be taken into consideration to increase the likelihood they will retain and apply what they are trained in (Shayo and Olfman, 1994).

The effectiveness of both the seminar and computer-based training would be calculated by comparing the quality of emails written before training with those written after the training and using paired t-tests to determine the significance of the training. The design and implementation of the seminar and computer-based training experiments are discussed in Chapter Six.

3.4 Summary

This chapter discussed the research strategy that is to be undertaken by the author in order to pursue the research objectives and fulfil the aim of the thesis. The research falls within the interpretivist camp rather than the positivist camp because of the social nature of the subject under investigation. An ideographic research style will be adopted because it is necessary to understand how email is used within its natural organisational environment. The author will use a series of surveys in the form of questionnaires and field experiments in order to pursue the research objectives. The methods will be conducted within the case study environments of four organisations, which have been detailed within Chapter One.

Chapter 4 Identifying Email Defects and their Impact

Chapter Preface

This chapter identifies the deficiencies of email communication within four organisations. The chapter begins with the design and implementation of a set of questionnaires that were used to examine how email is used within each organisation. The main findings of the questionnaires are then discussed, detailing the problem areas with email communication and the implications for each organisation. The results from the 3M questionnaire were presented in the paper 'Measuring Electronic Communication Defects and their Impact at 3M' at the SQM conference in April 2003. A full list of the author's publications is shown in Appendix I.

4.1 Introduction

The literature review (see Chapter Two) shows that there are many problems associated with email communication within organisations. These problems relate not only to the growing volume of emails received, but also to the written quality of the messages themselves. Four organisations participated in a study that focused on how email was used within their organisations. The first step to achieving effective email communication was to identify how email was used within these organisations and to identify their problem areas.

4.2 Capturing Organisational Email Use

Using the four organisations as case studies, the author wanted to identify any deficiencies in the way email was used in order to highlight areas for improvement. Section 2.3 of the literature review highlighted a number of problems with

organisational email use and the author wanted to determine if these existed within the four participating organisations.

Unsolicited email (SPAM) has been identified as a negative aspect of email use in a number of studies (Sillince et al., 1998; Brandenburg et al., 1999; Balter, 2002). The author wanted to determine the proportion of unsolicited email received within the participating organisations, even though it is often generated externally, to gain a complete picture of the volume of email received. Kimble et al (1998) found that some managers in his study were overloaded by email due to overuse of the carbon copy (cc) function. The author was keen to determine whether the carbon copy function was overused within the four participating organisations. It was necessary to determine the proportion of SPAM and whether the carbon copy function was overused , as this would indicate the amount of time spent dealing with irrelevant and unnecessary email. The total number of emails received needed to be determined to gauge how much time employees spent using email in total. This would enable the author to determine what proportion of incoming email was regarded as unnecessary or irrelevant.

The written quality of incoming emails also needed to be captured. The author was keen to establish the extent to which factors such as conciseness, correctness and clarity, identified by Brandenburg et al (1999), were present in the emails received within the four participating organisations, This would show if employees were receiving emails that were easy to read and concise, or if incoming messages were difficult to read and ambiguous. Frazee (1996) reported that 65% of all email messages fail to give the recipient enough information to act upon. The author wanted to determine the whether actionable emails received by employees contained sufficient information for them to know what is expected of them. Messages that are ambiguous can be misinterpreted, leading to incorrect actions being carried out, which can have serious negative implications for the organisation.

It was important to investigate the balance of email use in relation to other communication media. Markus (1994a) found that email can be purposefully used in place of other forms of communication such as face-to-face conversation or the

telephone, when the sender is trying to avoid social contact with the recipient. Choosing to send an email rather than speaking to a person adds to the volume of email generated within an organisation, which in turn adds to the time that an employee spends reading email. The author was keen to investigate the balance of email in relation to other media and the circumstances in which email may be inappropriately used in place of other media.

Research undertaken by Jackson et al (2001) found that email can be a distraction within the workplace and that there is an interrupt recovery time associated with email. The author was keen to establish whether email was regarded as a distraction within the four participating organisations, as this would indicate the amount of time spent using email.

The author was keen to understand how the employees felt about email use in their organisation and which particular aspects of email use they felt could be improved. Some of the potential problems identified in the literature (highlighted in this section) could be anticipated, but it was important to both confirm those and capture the wide range of issues that may have existed within each of the four organisations, not already mentioned.

Various methods for collecting this data were available, including semi-structured interviews, monitoring employees and questionnaires. The merits, limitations and suitability of each method were discussed in Chapter Three. The most effective way of obtaining the data was by questionnaire due to the large number of employees within three of the four organisations and the time restrictions imposed by each organisation.

All employees from 3M, Danwood and Professional Development (PD) were asked to complete the questionnaire, to obtain a complete representation of email use within each organisation. However, only a few departments and their employees in LogicaCMG were asked participate in the research, as it was run as a local initiative, rather than throughout the whole organisation.

4.3 Developing the Questionnaires

The questionnaires needed to capture the current state of email use within each of the four organisations. The questionnaires had to be approved by each organisation before deployment, which meant there was some variation between the four questionnaires, but the majority of the questions were the same for all participating organisations. The questionnaires were measuring employees' perception of email use within their organisation. The results may therefore not reflect the true nature of email use within these organisations, although they would still provide an insight into the problems encountered within these organisations.

The list of questions used for the four questionnaires can be seen in Appendices II-V. The first section of the 3M, LogicaCMG and Danwood questionnaires consisted of a series of questions to capture the demographic characteristics of the respondent. This enabled comparisons to be drawn between different demographic groups within these organisations. The demographic questions were not included in the PD questionnaire due to the small number of employees within the organisation and because all employees were based at the same location. The second section of the questionnaires focused on the use of email communication. The LogicaCMG and 3M questionnaires had a third section that covered general organisational communication, as management wanted to compare email communication with other communication media used within their organisation.

Several open-ended questions were used to capture how many emails employees received and how they categorised an email's importance and relevance. This would allow the respondent to provide a more precise answer than if closed scales were used. Although as the questionnaires were measuring employees' perception of email use, they may be unable to provide an accurate indication of the number of SPAM emails they receive and the number of emails they believe they are copied in unnecessarily. This means the proportion of emails received that are regarded as irrelevant and unnecessary may not be 100% accurate.

A series of closed attitudinal questions were used to gauge how email was used and how the employees viewed organisational email use. A five point Likert scale was used where respondents indicated the extent to which they agreed or disagreed with a statement about email use. The Likert scale works particularly well in the context of a series of questions that seek to elicit attitudinal information about a specific subject matter (Rea and Parker, 1997). Both favourable and unfavourable statements were used to avoid respondents repeatedly giving each question the same score. Oppenheim (1992) suggests that the reliability of attitudinal questions can be increased by asking the same question a number of times, altering the wording and context of each question. However, it was decided not to include this kind of check within the questionnaire because the participating organisations were concerned about the length of the questionnaire and the time required to complete it. This limitation meant the author was unable to follow best practice according to Oppenheim (1992), although this was unlikely to have affected the validity of the results because of the existence of the final open ended question, where respondents were free to comment upon email use within their organisation and enforce their responses to the closed questions.

The final question in the email section was open ended and provided the opportunity for respondents to comment on email use within their organisation. This question would provide rich qualitative data that would enforce the respondent's perspective on organisational email use reflected in their answers to the attitudinal questions. Qualitative data is useful to supplement or validate quantitative data gathered from the same setting (Miles and Huberman, 1994). This question also provided an opportunity to comment on any aspect of email use that was not covered in earlier sections of the questionnaire.

Both 3M and Danwood were willing to provide an incentive for employees to complete the questionnaire. Employees would be entered into a prize draw to win a gift voucher if they provided their employee number in the space provided. It was important to reassure employees that their employee number would only be used for purposes of administering the prize draw and that their individual responses would not be disclosed to their organisation.

Each questionnaire was hosted on the Internet, which made capturing the data easier than if a paper based questionnaire had been used. Every response to the questionnaire was automatically stored in a database, with each column representing each question, and each row representing each submitted response. The questionnaires were hosted within the Computer Science department at Loughborough University, and not within each organisation. This way it was possible to ensure that the data would not be manipulated prior to analysis. To ensure that the questionnaires were easy to complete radio buttons were used for each of the closed questions, which made them easier and faster to answer than if a typed response was required.

4.4 Deployment of the Questionnaires

Each questionnaire was live for a period of two weeks. When each of the organisations was ready to roll out the questionnaire the author provided them with a URL that directed them to the questionnaire. Each organisation would then pass this on to their employees via email and ask them to complete the questionnaire. This email would also explain the purpose of the questionnaire and reassure employees that their responses would be anonymous. Another email was circulated during the second week to remind and encourage employees to complete the questionnaire.

Many additional issues needed to be considered before the questionnaires were deployed, such as the security of the online questionnaire and how much bandwidth and file space would be required.

4.4.1 Security

It was important that the website was secure and that it could not be interfered with by a third party. This was important because the author did not want anyone to be able to access the questionnaire and submit bogus responses. The questionnaire was to be hosted on a server at Loughborough University that was used for all departmental student projects. The questionnaire could only be accessed by typing the full address

into a web browser. It was not possible to browse the author's files on the server as they were hidden by blank index pages. The questionnaire was secure in the sense that it could not be physically changed on the server without the author's ftp password.

4.4.2 Bandwidth and File Space

It was important that the host machine had sufficient file space to store all the responses, without responses getting lost or ignored. 3M had 2850 email users, so it was important that there was sufficient hard disk space to cope with the potential number of responses. In order to determine the likely amount of disk space required a dummy set of data was created and sent to the database. The total size of this table was 58,640K. The server experienced no problems accepting this amount of data. Bandwidth was not an issue because the completion of a questionnaire did not require a continuous connection to the server, as once a user had requested to view the questionnaire, a copy would be sent to their browser. A connection with the server would only be required again once the user submits the questionnaire.

The submitted responses from each of the questionnaires were also sent to the author in the form of an email. Each email would represent a single submitted response to the questionnaire. These emails were used as a back up in case of any problem with the database.

The size of the HTML questionnaire used for 3M was 26K, and a similar size for the other organisations. It was important that the download size of the questionnaire was as small as possible to ensure the respondent did not have to wait too long to access the questionnaire. The file size of the questionnaires was kept to a minimum by removing unnecessary white space created by the WYSIWYG editor and by having only limited images.

4.4.3 Viewing the Questionnaire Using a Proxy Server

There were also concerns about whether a proxy server was used by employees to view the questionnaire. Use of a proxy server meant it was possible to view outdated versions of the questionnaire, used for testing purposes, even if it has been updated at the original source. This issue was resolved by using a new unique URL for the final version when it was ready to go live at the organisation.

The use of a proxy server also had implications for the cut off point of the questionnaire. Even when the questionnaire was taken down from the source, employees may still be able to view the questionnaire and submit responses. This could be resolved by either changing the password for the database, as done for 3M, or by working on a copy of the original database table, as done for the other participating organisations. Working on a copy of a database table ensured any additional responses received after the deadline would not be included in the analysis, since they would be stored in the original table, not the copy, which was being used for analysis.

4.5 Identified Email Defects

In total, 875 employees from 3M completed the questionnaire. Given that the organisation has approximately 2850 email users, this gives a response rate of 31%. The questionnaire was sent out to 138 employees at LogicaCMG and 77 responses were received giving a response rate of 56%. Some 167 responses were received from Danwood and 16 from PD, giving response rates of 28% and 70% respectively.

In the analysis of the questionnaire percentages are given rather than the number of respondents for attitudinal questions. All percentages are from the total number of valid responses for each question or pairs of questions when comparisons are made. Invalid responses are not therefore included in the analysis (null answers were treated as invalid answers). Responses to the attitudinal questions were grouped according to whether a recipient agreed, disagreed or was neutral in their response to the question.

This meant the responses in the 1 and 2 points were combined, as were those in the 4 and 5 points. Neutral answers were where the respondent selected 3. Responses were grouped in this way to make it easier for the reader to identify whether the majority of responses agreed or disagreed with the statement. This follows the same style of analysis carried out by Marcus (1994a), who also grouped the responses to a five point Likert scale in this way.

4.5.1 The Quantity of Email Received

This section examines the email defects related to the quantity of email received within the four organisations.

4.5.1.1 Poorly Targeted Emails

The mean number of emails received per day by employees from each of the four organisations is shown in Table 4.1. These values give an indication how heavily email is used within each organisation. The median value is also shown which provides a more accurate average than the mean as it excludes anomalous values. Table 4.1 also shows how employees categorise the importance of their incoming email, in terms of what proportion is regarded as for information purposes only, together with the proportion of unnecessary and irrelevant email received within the four organisations. Unnecessary emails refer to emails where the recipient is copied in unnecessarily, and irrelevant or untargeted emails refer to unsolicited SPAM emails.

Organisation	Mean no of emails received per day (Median)	Proportion of Information only (%)	Proportion copied in unnecessarily (%)	Proportion of Irrelevant or untargeted (inc SPAM) (%)
3M	23 (20)	41	16	13
LogicaCMG	47 (43)	43	22	15
Danwood	27 (15)	49	14	19
PD	47 (31)	43	13	18

Table 4.1 Average emails received and the proportion of information only, unnecessary and irrelevant emails for each participating organisation

Table 4.1 shows that between 41% and 49% of emails received within the four organisations are for information purposes only. Typically, these type of emails still contain useful information but do not require any action to be carried out by the recipient. Therefore, emails of this nature may be better suited to another communication medium such as a bulletin board, as shown by the following response given in the questionnaire;

> "*Have a special message board for the internal SPAM mails*" LogicaCMG employee

The values in Table 4.1 show that a significant proportion of the emails received within the four organisations are not relevant to their employees, adding to the time spent dealing with email. Up to 29% of the email received by 3M employees and up to 37% received by LogicaCMG employees are unnecessary and have no relevance to them. These figures take into account irrelevant or untargeted email, and email where the recipient is copied in unnecessarily.

Over half of the respondents from LogicaCMG and PD agreed that they were copied in unnecessarily on email, as shown in Table 4.2.

Question	Organisation	Agree (%)	Neutral (%)	Disagree (%)
I receive irrelevant / untargeted emails (including SPAM)	3M	44	24	32
	LogicaCMG	41	21	38
	Danwood	44	27	29
	PD	81	13	6
I get copied in unnecessarily on email	3M	44	28	28
	LogicaCMG	53	22	25
	Danwood	33	35	32
	PD	56	25	19

Table 4.2 Employee views on whether they receive irrelevant email or are copied in unnecessarily

The following quotes taken from the open-ended questions in the questionnaire give evidence that employees are often copied in on emails for political reasons, which need to be discouraged to reduce the volume of unnecessary email circulated throughout an organisation.

> *"There is a strong tendency esp. with the xCMG side of the business to unnecessarily escalate through copying managers and manager's managers on emails."* LogicaCMG employee

> *"Less CC'ing to avoid responsibility for doing something about an issue. 'You knew about that issue, I sent it in an email on 01/04/03!'"* LogicaCMG employee

> *"People are often copied in for 'political' reasons rather than for 'necessity' which isn't helpful & should be discouraged from top of organisation down."* 3M employee

Misuse of the 'Reply to all' function can also increase the volume of email generated within an organisation.

> *"Remove the 'reply to all' feature. Too often the source of e-mail overload. It will make people think about the e-mail list or just reply to the sender".* 3M employee

Table 4.2 shows that over 80% of respondents from PD and over 40% of the respondents from the three other organisations agree that they receive irrelevant or untargeted email, including SPAM. While some employees included on mailing lists may regard such messages as for information purposes only, those that are incorrectly included within the list regard them as irrelevant or untargeted. Inaccurate or inappropriate group mailing lists can therefore also add the number of irrelevant emails circulated within an organisation.

> *"Better ownership of Groups would enable email to be targeted more accurately. Too often senders are not sure which group(s) to use so send to a wider group, just in case."* 3M employee

> *"send fewer general messages that have no relevance to either individuals or sectors of staff. ie internal administration vacancies to all sales staff."* Danwood employee

While unsolicited email (SPAM) also adds to the volume of email received within an organisation, it is often generated externally rather than internally and thus SPAM filtering software can aid in reducing the number of SPAM emails. The findings in this section show that a significant proportion of the email received within the four organisations is irrelevant or untargeted. These findings support a number of studies that identified SPAM as a negative aspect of email use (Sillince et al., 1998; Brandenburg et al., 1999; Balter, 2002), This section also supports the findings by Kimble et al (1998), who found that some managers were overloaded by email because of inappropriate use of the carbon copy function.

4.5.1.2 Media Selection

Many of the comments received, such as the one below, relates to how email was being used more and more in place of other forms of communication;

> *"There is a great tendency to use e-mails instead of direct or telephone contact. We need to find ways of reversing this unfortunate trend."* 3M employee

This view was shared by over half of the respondents from 3M, LogicaCMG and PD, as shown in Table 4.3.

Organisation	Agree (%)	Neutral (%)	Disagree (%)
3M	56	25	19
LogicaCMG	64	26	10
Danwood	34	34	33
PD	56	25	19

Table 4.3 Employee views on whether email is used too much in place of other forms of communication

Whilst email is a suitable medium for many messages, all users of email need to understand that not all intended recipients will be in a position to read or action emails immediately.

> "*People who are always in offices need to be aware that there are a large number of people who are unable to retrieve their e-mails until later in the day or next day, so if the content is important/urgent it may be better communicated via the telephone.*" Danwood employee

Some respondents suggested that verbal communication should be used more instead of relying on email, especially for important messages or items that require discussion.

> *"We are too reliant on email. We should use more verbal communication, particularly for discussion items."* LogicaCMG employee

> "*I think if something is very urgent people should not solely rely on email alone and pick up the phone to make sure it will get done."* Danwood employee

Others suggested email was the preferred communication medium because it keeps a record of any agreements made, which can be later used to prove or disprove that something has been done.

> "*I think email is too often used as a means of demonstrating that something has been said to one: i.e. it is too defensive. I would prefer a culture where we actually DO what we say we will - rather than having to prove that we are going to - or have done so.*" LogicaCMG employee

This over reliance on email has a significant impact on the amount of unnecessary email traffic generated within organisations, increasing the time spent writing and

reading emails that would have been more effectively communicated by face-to-face dialogue.

The findings in this section reflect those identified by Marcus (1994a), in that email can be purposefully used in place of other communication media, although Markus (1994a) identified the desire to avoid social contact as the reason for choosing email, whereas in the author's study email is chosen out of convenience.

4.5.1.3 Email Interruptions

Email can be a distraction within the work place depending on how the user's email application is set up and the volume of email they receive. Research undertaken by Jackson et al (2001), discussed in Chapter Two, shows how employees can reduce the number of email distractions by increasing the duration in which their email application checks for new email. Approximately half of the respondents from 3M, LogicaCMG and PD agreed that email often distracts them from more important work, as shown in Table 4.4.

Organisation	Agree (%)	Neutral (%)	Disagree (%)
3M	49	22	29
LogicaCMG	51	25	24
Danwood	25	22	53
PD	50	13	38

Table 4.4 Employees views on whether email often distracts them from more important work

One employee from LogicaCMG admitted to closing their email application when they had a deadline to meet because of the distraction caused by incoming email.

> *"When I'm really busy and have an urgent deadline to meet, I shut down Outlook, as incoming mails become a distraction. If someone really needs a response instantly, they'll come and find me."* LogicaCMG employee

These findings support the research undertaken by Jackson et al (2001) that email can be a distraction within the workplace. Email can cause disruption to an employees work pattern and thought processes because their attention is diverted to their email at regular intervals, depending on the setup of their email application. The effect of this can be magnified depending on the volume of email that an individual receives, meaning an employee may be distracted more often and for longer periods, the more email they receive.

4.5.2 Defects Related to the Quality of Written Email

The questionnaire results also identified a number of defects relating to the written quality of the emails generated within the organisations. These include deficiencies in spelling and grammar as well as deficiencies in the content and clarity of email messages.

4.5.2.1 Information Deficiency

The results from the questionnaires highlighted several defects relating to the quality of written email within the four organisations. Table 4.5 shows how employees responded when asked a series of questions relating to the clarity of the written email they receive.

Question	Organisation	Agree (%)	Neutral (%)	Disagree (%)
I would say the emails I receive are easy to read	3M	45	45	10
	LogicaCMG	32	54	14
	Danwood	56	37	6
	PD	38	50	13
I would say the emails I receive are straight to the point	3M	33	50	18
	LogicaCMG	32	49	18
	Danwood	54	36	10
	PD	19	69	13
If I receive an email that requires action, it tells me what is expected of me	3M	46	39	15
	LogicaCMG	32	42	26
	Danwood	51	38	11
	PD	56	31	13
If I receive an email that requires action, it states when action is required	3M	37	40	23
	LogicaCMG	28	37	35
	Danwood	48	40	12
	PD	56	19	25

Table 4.5 How employees view the written quality of the emails they receive

Some of the comments received from the questionnaire reflected the findings in Table 4.5. Some respondents explicitly commented about the poor use of grammar and poor structuring of messages.

> *"Quite often the quality of spelling and grammar is not acceptable, particularly in the case of emails that are sent to customers."* Danwood employee

> *"people should always read over messages before sending them to check for spelling/potential misinterpretation"* PD employee

Emails that are poorly worded can be ambiguous and can lead to incorrect actions being carried out. Poorly written emails that are sent to customers could also affect the reputation of an organisation. During the research for this thesis, the author experienced this first hand, as a miss spelt email written by the author was circulated around The Danwood Group, which did not benefit the authors relationship with the organisation and contributed to failure of the training programme, as discussed further in Chapter Six.

Only 19% of PD and one third of 3M and LogicaCMG respondents agreed that the emails they receive are straight to the point. Emails that are verbose take longer to read than clear concise messages, which add to the time that employees spend using email.

> "*Emails are often too long and detailed. Many would benefit from being more direct and concise.*" 3M employee

> "*Staff should reply quickly with short, to the point response - no waffle. Staff should apologise if an early answer is not possible, stating when they can reply*". LogicaCMG employee

Only 32% of respondents from LogicaCMG indicated that the actionable emails they receive state what action is expected of them. If employees are not sure what is expected of them this can lead to a delay in any action being carried out. Actionable emails should also state when action is required by, although only 28% of the respondents from LogicaCMG indicated that actionable emails state when any action is required. This would indicate that some actions might not be completed when expected because the recipient was unaware of a deadline.

Table 4.6 shows that the majority of respondents from the four organisations believe that they write easy to read messages that are to the point and inform the recipient of any action that is required. A comparison of the values in Tables 4.5 and 4.6 shows that employees have different views about both the written quality of the emails they write and emails they receive.

Question	Organisation	Agree (%)	Neutral (%)	Disagree (%)
I would say the emails I write are easy to read	3M	89	10	1
	LogicaCMG	86	13	1
	Danwood	90	8	3
	PD	88	13	0
I would say the emails I write are straight to the point	3M	84	14	2
	LogicaCMG	83	14	3
	Danwood	86	11	3
	PD	81	19	0
If I write an email that requires action, it tells the recipient what is expected of them	3M	84	13	3
	LogicaCMG	86	11	3
	Danwood	85	13	3
	PD	100	0	0
If I write an email that requires action, it states when action is required	3M	67	23	8
	LogicaCMG	61	28	11
	Danwood	72	23	4
	PD	81	19	0

Table 4.6 How employees evaluate the written quality of the emails they send

The difference between how employees evaluate their own emails and those received from their peers may be due to the senders not fully appreciating the context in which the message will be received. An email may make sense to the author of the message, however the recipient may not fully understand the message because they lack the background knowledge of the sender.

4.5.2.2 Ineffective use of the Subject Line

The subject line and the name of the sender are the first pieces of information that are seen when a new message arrives in the inbox. These provide the recipient with clues about the content and the urgency of the message. Blank or insufficient subject lines not only make it difficult to access the content and the urgency of the message, but also make the message difficult to retrieve once filed.

> *"I find a number of people don't put anything in the subject box, which I find very irritating. I also find it annoying if people just put something general in there. For example if they have a query on something, rather than giving a customer name, they would just put 'query' in the subject box. As I keep my e-*

mails in alphabetical order, it's very annoying as I have to keep changing the subject." Danwood employee

"*I find it really annoying when people don't use the subject box correctly and usually have to change the subject in order for me to locate the e-mail when required.*" Danwood employee

Table 4.7 shows that only 19% of respondents from LogicaCMG agreed that the subject line contained sufficient detail for them to assess the importance of a message.

Organisation	Agree (%)	Neutral (%)	Disagree (%)
3M	27	28	45
LogicaCMG	19	43	38
Danwood	39	28	33
PD	25	31	44

Table 4.7 Employee views on whether the subject line of incoming email contains sufficient detail for them to assess the importance of the message

The problems caused by ineffective subject lines can be magnified by the volume of email that an individual employee receives. The more email that an employee receives the more crucial an effective subject line becomes because the subject line and name of the sender will influence which messages get read first and which are discarded.

The defects relating to the written quality of email highlighted within this section reflect a number of issues and problems with email use identified within the literature review. The factors identified by Brandenburg et al (1999) that contribute to the quality of the content of emails have not been completely adhered to, given the comments received and the significant difference between how employees evaluate the emails they receive and the emails they send (as shown in Tables 4.5 and 4.6 respectively). Employees indicated they write emails that are easy to read and concise, yet were not as positive when asked to evaluate the email they received. The values in Table 4.5 also support the findings reported by Frazee (1996) that 65% of email fails to give the recipient enough information to act upon, given that only one third of

LogicaCMG employees indicated that when they receive an actionable email it states what action is required.

4.5.3 Deficiencies with Organisational Email Configuration

The qualitative data from the questionnaires identified several potential deficiencies with how email systems were configured within the organisations. Only a small number of employees highlighted these defects and therefore the impact on the organisation or employees is somewhat difficult to determine.

Several respondents from LogicaCMG commented on the inadequate disk space allowed for their email quota, and how receiving several large attachments could fill their quota. While this may force employees to manage their inbox, tasks can be missed if certain messages are filed before being actioned.

A number of respondents from Danwood commented on the lack of an 'out of office' facility. Without such a feature the sender of a message would be unaware of the recipient's absence, which can lead to actions not being undertaken until the recipient returns to the office.

Other Danwood respondents stated the email facilities available to those that mainly work off site were inadequate. These respondents often relied on 'dial up' connections to access their email, which meant that downloading email with large attachments was time consuming and not always possible. Due to the nature of their work, these employees may only check their email once or twice per day and could therefore miss important deadlines. These respondents wanted their colleagues on site to be made aware of their circumstances and that they cannot always respond instantly to email.

4.6 Email Defects in Relation to age and job Grade

The results from the 3M questionnaire showed that a higher proportion of older and senior employees identified deficiencies in email use compared to their junior colleagues. It was also found that respondents with a higher job grade tended to be more critical of the emails they received compared to those on lower job grades. Those on higher job grades also received more emails than their junior colleagues. While these findings indicate that more senior employees are affected more by deficiencies in email use, the results do not show who the culprits are when it comes to sending ineffective email. Similar results were found upon analysis of the Danwood and LogicaCMG questionnaires, with older respondents generally receiving more email on average than their junior colleagues.

4.7 Conclusions

This chapter has met the first research objective of understanding how email is used within the workplace of the organisations studied and has identified many common problems associated with email communication. The questionnaires were measuring employees perception of email use within their organisation. The results may therefore not reflect 100% the true nature of email use within these organisations, although they still provide an insight into the problems encountered within these organisations. A more accurate account of how email was used and the problems encountered may have been possible if the author was able to observe and interview employees and / or obtain information from the organisations email servers. However this was not permitted by the organisations examined.

The problems identified within the four organisations reflect many of the issues identified within the literature review, although the author's findings cannot be directly compared to some of those within the literature because many of these issues are only identified and not measured. The identified problems or defects with email use relate to both the quality and quantity of email generated within the workplace, as well as ineffective management and configuration of an organisations email systems.

Defects relating to the quality of written email included poor use of the subject line, receiving emails that were difficult to read and messages containing ambiguous content. These defects can make it difficult for the recipient to process email, which may result in incorrect actions being carried out or deadlines being missed. Email defects that relate to the quantity of email messages generated within an organisation can cause employees to become overloaded by email. Excessive use of the carbon copy function and the over reliance on email in place of other forms of communication add to the volume of email generated within the workplace.

The impact of the identified email defects varied within the four organisations. Respondents from LogicaCMG and PD were generally more critical about how email was used by their colleagues than respondents from the other organisations. This may be because respondents from LogicaCMG and PD received more email per day than 3M or Danwood employees, and are therefore more aware of the deficiencies with email communication. Danwood respondents on the other hand were generally less critical about the problems with email use within their organisation, compared to respondents from the other organisations. This may be due to the comparatively small number (median = 15) of emails received per day, which reduces the impact of some email defects.

The email defects identified need to be reduced in order to increase the effectiveness of email communication within the workplace. These defects can add to the amount of time employees spend using email, which leaves less time to carry out other aspects of their job. The amount of time employees spend using email can be reduced by reducing the volume of unnecessary email and by improving the quality of written email. The question is can this be achieved through seminar based training and computer based training which will be discussed in the next two chapters.

Chapter 5 The Development of a CBT Email System to Reduce Email Defects

Chapter Preface

This chapter discusses the development of a computer based email training application that will be used to determine the effectiveness of a combined seminar and computer based training approach to improving email use within the workplace. The real time email trainer has been developed to integrate into employees Microsoft Outlook email application. It detects defects within an email before the message is sent. The user then has the opportunity to edit their email before they send it. The effectiveness of this tool will be determined within the training programme discussed in Chapter Six, where a group of employees will evaluate the email they receive from a paired sender before and after the sender receives training and has been given the computer based email training application.

5.1 Introduction

A real-time email trainer was developed to determine if a computer based training approach, when used in conjunction with seminar based training (SBT), would be more effective than solely SBT at improving employee use of email. This software was developed as there was no known viable alternative that could have been used in its place. The email training application is a first version prototype, with extra functionality planned for later versions depending of the findings of this research.

5.2 Developing the Real Time Email Trainer

The software has been built so it flags up potential defects within an email to the sender before the message is sent. The email trainer module has been built so it can be

integrated into the users email application (MS Outlook) as shown in Figure 5.1. The software provides the sender with an opportunity to review and edit a message before it is sent. This real time email trainer, which is effectively a computer based training (CBT) tool acts as a reminder to the user about ineffective email use by parsing each email and highlighting the defects in a mail report.

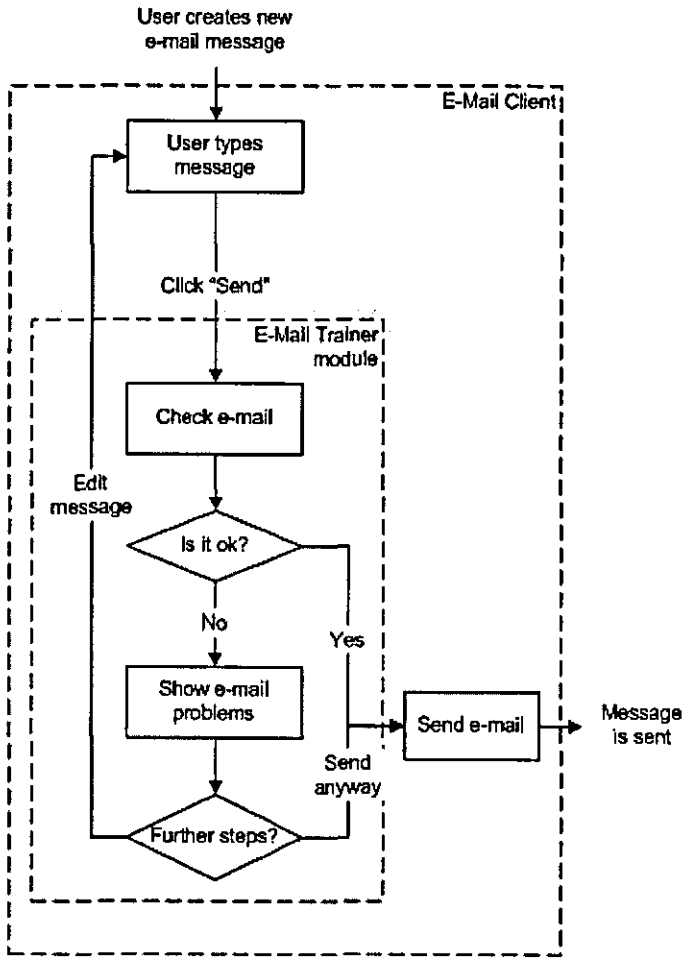


Figure 5.1 The integration of the real time email trainer into the email application

If an email has been previously parsed and still contained deficiencies when the user tries to resend the message, the potential defects will still be shown to the user in the 'Mail Report' window. Any remaining potential defects will be shown to the user regardless of the number of times a user has edited the message. The user also has the option to ignore the defects identified by the software and to send the email once it has been parsed. It was important that the user was able to overrule the software in

this way, as it would make the software easier to use as the user may disagree with the potential defects identified by the software and it would also be difficult to create a email trainer that is one hundred percent accurate. If the real-time trainer did not identify any potential defects within an email, then the email would be sent to the users outbox, ready to be sent to the server.

5.2.1 Rational for Design

A real-time email trainer was developed to determine if a computer based training approach, when used in conjunction with seminar-based training (SBT), would be more effective than solely SBT at improving employee use of email. Section 2.4.1 of the literature review highlighted a number of existing software packages designed to aid users manage their mailbox, but these do not help users to write effective emails. The lack of alternative software led the author to design the real-time email trainer.

Section 2.3 of the literature review (Chapter Two) identified a number of studies highlighting problems with organisational email use. Many of these problems were found to exist within the four organisations under investigation as shown in Chapter Four. The author wanted to determine if these identified problems could be reduced by a computer-based training software. The software would only be able to identify specific problems relating to an individual email message, it was not intended to help alleviate all the issues identified in section 2.3 of the literature review.

Kimble et al (1998) found that managers can be overloaded by email due to inappropriate use of the carbon copy function. The results from Chapter Four show that over half the respondents from LogicaCMG and PD agreed that they received email they were copied in on unnecessarily. Employees also commented on how the 'reply to all' function could be misused and lead to email overload (section 4.5.1.1 of Chapter Four). It was hoped the CBT software would reduce the number of unnecessary emails.

Frazee (1996) reported that 65% of emails fail to give the recipient enough information to act upon. The results from Chapter Four show that only 19% of employees from LogicaCMG agreed that the subject line contains sufficient information for them to assess the importance of emails they receive. The CBT software would aim to address this issue by ensuring the subject line of an email was sufficient in length to inform the recipient what the message is about.

Some of the factors associated with the quality and format of email messages, identified by Brandenburg et al (1999) were not always adhered to within the four participating organisations, as reflected in the significant differences between how employees evaluated the email they sent and those they received (see section 4.5.2.1). The software would hopefully improve the tone and layout of email messages by informing the recipient when their message is poorly formatted or contains an excess of capital letters, which can be regarded as aggressive behaviour.

5.2.2 Functionality

The real-time email trainer parses each email against a set of rules that govern whether a particular defect exists. The sensitivity of the parsing criteria is determined by a set of parameters that can be altered to adjust the sensitivity of the software. The parameters were set according to what participants in the recipient training deemed as acceptable and unacceptable use of email within their organisation. This was determined by the recipients highlighting problems with mock emails during their training session and discussing their tolerances of the identified issues. The parameters can be set by altering the values in the registry that relate to the sensitivity of the parsing criteria. Parameters were used instead of fixed values so the sensitivity of the software could be adjusted. For some individual users the parameters had to be adjusted to take into account the characters and space used by their email signature,

The real-time email trainer was not able to detect defects relating to the setup of the user's email application (for example the default time for polling for new email), but only certain defects within individual email messages. The software is able to parse

text within the recipient fields (To, CC, and BCC), the subject line and the message body. It is also able to detect the size of any attachments contained within an email. If the user was replying to or forwarding a message, then the software would only parse the new part of the message, and not the text in the original email.

The software counts the number of recipients to which an email is addressed and will alert the sender if this exceeds the value set in the parsing parameter . It is hoped that by reminding the sender of the number of recipients in their message (if they exceed the stipulated number), that the sender would reconsider if all of the recipients they have named need to see the email. This will hopefully reduce the number of recipients copied in and the number of unnecessary sent emails within an organisation. Users of the software are also prompted whenever they use the reply-to-all function, as to whether it was necessary to reply-to-all original recipients. It was therefore hoped that by asking users whether it was necessary to reply-to-all that this would help reduce the number of unnecessary emails received within an organisation.

The software was built to also identify certain defects relating to ineffective subject lines. It is hoped that the software would encourage employees to write more effective subject lines that enable their recipients to know what the message is about and gauge the importance of the message. The software is able to detect blank subject lines and those that are particularly short. The software is also able to identify a subject line containing all capital letters, which can be regarded as aggressive behaviour on the part of the sender.

As the software is a first version prototype it is only able to detect several simple defects associated with the message body of an email. The software is unable to identify potential problems with the written content of an email in terms of poor grammar or use of English, although the user could still use the spell check facility within Outlook. The functionality to detect more complex defects depends on the outcome of this study. However, the real-time email trainer is able to count the number of lines, blank lines and characters used within a message. These values have been used to develop a set of rules that govern whether an email is formatted appropriately. These rules relate to whether a message has been formatted into

paragraphs or whether the text within a message is fragmented, making it difficult for the reader to read. Emails that are excessive in length (greater than a set number of lines or characters set by a number of parameters) are flagged to the sender as being messages that may have been better suited to a phone call or face-to-face communication. While users are unlikely to discard such a message once already written, this flag will remind senders about writing long emails in the future.

A full list of possible user scenarios and rules governing the parsing criteria can be seen in Appendix VI. This shows the full functionality of the software together with the parameters used that affect the sensitivity of each rule. The dependencies and conditions of each of the parsing criteria are also listed, which govern which defects are flagged to the user in the mail report.

5.2.3 User Interface

Once installed the real time email trainer is integrated into the users email application and is only activated if any of the parsing scenarios (see Appendix VI) are triggered. It was important that the software interface is easy to use, it maintains the look and feel of Outlook and it is unobtrusive as possible.

If any of the parsing criteria are triggered when the user sends an email, a window is shown that highlights the defects within the message, as shown in the example in Figure 5.2. The identified defects are grouped according to whether they are related to the recipient field, subject line, message body or attachment issues.

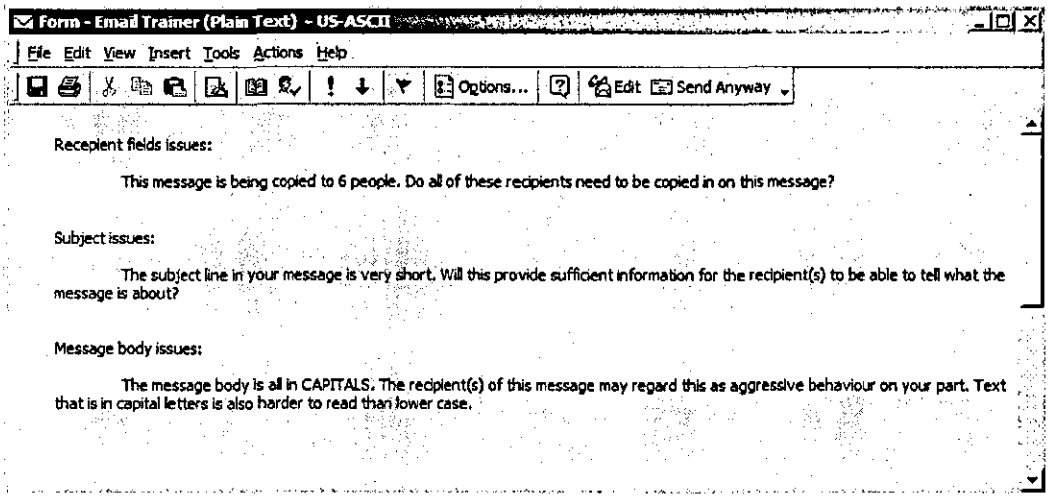


Figure 5.2 Email report displayed to sender if any defects identified within message

The sender then has the choice to either edit the email or ignore the suggestions and send the email using the two new buttons that appear on the far right of the toolbar as shown in Figure 5.2. It is important to provide the facility to send the message ignoring the suggestions because in some cases it is necessary to override the software, for example when copying a large number of recipients into a message. If the sender chooses to edit the message they return to their original message, as shown in the example in Figure 5.3.

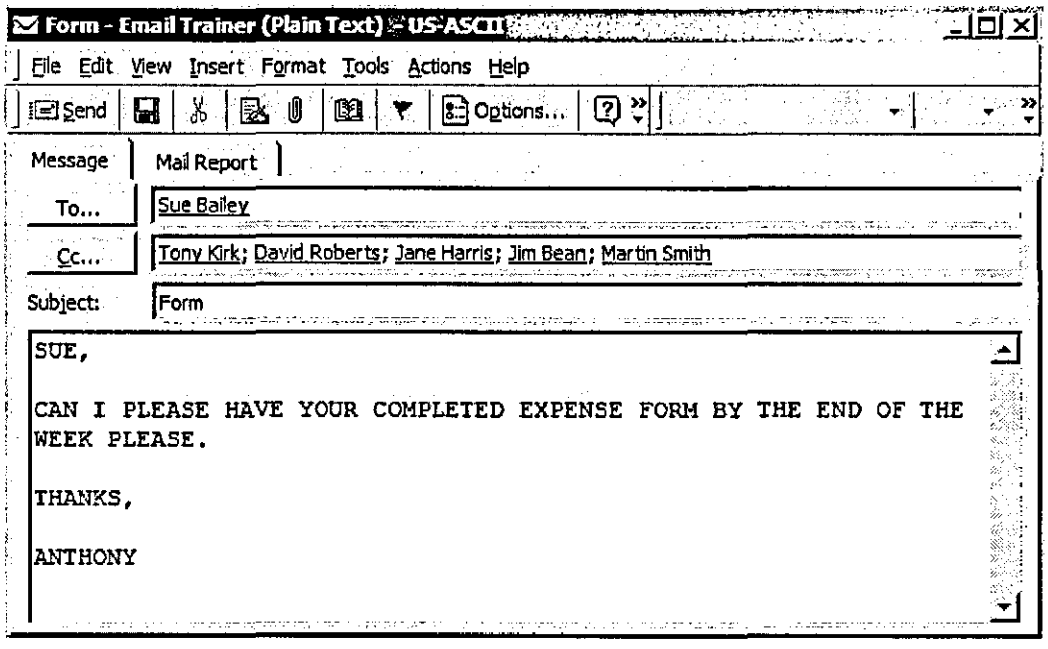


Figure 5.3 Poorly written email with mail report tab

Once the user has returned to their original email message they can review the defects reported in the mail report by clicking the 'Mail Report' tab, which is directly situated below the toolbar. The user can switch between the email and the 'mail report' until they are satisfied with the changes they might like to make, and they are ready to resend the email. If their revised email still contains defects they will be presented with another 'Mail Report' screen as depicted in Figure 5.2, and will again have the choice to either edit or send the email as it is.

5.2.4 Software Architecture

Due to time constraints imposed on the author, the first version of the real time email trainer software has limited functionality, but has enabled a workable version to be ready. A third party developed the software using the specifications provided by the author. The software was developed using Visual Basic as this would enable the developer to build the software faster than if another more complex programming language such as C++ was used.

The software was designed to work with Microsoft Outlook 2000, 2002 and 2003 because Outlook is the defacto standard and is used in the majority of organisations the author has studied. The development time would also be reduced if the software only needed to be compatible with Outlook and not other email applications. The software code was compiled to produce a '.dll' file that would be integrated into Outlook as a 'Com Addin'.

A new form was also produced which needed to be published within the forms folder in Outlook. This form replaces the existing form that a user would see when they click to create a new message. A new form was required to accommodate the additional 'Message' and 'Mail Report' tabs created, and the new 'Edit' and 'Send anyway' buttons that appear in the mail report window.

Installation of the software requires a file to be added to the registry to store the values for the parameters associated with the parsing criteria. Editing this file and reapplying it to the registry could then alter the values for parameters . Once the software was installed it was important that a copy of this registry patch was not left in the root directory of a user's hard drive or they may find it and edit the parameters undermining the purpose of the software. For this reason, the parameters that determine the sensitivity of the parsing criteria were stored in the registry. The parameters can only be modified by reapplying an edited version of this registry file or by editing the registry itself.

5.2.5 Software Testing

The software was revised several times during the development process and was continuously tested on a group of six computers within the university, by the author and the developer. The software was tested using the three different versions of Outlook on computers running both Windows 2000/XP to ensure compatibility within the three participating organisations. It was also important to ensure that emails sent using the software could be received and read without any problems, regardless of which email application the recipient was using. There were initial problems viewing attachments on machines that were not running Outlook, where attachments appeared as 'winmail.dat' files. This was overcome by changing the format in which emails are sent from HTML to 'plain text' format. Users of Outlook 2003 also had to ensure the default message format was set to 'plain text only' for every contact in their address book. The completed first version of the software still had a few limitations and issues that were explained to the user during installation.

5.3 Conclusions

This chapter has discussed the development of a computer based email training application that acts as a reminder to the user about ineffective email use by parsing each email and highlighting the defects. The software can identify certain defects

within the recipient field, the subject line, message body and with attachments, providing the user with the opportunity to change the email before it is sent.

The development of this software will enable the third research objective to be pursued, to determine the effectiveness of a combined SBT and CBT training approach at improving email use within the workplace. This objective is addressed in the following chapter that examines the effectiveness of both a combined SBT / CBT and single SBT approach to improving email use within the workplace.

Chapter 6 Reducing Email Defects within the Workplace

Chapter Preface

This chapter discusses the development of a training programme aimed at improving email use, through the deployment of seminar based training (SBT) and computer based training (CBT). The chapter begins by exploring alternative approaches to reducing email defects, before focusing on the development of the training programme. The main results from the SBT are then discussed and show the effectiveness of this training approach at reducing email defects. This chapter then discusses the effectiveness of the combined SBT / CBT approach to improving employee email use, compared to just SBT. This chapter has resulted in the publication of the paper 'Email Training Significantly Reduces Email Defects' in the International Journal of Information Management, and the paper 'The Effectiveness of Training in Reducing Email Defects', presented at the 2004 SQM conference.

6.1 Introduction

The questionnaire results discussed in Chapter Four identified problem areas or defects with email communication within the four organisations. These defects relate to the volume and poor written quality of email, as well as the ineffective setup of an organisation's email system. To make email communication more effective these defects need to be minimised to reduce the amount of time employees spend dealing with email. Reducing the quantity of unnecessary and irrelevant emails received can save employees time, as less time would be spent reading and processing non-value emails. Improvements in the clarity and conciseness of email messages can also reduce the time needed to process email messages. Email messages that have clear concise messages are also less likely to be misinterpreted, enabling actions to be carried out without delay. Reducing these email defects within organisations could

result in savings in terms of staff time, which can then be converted into cost savings for each organisation.

6.2 Tackling Ineffective Email use

Section 2.4 of the literature review highlights a number of approaches that organisations can to try and reduce email defects. Each approach tackles the issue in a different way, with some dealing with reducing specific defects on the sender side, while others deal with reducing the burden of email on the recipient.

As mentioned in Chapter One (section 1.1), several organisations such as Nestle SA and Liverpool city council have introduced email free days to reduce email use and encourage staff to use other forms of communication (Thomas, 2003). John Caudwell, chief executive of communications company Phones 4U has banned the internal use of email, a move which he says will save his employees up to three hours a day, which translates into a saving of £1 million a month (Wray, 2003). While this approach may get the message across to employees to talk more and email less, it would be impractical to introduce such schemes into large organisations that rely heavily on email for both internal and external communication because of the potential disruption it could cause.

The volume of email generated within an organisation could be reduced if employees are charged for the amount of email they send. Davenport (1997) suggests that a variety of economic factors such as patterns of information pricing and available subsidies can greatly influence how often and how well people communicate. If internal email use is free, but the use of voicemail is charged to an employee's budget then it is likely that employees will use email more than the phone. One way to reduce email overload would be charge individuals for the amount of information they send and the number of people to whom they send it (Davenport, 1997).

Section 4.5.1.1 of Chapter Four showed that employees are copied in unnecessarily on email due to overuse of the 'Reply-to-all' function. After removing the 'Reply-to-all'

function from the email template in Lotus Notes, 3M noticed a 13% decrease in the number of messages generated within the UK region after a 14 week period. While this approach may have reduced the volume of email generated within 3M, it did not tackle any other defects identified in Chapter Four.

There are a number of software packages that help employees to manage the growth in email messages as discussed in section 2.4.1 of the literature review. While these software packages do not directly reduce email defects, they do help employees to overcome some of the problems that result from the defects. This software is designed to make it easier for recipients to manage, file and prioritise their emails.

Traditional SBT could also be used to try and reduce some of the defects associated with email use. This would involve teaching employees about the many problems of email use within the workplace and encouraging them to use email more effectively. Email training within organisations tends to focus on the software side, such as how to send and receive messages. Employees are rarely trained on the social skills of email communication, such as when it is appropriate to send email and how to make it easy for the recipient to understand and act upon your message (Hallewell, 2000).

The introduction of an email free day or the use of an email quota system was not favoured by the author or the participating organisations because of the potential negative disruption and because these approaches appeared to be more of a 'work around' rather than tackling the underlying problem of bad communicators. The deployment of an email training programme was the chosen approach by the author to aid in reducing email defects, as this is thought to be less disruptive to implement and has a wider scope to cover more email defects than other approaches.

6.3 Developing the Email Training Programme

The training programme would use both SBT and CBT approaches to tackle the identified email defects. The training programme would target identified defects that individual employees can help reduce, by improving the way they use email.

Employees would also be given training on how to manage their inbox, including the use of folders and filters. Defects that related to the configuration of an organisations email system would also be brought to the attention of management in a report covering the questionnaire results.

The content for the SBT was derived partly from some of the problems of email highlighted within the literature review (Chapter Two) and mainly from the problems identified within each organisation as shown in Chapter Four. Whittaker and Sidner, (1996) suggested that employees find it difficult to file email into folders and Yui et al (1997) argued that the filing and maintenance of email is very time consuming and cognitively intense. It was therefore important that the SBT informed users how to effectively manage their inbox through the use of folders and message rules.

The main section of the training focused on areas of email use that individual employees could improve. This included asking employees to consider whether it is necessary to send an email, or if it would be more appropriate to use another medium, such as the telephone. Section 4.5.1.2 of Chapter Four showed that over half the respondents from 3M, LogicaCMG and PD felt that email was used too much in place of other forms of communication within their organisation. Employees commented that this can delay urgent actions being carried and that voice communication should be used for urgent messages. The employees were also asked to consider whom they were sending their email message to, and whether all recipients needed to be copied in on a message. The results in section 4.5.1.1 of Chapter Four showed that a significant proportion of the email received within the four organisations was irrelevant or untargeted. This was found to be partly due to inappropriate use of the carbon copy and reply to all functions. The participants were given training on how to write effective subject lines and emails that contain clear concise messages. It was important that the training covered these areas as they were identified as problem areas from the questionnaire results (Shown in section 4.5.2 of Chapter Four).

The content of the SBT was tailored to match the specific problems identified within each organisation. The main part of the training programme was similar throughout the four organisations, although more emphasis was placed on the specific problems

within each organisation. The SBT for LogicaCMG and PD had a greater focus on aiding users manage their inbox, than at 3M or Danwood. This was because employees at LogicaCMG and PD received, on average, more emails per day than employees at 3M or Danwood and commented more on how it can be difficult to manage their inbox. The first section of the SBT highlighted the problems found within each organisation from the questionnaire, which placed the content of the training session into context. This differed between organisations, as some had more identified problems than others. LogicaCMG employees were more critical of email use within their organisation than employees from Danwood, and therefore had more problems with email that were discussed at the start of the training.

When developing both the SBT and CBT it was important to consider a number of the issues identified in section 2.5 of the literature review. It was vital that the SBT sessions were interactive and encourage active participation as increases the likelihood that what is taught will be retained and later applied (Read and Kleiner, 1996). This was taken into account by asking employees to share their experiences of email use and highlight the problems within a set of mock emails.

Although a number of authors (Shelbourne, 2002, Boheln and Ferratt, 1993) argue that the method of training should be determined by the learning style of the trainees, the author was unable to determine this as the participants were not known or met until the start of the training session. This was unlikely to affect the results, since all participants were known to be computer literate and moderate users of email.

The slides used in the SBT for 3M and Professional Development (PD) can be seen in Appendices VII and VIII respectively. The SBT summarised the common problems with email use that can exist within the workplace. The 3M training focused on the problems highlighted from the questionnaire results, whereas within the PD training, the common problems of email use were highlighted using examples from research by others. It was important to show the common problems with email communication to enable participants to understand the magnitude of some of the issues.

For research purposes it was important that improvements resulting from the training programme are measured. Information about the volume of email traffic within the organisations would have been obtainable from the servers, but this would not give the full picture of how email is used. Data relating to the email traffic would only provide clues about email defects that contribute to the volume of email generated, not about the other defects. It would also be difficult to directly attribute any change in the volume of email to the impact of the training. The most appropriate way to capture any improvement in email communication was for employees to evaluate the emails they received from their colleagues.

The email training required sender and recipient pairs to be identified that would participate in the programme. The senders would have an established email communication relationship with their recipient(s), in that they make regular contact with each other via email. An outline of the various stages of the training programme is shown in Figure 6.1.

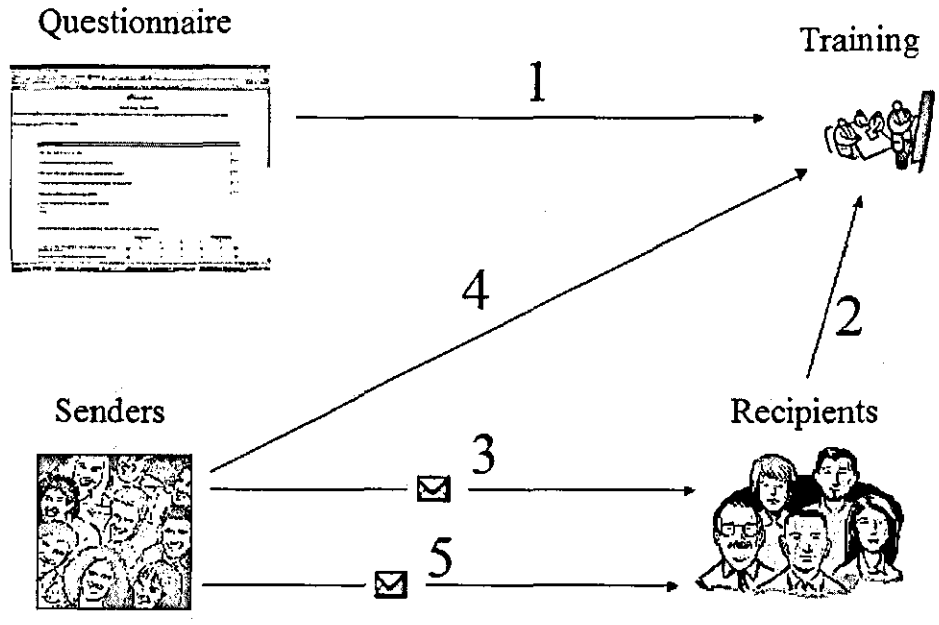


Figure 6.1 The stages of the email training programme.

The content of the training was derived from the results of the questionnaire, which showed the problem areas within each organisation (1). Once the sender / recipient

pairs were established, the recipients would receive training (2), as illustrated in Figure 6.1. The third phase of the programme involved the recipients evaluating up to 20 emails they receive from their paired sender(s) over a specified timeframe (3). After the senders email had been evaluated, the senders would then receive training on the best practices of email (4). Once the senders had received training the recipients were asked to evaluate up to a further 20 emails they received from their paired sender over a specified timeframe (5).

The senders participated knowing that some of their email would be marked, although they were not told who their paired recipient(s) was. The difference in the scores before and after the sender received training would indicate the success of the training. The recipients would be asked to date and evaluate the emails they received after the senders had their training. This would enable the author to determine if any improvement could be sustained, or if the effect of the training would tail off. Individuals could not participate as both a sender and a recipient as this would invalidate the results for the first evaluation phase, as they would know what criteria they were being marked against before the senders had received training.

In order to determine the effectiveness of both SBT and CBT, one group of senders from the PD organisation would receive only SBT and another would receive both SBT and CBT. The CBT involved users having a piece of software installed on their desktop that would act as a 'real-time email trainer', highlighting potential deficiencies within email messages before they are sent. The software used for the CBT is detailed in Chapter Five.

6.3.1 Evaluation Criteria

The criteria by which the recipients would evaluate their sender's email were derived from the email defects identified in Chapter Four. These criteria related to defects that could be identified within a single email, because employees were evaluating individual emails, not collectively as in the questionnaire. The SBT would also cover other email defects and aspects of email best practice such as reducing the interruptive

nature of email. However, the effect of this part of the training would not be measured because its impact could not be determined from evaluating individual emails. The defects that would be measured only related to those that could be identified from email messages the recipients received from their senders.

The recipients would be asked to mark each email against a set of nine criterions, giving a score from 1 to 5, for each of the first eight criterions, depending on how well the email met that particular criterion. A score of 1 would be used to indicate that the email fully meets the criterion and a score of 5 that it completely fails to satisfy the criterion. The ninth criterion was measured in seconds. A section of the criteria sheet can be seen in Figure 6.2.

	Example	Email 1	Email 2	Email 3	...
The suitability of email as the communication medium	3				...
The email is easy to read	2				...
The email is straight to the point	3				...
The relevance of the message to me	2				...
If it is an actionable email:					
it tells me what is expected of me	4				...
it states when action is required	5				...
The subject line contains sufficient detail for:					
me to assess the importance of the message	2				...
me to understand what the message is about	1				...
Approx how long did it take you to read and understand the message?	90 secs				...

Figure 6.2. Evaluation criteria used by Recipients

A copy of the full criteria sheet can be seen in Appendix IX An additional sheet explaining the scale that would be used to mark each of the criteria was also given to the recipients (as shown in Appendix IX).

The first criterion asked the recipient to evaluate whether email was the most suitable medium for each email message received from their paired sender. The questionnaire results revealed many employees were concerned about the over reliance on email in

place of other forms of communication. This criterion was included to determine if the senders would pay more attention to which communication media is most suitable for a particular message following the SBT.

The results in Chapter Four also highlighted deficiencies in the written quality of the email received by employees within all four organisations. The effect of SBT on improving the quality of email would be captured by asking the recipients to evaluate whether their sender's email was easy to read, to the point, and if it specified any action or any deadline. The recipients would also be asked to evaluate their senders' use of the subject line, in terms of how well it conveyed the subject of the message as well as the importance of the message itself. It was important that the SBT covered effective use of the subject line because it was an identified email defect (section 4.5.2.2 of Chapter Four) as a poorly written subject line can make it difficult to file and prioritise email messages.

The results from Chapter Four showed that many employees felt they received unnecessary emails. The effect of the SBT on enabling the senders to better target their email would be captured by asking recipients to evaluate the relevance of the message to them. Recipients would also be asked to indicate how long each email had taken to read and understand. This would show if the senders were writing more concise emails as a result of the training.

6.4 Administering the Training Programme

It was intended that the training programme would be rolled out within the four organisations that completed the questionnaire. There would be some variation in how the training programme would be administered within the four organisations due to the availability of individuals, the type of email application used and constraints imposed by management.

6.4.1 The 3M Organisation

The senders selected for the SBT within 3M were high volume email users (identified through Lotus Notes billing data provided by the organisation) and the recipients were in regular contact with these senders via email. There were 11 senders that participated from 3M, each having between one and three recipients evaluating their email, making a total of 20 pairs. The pairs were identified and setup by a coordinator within 3M, as the author did not have access to the 3M information sources, such as individual contact details or information of who were high volume email users. High volume senders were selected to increase the likelihood that 20 emails would be received by the recipients in each phase of the programme within the specified timeframe imposed by 3M's management.

At 3M both the sender and recipient training sessions were run by the employees from the 3M's e-productivity department, with the author providing the material used for each session. In order to accommodate all participants, each training session was run on two separate days at 3M's headquarters in Bracknell. Each session was scheduled for one hour, which included the presentation and time for discussion. Once the sender and recipient pairs were established, the recipients were ready to receive the SBT. The recipients were given a presentation that highlighted the problems of email communication within the organisation and were given guidance as to how to complete the criteria sheet. Several example emails were shown to the recipients to highlight some of the defects and to illustrate how to complete the evaluation sheet.

The recipients were then asked to evaluate up to 20 emails they received from their paired sender over the period of a week. At the end of the week or once 20 emails had been evaluated, the evaluation sheet was returned to the coordinator at 3M before being returned to the author. Once the first phase of the training had been completed the senders would then receive email training.

The sender training went into more detail to explain the email defects and was more interactive than the recipient training. The senders were shown a variety of emails and were asked to pick out the defects, whereas the recipients were simply told what the

defects are. The senders were given training on how to better manage their email. They were told about the use of folders and archiving. The training for the senders was more comprehensive than that of the recipients because it was the senders that were being marked, whereas the recipients just needed to be aware of the email defects and be able to complete the evaluation sheet. The senders were shown a copy of the evaluation sheet so they knew how they would be marked, although they were not told which of their recipients would be doing so. Once the senders had received the email training, their paired recipients were asked to mark a further 20 emails they received from the senders. This was also done over a period of a week, after which the evaluation sheets were collected and returned to the author.

The time constraints imposed by 3M limited each evaluation phase to one week, meaning only the short-term effect of SBT would be captured within this organisation. The author was unable to ask the recipients to evaluate the email received from their paired sender for a longer period of time due to constraints imposed by 3M's management. The author was therefore unable to determine the longer-term effect of SBT on improving email use within 3M.

The effectiveness of CBT at improving email use was not tested at 3M because of the CBT software was incompatible with their email system (Lotus Notes). The CBT software was designed to run as an add-in to Microsoft Outlook. Outlook was chosen as it has the market share of the email application market, and thus it was more likely it would be used within the majority of organisations (which was the case for the three other organisations studied within this research).

6.4.2 LogicaCMG

The employees that participated in the training programme at LogicaCMG were coordinated by the author's main contact within the organisation, who was a project manager. Initially, 10 senders agreed to take part, each having between one and three recipients evaluating their email, which provided a total of 24 pairs. Employees were

asked to participate on the basis that they had regular email contact with their nominated pair.

The author ran the recipient training session, which was conducted at LogicaCMG's Bristol office. The training session was customised for LogicaCMG, incorporating some of the questionnaire results and focusing on some of the email defects that were specific to LogicaCMG. The email training programme was not enforced by upper management at LogicaCMG, and was only run as a local initiative coordinated by the author's contact which made it difficult for him to convince people to participate and attend the SBT. Unfortunately only four out of the eight participants attended the recipient training. This was also partly due to low moral among LogicaCMG staff, following a recent unfavourable meeting about their working conditions and the possibility of redundancies. Eleven evaluation sheets were returned to the author at the end of the first evaluation phase. The low morale amongst staff, combined with staff being away on holiday, made it difficult to schedule a date for the sender training. Only two of the initial senders confirmed they would be available to attend the training, and as a result the sender training was cancelled, and the full SBT and CBT training programme was never completed at LogicaCMG.

6.4.3 The Danwood Group

The training session for the Danwood Group employees took place at their head office in Lincoln, and was conducted by the author and Dr Jackson. The SBT was concatenated onto an existing training programme about improving writing styles, run by Danwood's training department. The two training sessions were combined because of the similar nature of the material and it was thought to be less disruptive for employees.

Although the Danwood programme would provide a pool of potential participants for the email training programme, the sender / recipient pairs had to be coordinated by the author, unlike at 3M or LogicaCMG where this was done by an internal contact. Four of these combined training sessions were scheduled with the first two for recipients

and the second two for the senders. In order to recruit participants for the training programme an email was circulated to Danwood employees advertising the course and its benefits. This email was written by the author and sent to the Training Manager at Danwood, who then circulated it to the employees. Unknowingly to the author, this email contained a typing error which was not discovered until it had been circulated to the employees at Danwood. Within the email, the author had mis-spelt the word 'colleagues' as 'colleges', an error that was not identified by the spell check. This email caused embarrassment for the Training Manager, since the email was advertising a course on improving writing styles, yet it contained a grammatical error. This did not benefit the author's relationship with the Danwood and did not help with the administration of the email training programme.

The duration of the first training session was in excess of two and a half hours, as a result of combining the Danwood training with the email training programme. Participants had already received two hours of training before the email training commenced, which may have affected their level of concentration during the delivery of the email training material. The material used in the email training was similar to that used at 3M and LogicaCMG. During the email training the participants were asked if they wished to take part in evaluating some of the emails they received from their peers. Participants wrote down the names and email addresses of some of their colleagues, whom they thought would benefit from email training. The nominated individuals would then be invited to take part in the training programme, attending either the third or fourth training session. This approach to identifying sender / recipient pairs assumed that the nominated senders would be willing to participate. The coordinator of the Danwood training was dissatisfied with the approach taken by the author to identify the pairs because she felt it disrupted the training session and was of little benefit for participants. It became clear that the Danwood Group coordinator never really fully understood the email training programme and the significance of the sender / recipient pairs, even though it was explained to her on several occasions.

The sender / recipient pairs were never established and the effects of the SBT / CBT on reducing email defects within Danwood was not determined. This was partly due

to the insufficient number of participants and the lack of support from management in establishing the pairs. While Danwood management were positive towards the email training programme and the potential benefits it would bring, they were not concerned with measuring the effectiveness of the programme, or supporting the author in the data collection process.

6.4.4 Loughborough University – PD

Within PD there were six senders that volunteered to have their emails evaluated for the email training programme. Three would receive only SBT and three would receive both SBT and CBT. The senders were asked to nominate 12 individuals within the university (with whom they have regular email contact), to act as recipients within the training programme (6 within PD and 6 outside of PD, but still within the university). All nominees were contacted and those that accepted became the recipients. A website was created for the participants that provided more information about the email training programme and explained what would be expected of them.

There were 16 sender / recipient pairs that participated in the email training. One of the initial senders was unable to participate, leaving five senders, each having between two and four recipients evaluating their email. It was hoped that a greater number of pairs could have been established, but only a small number of the nominated recipients agreed to participate in the training programme.

The training sessions were run by Dr Jackson and held within the Computer Science Department. The recipient training was run on three occasions due to the limited availability of the recipients. The material covered in the training sessions was similar to that used within the other participating organisations. After the recipient training, the recipients started to evaluate the emails they received from their paired sender(s) for up to two weeks. The recipients could also evaluate historic email they had received from their sender(s), to increase the number of emails evaluated. After the first evaluation phase, the completed forms were returned directly to the author. The results of the first evaluation phase were used to determine which of the senders

would receive CBT in addition to SBT. The results were used to identify senders that had similar scoring patterns, so one would receive SBT and the other similar scoring sender to receive both CBT and SBT. Two senders were chosen to receive CBT in addition to the SBT, with the remaining three senders receiving solely SBT. This made a total of six pairs for the combined CBT / SBT and ten pairs for just the SBT. Ideally an equal number of pairs would have been chosen for the two training approaches, although this was not possible due to the odd number of senders and the lack of nominated recipients that agreed to participate. The CBT was conducted by the author, individually with each participating sender, immediately after the SBT. The CBT involved the senders having a piece of software installed onto their computer that would highlight potential deficiencies with the senders email before the message is sent. The author installed the software and briefed the senders on its use. The development and details of the software are discussed in Chapter Five.

After the senders had received the relevant training, the recipients were contacted and asked to recommence evaluating emails received from their paired sender(s) for the period of a month. The recipients were asked to date each email they evaluated, to determine if the effects of the training would diminish over the period of a month. At the end of the second evaluation phase the recipients returned the completed evaluation forms directly to the author.

6.5 The Effectiveness of SBT

The constraints imposed on the training programme as mentioned in section 6.4 meant that the SBT was only successfully administered within 3M and PD. Constraints imposed on the duration of the evaluation phases within 3M meant it was not possible to determine the longer term impact of the SBT within 3M. The different timescales and the different number of sender/ recipient pairs used within 3M and PD also made it difficult to draw direct comparisons on the effect of the SBT within these two organisations. In order to determine the effectiveness of the SBT in reducing email defects, the scores both before and after training were averaged for each sender / recipient pair. The average for all participating pairs was calculated to determine the

overall effect of the training for each of the criterion for both 3M and PD. The t-test statistic was used to determine the significance of the SBT at reducing each of the defects represented by each criterion. The data met the preconditions of the paired t-test in that the before and after scores were related and the scores were normally distributed. The results indicate which aspects of email use are most receptive to SBT. The effectiveness of a combined SBT and CBT approach to reducing email defects is discussed in later on in this chapter in section 6.7.

6.5.1 The Impact of SBT within 3M

The overall average scores from the 20 sender / recipient pairs from 3M, both before and after training can be seen in Table 6.1.

Criterion	Before Training	After Training	Difference
The suitability of email as the communication medium	1.49	1.40	-0.10
The email is easy to read	1.63	1.39	-0.24
The email is straight to the point	1.58	1.36	-0.22
The relevance of the message to me	1.69	1.50	-0.19
If it is an actionable email:			
It tells me what is expected of me	1.80	1.73	-0.13
It states when action is required	2.61	2.12	-0.48
The subject line contains sufficient detail for:			
Me to assess the importance of the message	2.89	2.19	-0.70
Me to understand what the message is about	2.17	1.49	-0.65
Approx how long did it take to read and understand this message? (Seconds)	76.21	65.67	-10.54

Table 6.1 The overall mean effect of SBT on how emails were evaluated within 3M

The values in Table 6.1 show that the SBT has been successful at improving the senders' use of email across all of the evaluation criterion by the lower average scores after the SBT. The largest overall improvement has been in the senders' ability to write more effective subject lines that inform the recipient of the content of the message and enable the recipient to gauge its importance. Table 6.1 also shows an overall improvement in the written quality of email as a result of the SBT. The senders from 3M were able to write emails that are easier to read, more concise and take less time to read and understand than they did before the SBT.

To determine the significance of the effect of SBT, the t-test statistic was calculated for each of the criterion that the emails were marked against, using the before and after values of the 20 sender and recipient pairs. The t-test statistic for each of the criterion can be seen in Table 6.2, the values are based on a paired two-tailed t-test.

Criterion	Significance from (2 tailed) t test
The suitability of email as the communication medium	0.438
The email is easy to read	0.022
The email is straight to the point	0.023
The relevance of the message to me	0.138
If it is an actionable email:	
It tells me what is expected of me	0.623
It states when action is required	0.320
The subject line contains sufficient detail for:	
Me to assess the importance of the email	0.003
Me to know what the message is about	0.005
Approx how long did it take to read and understand this message?	0.285

Table 6.2 t-test statistic comparing the difference between before and after training at 3M for each criterion

The t-test values in Table 6.2 show that the training has been significantly successful at the 95% level at improving an employee's ability to write emails that are easy to read and that are straight to the point. The results also show that the training has been significant at the 99% level at improving the way that an employee uses the subject line to convey information about the content and the urgency of an email.

The results on lines two and three of Table 6.2 of the criterion show the SBT had a significant impact on improving the senders' ability to write clearer emails that are straight to the point. This is important because emails that are more direct take less time to read and understand. Emails that are easy to read are less likely to be misinterpreted, so there is less chance of incorrect actions being carried out.

The SBT has had a highly significant impact on improving the senders' ability to make better use of the subject line. As a result of the training the senders are writing subject lines that better enable the recipient to know what the message is about and to judge the importance of the message. If a message has an informative subject line

then it is easier for the recipient to process the email. This is important for employees that receive large numbers of email and find it difficult to process their inboxes.

6.5.2 Training Impact for PD

The impact of the SBT within PD was calculated over two separate intervals, to determine if the effect of the training would be sustained for the period of a month. The initial impact of the training was calculated using emails that had been evaluated during the first two weeks of the second evaluation phase (the first two weeks after sender training). Emails that were evaluated during weeks three and four of the second evaluation phase would be used to determine if any effect of the SBT had been sustained.

6.5.2.1 Initial Impact of the Training

There were ten sender / recipient pairs that participated in the SBT, although the data from one pair had to be discarded from the analysis, as the recipient did not receive any emails from their paired sender during the second evaluation phase. The overall average scores for the remaining nine sender / recipient pairs from PD both before and up to two weeks after the SBT is shown in Table 6.3.

Criterion	Before Training	After Training Weeks 1&2	Diff	Significance from (2 tailed) t test
The suitability of email as the communication medium	1.55	1.12	-0.43	0.050
The email is easy to read	1.56	1.21	-0.35	0.076
The email is straight to the point	1.59	1.17	-0.42	0.046
The relevance of the message to me	1.60	1.44	-0.16	0.562
If it is an actionable email:				
It tells me what is expected of me	1.83	1.43	-0.41	0.134
It states when action is required	2.36	2.19	-0.18	0.679
The subject line contains sufficient detail for:				
Me to assess the importance of the message	2.26	1.88	-0.38	0.057
Me to understand what the message is about	2.08	1.63	-0.45	0.040
Approx how long did it take to read and understand this message? (Seconds)	49.92	45.88	-4.04	0.609

Table 6.3 The overall mean effect of SBT on how emails were evaluated within PD in weeks one and two after training

The values in Table 6.3 show that the SBT has lead to an average overall improvement in how email is used by the senders within PD up to two weeks after the training.

The t values in Table 6.3 show there has been significant improvements (at the 95% level) in the sender's ability to write concise messages that are straight to the point and in the sender's ability to write more effective subject lines that enable the recipient to understand what the message is about. This is shown by the t values ($t<0.05$) in Table 6.3.

Table 6.3 also shows that four criterions had improvements that are significant at the 90% level. This is shown by a t value of ($t<0.1$). The SBT has lead to significant improvements (at the 90% level) in the senders' ability to choose the most appropriate communication medium, write emails that are easy to read, and contain a subject line that enables the recipient to assess the importance of the message.

6.5.2.2 Longer Term Effect of the Training

The overall average scores for the nine sender / recipient pairs from PD, both before and in weeks three and four after the SBT can be seen in Table 6.4. The values in the second column represent emails that were evaluated during the third and fourth weeks of the second evaluation phase.

Criterion	Before Training	After Training Weeks 3&4	Diff	Significance from (2 tailed) t test
The suitability of email as the communication medium	1.55	1.18	-0.38	0.057
The email is easy to read	1.56	1.46	-0.10	0.696
The email is straight to the point	1.59	1.29	-0.30	0.184
The relevance of the message to me	1.60	1.71	+0.11	0.741
If it is an actionable email:				
It tells me what is expected of me	1.83	1.65	-0.19	0.341
It states when action is required	2.36	1.87	-0.49	0.221
The subject line contains sufficient detail for:				
Me to assess the importance of the message	2.26	1.70	-0.56	0.006
Me to understand what the message is about	2.08	1.65	-0.43	0.073
Approx how long did it take to read and understand this message? (Seconds)	49.92	47.78	-2.14	0.491

Table 6.4 The overall mean effect of SBT on how emails were evaluated within PD in weeks three and four after training

Table 6.4 shows that the SBT has lead to an average overall improvement across eight of the nine evaluation criterions, when measured three and four weeks after the training. The only criterion not to show an overall improvement when measured over this period was that relating to the relevancy of the email to the recipient.

The t values in Table 6.4 show that the only highly significant improvement (at the 99% level) in weeks three and four after the SBT has been in the senders ability to write subject lines that enable the recipient to gauge the importance of the message. Other significant improvements (at the 90% level) in weeks three and four after the SBT are in the senders ability to choose the most appropriate communication medium and the senders ability to write subject lines that enable the recipient to know what the message is about.

6.5.2.3 The Sustainability of SBT – Week 1 & 2 Compared with 3 & 4

Comparing the values in Tables 6.3 and 6.4 shows whether the initial impact of the SBT has been sustained or has tailed off for each criterion over the period of four weeks.

Tables 6.3 and 6.4 show that the SBT has lead to an average overall improvement in the senders' ability to choose the most suitable communication medium over the four week evaluation period. During weeks one and two after the SBT for this criterion showed an improvement of 0.43. During the third and fourth weeks of the second evaluation phase this improvement had reduced to 0.38, indicating that the impact of the SBT has slightly faded over the four week period. This is also reflected in the larger t value in Table 6.4, indicating the improvement is less significant after three to four weeks, when compared to up to two weeks after the SBT.

The impact in weeks one and two after the SBT on the senders' ability to write easy to read emails and emails that are straight to the point has also reduced during the third and fourth weeks of the second evaluation phase. The initial improvements of 0.35 and 0.42 for these criterions were reduced to 0.1 and 0.3 respectively during the final two weeks of the evaluation phase. The reduction in the initial impact of the SBT is also reflected in the t values in Table 6.4, which shows the effect of the SBT on improving these criterions is no longer of significant value in weeks three and four after the training.

Table 6.3 shows the SBT lead to an overall improvement in the senders' ability to effectively target their email in weeks one and two. This initial improvement was not sustained during weeks three and four of the second evaluation phase. In real terms the senders' were worse than before they had SBT at targeting their email, as shown in Table 6.4.

The senders are able to write more effective actionable emails as a result of the SBT. The emails they send after three and four weeks better inform the recipient of what action is required of them and by when. This is shown by the lower average scores for these criterions after the SBT in both Tables 6.3 and 6.4. After the initial two weeks the improvement in the senders' ability to state what action is required of their recipients has been reduced during weeks three and four weeks after the SBT, however there has been a further improvement in the senders' ability to specify deadlines by which actions should be completed. This suggests that while the senders ability to specify clear required actions may decrease up to three to four weeks after

receiving SBT, the senders ability to specify deadlines is more likely to be sustained longer term after receiving training.

After receiving SBT the results show that the senders were able to write more effective subject lines that better inform the recipient of the content and importance of a message. After the initial improvement in weeks one and two in the senders' ability to write informative subject lines, the results show that their ability has become less significant over weeks three and four, as shown by the larger t value in Table 6.4. The senders' ability to convey the importance of an email has shown greater improvement over weeks three and four of the evaluation phase, than that during the first two weeks. This suggests that while the senders' ability to write informative subject lines may become less significant after three to four weeks after receiving SBT, their ability to convey the importance of the message has been sustained over the same period.

Table 6.3 shows that after the SBT, the senders' were writing emails that take the recipient less time to read and understand. After weeks one and two showed that the SBT reduced the average time taken to read and understand each message was approximately four seconds, weeks three and four showed an increase in the time to read email. Three to four weeks after the SBT it takes just over two seconds longer to read email, reflecting the fading effect of the SBT on this particular criterion.

6.6 Relationships Between Evaluation Criterions

As part of this research it was important to assess the strength of the relationships between the different criteria. Through understanding the relationships it is then possible to give further meaning to the impact of the email training. The relationships were calculated using Pearson's correlation coefficient (r) to determine if there was any significance in the relationships between how the recipients marked the emails against one criterion compared to another criterion. This analysis does not show if there has been any improvement in any of the criteria, it only shows if there is a relationship between how two of the criteria were marked. A significant correlation would show that one criterion is marked in the same way as another, but it will not

show if the training has lead to an improvement or not. This information would aid organisations wishing to improve email effectiveness because it identifies how an improvement in one area is likely to lead to an improvement in another.

6.6.1 Relationships Between Email Defects within 3M

It was found that there was positive correlation at the 95% level for the relationships, shown in Table 6.5, both before and after the senders had received SBT. Highly significant relationships at the 99% confidence level are identified with a star. These values were based on a 2 tailed Pearson's correlation coefficient with 18 degrees of freedom.

Significant Relationships Between Criteria	Before Training (r)	After Training (r)
The suitability of email as the communication medium AND the email is easy to read	0.646*	0.533
The suitability of email as the communication medium AND the email is straight to the point	0.72*	0.61*
The email is easy to read AND the email is straight to the point	0.788*	0.7*
The email is straight to the point AND the email is relevant to me	0.579*	0.664*
If it is an actionable email it tells me what is expected AND by when action is required	0.473	0.504
The subject line contains enough information for me to be able to assess the importance of the message AND for me to know what the message is about	0.815*	0.492

Table 6.5 Significant relationships between criteria before and after SBT for 3M (18 degrees of freedom)

* significant at 99% level

The results in Table 6.5 show that there is a relationship between whether an email is easy to read, whether it is to the point and whether email was the most appropriate medium to use. It can be said with 99% confidence that there is a correlation between an email being easy to read and being to the point. The data shows that messages that would have been better suited to another form of communication are likely to be difficult to read and not to the point. An email that is easy to read is likely to be straight to the point; similarly an email that is difficult to read is likely not to be to the point. There was also a significant relationship between whether an email is straight to the point and whether it is relevant to the recipient. Messages that are relevant to the

recipient are likely to be straight to the point, whereas verbose emails are likely to be irrelevant to the recipient.

The criteria that are associated with actionable emails are related. If an actionable email states what action is required then is likely that the email will also state by when the action is required. Although the training did not show a significant improvement in this area, it is still useful to employees who write actionable emails to also specify when the action is required by.

Similarly the criterions associated with the use of the subject line are related. If a recipient is able to access the importance of an email from the subject line they are also likely to know what the message is about. Effective use of the subject line is vital for recipients as they can prioritise and manage incoming email.

6.6.2 Relationships Between Email Defects within PD

Analysis of the completed evaluations sheets identified two significant relationships (at the 95% level) between the criterions that were maintained throughout the whole evaluation period, shown in Table 6.6. Highly significant relationships at the 99% confidence level are identified with a star.

Significant Relationships Between Criteria	Before Training (r)	After Training (2 weeks) (r)	After Training (4 weeks) (r)
The email is easy to read AND the email is straight to the point	0.928*	0.925*	0.926*
The subject line contains enough information for me to be able to assess the importance of the message AND for me to know what the message is about	0.986*	0.880	0.735

Table 6.6 Significant relationships between criteria before and after SBT for PD (7 degrees of freedom)

* significant at 99% level

The values in Table 6.6 show that there is a highly significant positive correlation between whether an email is easy to read and whether it is to the point. The other significant correlation was between the criterions associated with the use of the

subject line. As with the relationships identified from SBT at 3M, these do not relate to the effectiveness of the SBT, but how an improvement in one area is likely to lead to an improvement in another.

6.7 The Effectiveness of a Combined Computer and Seminar Based Training Approach within PD

Due to constraints imposed by management (as mentioned in section 6.4) the combined CBT / SBT training approach was only administered within PD. This meant the results could not be compared with other three organisations. The number of participating pairs within the combined training programme was less than the number of pairs that participated within the SBT (section 6.5.2), meaning that it was harder to draw direct comparisons between the two training approaches. Ideally an equal number of pairs would have participated in the SBT and the combined SBT/ CBT training, although this was not possible due to a lack of willing participants. The effectiveness of a combined seminar and computer based training approach to reducing email defects was determined in the same way the as the effectiveness of SBT. The CBT was combined with SBT because the author believed that the software on its own would not be able to cover all aspects covered in the SBT. As with the SBT analysis, the average of all participating pairs was calculated to determine the overall effect of the training for each of the criterion and the t-test statistic was used to determine the significance of the training for each criterion. The data met the preconditions of the paired t-test as the before and after scores were related and the evaluation scores were normally distributed.

The impact of the combined training approach was calculated over two separate intervals to determine if the effect of the training would be sustained for the period of a month. The initial impact of the training was calculated using emails that had been evaluated during the first two weeks of the second evaluation phase. Emails that were evaluated during weeks three and four of the second evaluation phase were used to determine if any effect of the training had been sustained.

6.7.1 Initial Impact of the Combined Training Approach After Two Weeks of use

There were six sender / recipient pairs within PD that participated in the CBT, in addition to the SBT. Although the data from one pair had to be discarded from the analysis as the recipient failed to return the evaluation sheet at the end of the second marking phase. The overall average scores for the remaining five sender / recipient pairs from PD, both before and two weeks after the combined CBT / SBT, can be seen in Table 6.7.

Criterion	Before Training	After Training (2 weeks)	Diff	Significance from (2 tailed) t test
The suitability of email as the communication medium	1.34	1.03	-0.31	0.167
The email is easy to read	1.48	1.58	+0.10	0.632
The email is straight to the point	1.30	1.21	-0.09	0.509
The relevance of the message to me	1.48	1.35	-0.12	0.742
If it is an actionable email:				
It tells me what is expected of me	2.05	1.58	-0.46	0.551
It states when action is required	2.40	2.25	-0.15	0.656
The subject line contains sufficient detail for:				
Me to assess the importance of the message	1.79	1.60	-0.19	0.570
Me to understand what the message is about	1.81	1.17	-0.64	0.061
Approx how long did it take to read and understand this message? (Seconds)	43.49	36.90	-6.59	0.522

Table 6.7 The overall mean effect of a combined SBT/ CBT approach on how emails were evaluated within PD 2 weeks after training

The values in Table 6.7 show that the SBT / CBT has lead to an initial average improvement in how email is used by the senders across eight of the nine evaluation criterions, two weeks after the SBT and introduction to CBT. This is shown by the lower overall average scores for these criterions two weeks after the training.

Table 6.7 shows that two weeks after the training the senders have not improved their ability to write emails that are easy to read although emails now take on average 6.59 seconds less time to read and understand.

The only significant improvement (at the 90% level) two weeks after the training is the senders' ability to write subject lines that enable the recipient to understand what

the message is about. The significance of the combined training approach may have been improved if a greater number of pairs had participated in the training programme.

6.7.2 Impact of the CBT After Four Weeks of use

The overall average scores for the five sender / recipient pairs from PD, both before and four weeks after the training, can be seen in Table 6.8. The values in the second column represent emails that were evaluated during the third and fourth weeks of the second evaluation phase.

Criterion	Before Training	After Training (4 weeks)	Diff	Significance from (2 tailed) t test
The suitability of email as the communication medium	1.34	1.05	-0.29	0.157
The email is easy to read	1.48	1.15	-0.33	0.081
The email is straight to the point	1.30	1.10	-0.20	0.101
The relevance of the message to me	1.48	1.35	-0.13	0.525
If it is an actionable email:				
It tells me what is expected of me	2.05	1.00	-1.05	0.034
It states when action is required	2.40	1.30	-1.10	0.028
The subject line contains sufficient detail for:				
Me to assess the importance of the message	1.79	1.93	+0.15	0.660
Me to understand what the message is about	1.81	1.63	-0.18	0.067
Approx how long did it take to read and understand this message? (Seconds)	43.49	27.00	-16.49	0.102

Table 6.8 The overall mean effect of SBT/ CBT on how emails were evaluated within PD 4 weeks after training

Table 6.8 shows the combined training approach has lead to overall improvements in eight of the nine evaluation criteria, four weeks after the training. The only criterion not to show an overall improvement for this period was the senders' ability to write subject lines that enable the recipient to assess the importance of the message.

The t values in Table 6.8 show that the training has lead to significant (at the 90% level) improvements in the senders' ability to write emails that are easy to read and their ability to write subject lines that enable the recipient to know what the message is about. There have also been significant improvements (at the 95% level) in the

senders' ability to write effective actionable emails that both inform the recipient what action is required and when it is required by.

6.7.3 The Sustainability of a Combined Training Approach

The sustainability of the combined seminar and computer based training approach to improving employee email use can be gauged by comparing the values for each criterion in Tables 6.7 and 6.8.

The values in Tables 6.7 and 6.8 show that the combined training approach lead to an overall improvement in the senders' ability to choose the most suitable communication media for a message. The initial improvement of 0.31 on the overall average score was reduced to 0.29 in weeks three and four after the initial SBT training has taken place. This indicates the impact of the training has faded very slightly for this criterion, although an increase from 1.03 to a score of 1.05 on a five point scale, still shows the senders are using email only when it is the most appropriate communication media for the message they are sending.

Table 6.7 shows that the senders were judged to be writing emails that were easier to read before they had received training than two weeks after they received training. Despite this initial dip, there was an overall improvement of 0.33 on the overall average score for this criterion during the third and fourth weeks of the second evaluation phase, which was significant improvement (at the 90% level).

There was further improvement in the conciseness of written emails during the third and fourth weeks of the second evaluation phase, as shown by the lower average score in Table 6.8 than Table 6.7 for this criterion. This shows that the initial impact of the combined training programme on improving the conciseness of written emails has not faded during the final two weeks of the second evaluation phase.

The combined training programme resulted in an initial improvement in the senders' ability to effectively target their email, as shown in Table 6.7. This initial

improvement was sustained throughout the second evaluation phase, as shown in Table 6.8.

The values in Tables 6.7 and 6.8 show there have been further improvements in the written quality of actionable emails, written during weeks three and four of the evaluation phase. These improvements relate to whether an email states what action is required of the recipient and when it is required by. This shows the initial impact of the combined training approach has not faded for these criterions, but further improved.

The values in Table 6.7 show that the combined training programme has lead to a significant improvement (at the 90% level) in the effectiveness of subject lines that enable the recipient to understand what the message is about. While the significance of this improvement has been maintained during weeks three and four, the effect of the training has faded, as shown by the values for this criterion in Table 6.8. The senders' ability to write subject lines that convey the importance of an email has also faded in weeks three and four as shown in Tables 6.7 and 6.8.

The average time taken to read and understand each email has also been reduced further in weeks three and four. Each email now takes an average of 27 seconds to read and understand, compared to 43.5 seconds before training and 37 seconds after weeks one and two.

This section has shown the initial impact of the combined training programme has either been sustained or shown further improvement in weeks three and four after the combined training, across six of the nine criterions.

6.8 Comparing the SBT Against the Combined Approach of the CBT and The SBT

This section compares the effectiveness of a combined training approach of CBT and SBT against just SBT. This comparison will determine which of the evaluation

criterions are most receptive to each approach, both two and four weeks after the initial training.

6.8.1 The Initial Impact of Both Training Approaches During Weeks One and Two

The evaluation scores for both the combined and just the SBT approaches two weeks after the training within PD are shown in Table 6.9. Comparing the two gives an indication of which approach is more effective across which criterions. It is inappropriate to compare the 'difference' columns in Table 6.3 and Table 6.7 because of the different 'Before Training' scores for the two training approaches. The scores before the combined training approach were lower than those for the SBT for seven of the nine criterions, leaving a smaller margin for improvement for the combined training approach across these criterions. The values in brackets in Tables 6.9 show the criterions where the SBT has a lower initial score after two weeks than that of the combined training approach.

Criterion	2 weeks after SBT Training	2 weeks after combined Training	Difference
The suitability of email as the communication medium	1.12	1.03	0.09
The email is easy to read	1.21	1.58	(0.37)
The email is straight to the point	1.17	1.21	(0.04)
The relevance of the message to me	1.44	1.35	0.09
If it is an actionable email:			
It tells me what is expected of me	1.43	1.58	(0.16)
It states when action is required	2.19	2.25	(0.06)
The subject line contains sufficient detail for:			
Me to assess the importance of the message	1.88	1.60	0.28
Me to understand what the message is about	1.63	1.17	0.46
Approx how long did it take to read and understand this message? (Seconds)	45.88	36.90	8.98

Table 6.9 The average scores for the SBT and the combined training approach within PD two weeks after the initial training

Table 6.9 suggests the combined training approach is more effective than sole SBT at improving employees' use of the subject line, enabling them to better target their

email, and enabling them to choose the most suitable media for their message. The lower scores for the combined training approach could be due to the impact of the 'email training' software, which could flag potential issues with these areas to the user.

The results from PD show that just SBT had lower average scores than the combined approach of SBT and CBT for the criterions related to the written quality and conciseness of email messages, including those that are actionable.

6.8.2 The Impact of Both Training Approaches During Weeks Three and Four

Table 6.10 compares the overall evaluation scores for both the combined CBT and SBT and the sole SBT approaches in weeks three and four after the initial training. The values in brackets in Tables 6.10 show the criterions where the SBT has a lower initial score after two weeks than that of the combined training approach.

Criterion	4 weeks after SBT Training	4 weeks after combined training	Difference
The suitability of email as the communication medium	1.18	1.05	0.13
The email is easy to read	1.46	1.15	0.31
The email is straight to the point	1.29	1.10	0.19
The relevance of the message to me	1.71	1.35	0.36
If it is an actionable email:			
It tells me what is expected of me	1.65	1.00	0.65
It states when action is required	1.87	1.30	0.57
The subject line contains sufficient detail for:			
Me to assess the importance of the message	1.70	1.93	(0.23)
Me to understand what the message is about	1.65	1.63	0.02
Approx how long did it take to read and understand this message? (Seconds)	47.78	27.00	20.78

Table 6.10 The average scores for the SBT and the combined training approach within PD four weeks after the initial training

The values in Table 6.10 show the combined training approach has lower average scores than the SBT, across eight of the nine criterions. This suggests the combined

training approach is more effective than SBT at improving employee email use, up to four weeks after the initial training.

The only criterion where the SBT had a lower average score than the combined approach was in the senders' ability to write effective subject lines that convey the importance of the message. This suggests that a combined training approach has no additional impact on this criterion than a SBT approach.

6.9 Conclusions

This chapter has met the second research objective of determining the effectiveness of SBT at improving email use within the workplace. Training employees on the best practices of email use can help to reduce email defects within an organisation, as shown by the overall average improvements in the evaluation scores at 3M and PD. The different number of participating pairs and different overall evaluation scores before training make it difficult to draw direct comparisons and compare the significance of the SBT between 3M and PD.

The t-test analysis shows that four out of the nine criteria showed significant initial improvements at both 3M and PD after the SBT. The four significant improvements were:

- Better written emails that were easier to read. (significant at the 95% level for 3M and at the 90% level for PD)
- Better written emails that were more concise and to the point (significant at the 95% level for both 3M and PD)
- Better use of the subject line which made it easier to assess the importance of the message (significant at the 99% level for 3M and the 90% level for PD)
- Better use of the subject line which made it easier to know what the message is about (significant at the 99% level for 3M and the 95% level for PD)

The t-test analysis also showed a significant (at the 90% level) initial improvement in the PD senders' ability to choose the most effective communication medium for a

message. Although there was an overall average improvement in the 3M senders' ability to effectively choose the most suitable communication medium, this improvement was not statistically significant.

The initial effect of the SBT can fade over time, as shown by the results from PD. The results show that seven of the criteria had higher average overall scores after one month than during the first two weeks after the SBT, indicating a reduction of the impact of the SBT across these criterions. The only criterions where the effect of the SBT did not fade after four weeks were the senders' ability to specify clear deadlines and the senders' ability to write subject lines that enabled the recipient to gauge the importance of the message.

The correlation analysis has shown that there are statistically significant relationships between some of the evaluation criteria used in the training programme. These relationships can aid in the understanding of how an improvement in one area can lead to an improvement in another, which can enable detailed and specific email training to be prescribed to specific employees.

This chapter has shown that SBT can improve employee use of email, although the initial impact of the training can fade over time. The results show the impact of SBT can vary on which areas of email use are improved, with some criterions showing greater improvement than others. Although it is difficult to draw direct comparisons between the impact of the SBT at 3M and PD, the overall evaluation scores were lower for both organisations when measured after the training indicating the effectiveness of the SBT approach to improving email use.

This chapter has also shown that the use of a combined training approach can lead to improvements in the way employees use email as shown by the results from PD. The initial impact of the combined training approach resulted in improvements across eight of the nine evaluation criterions. The only criterion not to show an initial overall improvement was the senders' ability to write emails that are easy to read, despite this criterion showing significant initial improvements for the SBT at 3M and PD. Only one of the criterions showed a significant (at the 90% level) initial improvement, this

was in the senders' ability to write effective subject lines that enable the recipient to know what the message is about.

Six of these initial improvements had been sustained or shown further improvement four weeks after the training. The only criterions where the overall initial impact of the training had faded were in the senders' ability to choose the most suitable communication medium and their ability to write effective subject lines that convey the importance of the message and enable the recipient to know what the message is about.

The t-test analysis showed that four of the nine evaluation criterions showed significant improvement four weeks after the combined training approach was administered. The four significant improvements were:

- Better written emails that were easier to read (significant at the 90% level)
- Better written actionable emails that state what action is required of the recipient (significant at the 95% level)
- Better written actionable emails that clearly state any when action is required (significant at the 95% level)
- Better use of the subject line, which made it easier to know what the message is about (significant at the 90% level)

The significant finding from this research is that when comparing the impact of the combined training approach with a single SBT approach, the results from the PD study suggest the impact of the combined approach is more sustainable than the SBT on its own. This finding has met the third research objective of determining the effectiveness of a combined SBT and SBT approach to improving employee email communication.

Chapter 7 Optimising the Email Environment

Chapter Preface

This chapter discusses how the cost of using email can be reduced within the workplace. The cost of email use within 3M, LogicaCMG and Professional Development (PD) is calculated from the total employee time spent using email. The financial impact of the seminar based training (SBT) and the combined computer / seminar based training approach is calculated and discussed. The chapter also shows how the cost of email use can be further optimised by reducing the volume of irrelevant and untargeted email and by reducing the frequency an email application checks for new email. This chapter is based on the papers 'A Simple Approach to Improving Email Communication' accepted for publication in Communications of the ACM, and 'Optimising the Email Communication Environment' published in the proceedings of the 2005 IRMA conference.

7.1 Introduction

The results from Chapter Six showed that email defects can be reduced and effective use of email improved by deploying SBT and computer based training (CBT). This chapter determines the cost of email use within 3M, LogicaCMG and PD, and how this can be reduced by various approaches that optimise email use within the workplace. The cost of email use within Danwood could not be determined as employees did not complete the email training programme, and therefore the average time taken to read and understand an email could not be determined. The potential financial benefit of both training approaches at improving organisational email effectiveness can be calculated by applying monetary values to the time employees spent using email and comparing the time values before and after training. The potential financial impacts of other approaches to optimising email use are also

discussed. These include increasing the duration at which an email application checks for new mail and the removal of all non-value email.

7.2 The Cost of Email use

The cost of email use within an organisation can be calculated from the amount of time that employees spend using email. This is determined by the number of emails an individual receives, the time it takes to read each email and the number of email users within the organisation. The financial cost of reading emails can be calculated by applying monetary values, based on an average salary, to the time spent using email.

However, this value only indicates how much time employees spend actually reading email, it does not take into account the interruptive nature of email. Research undertaken by Jackson et al (2001) found that the amount of time it takes employees to recover from an email interrupt, and to return to their work at the same rate at which they left it, was on average 64 seconds. If an employee has their email application set to check for new email every 5 minutes, then the possible number of interruptions they receive in an 7.5 hour day is 90. Since it is unlikely that all email will arrive at separate intervals, the author will assume that only half a users daily email arrives at separate intervals, given email activity peaks at several times a day, coinciding with the start and end of the working day (Jackson et al, 2001).

Assuming an average salary of £24,603 (amounts given in British pounds) per annum, based on the UK average salary according to National Statistics Online (National Statistics, 2002) and an assumed overhead of a further £24,603 per year then the total cost per day of reading email for an organisation can be calculated using Equation 7.1. An overhead is required to take into account establishment costs (e.g. rent and rates), administrative costs (e.g. telephone and printing) and employment costs (e.g. national insurance contributions and pensions).

Daily cost of organisational email use = $(t_1 + t_2)*w*n$

Where t_1 is the time taken for an employee to read all emails received (minutes)
t_2 is the total interrupt recovery time per employee (minutes)
w is the average cost of an employee per minute
n is the number of employees within the organisation.

Equation 7.1 The organisational cost of email use (per day)

Equation 7.1 can be used as a basis for calculating the annual cost of email use within an organisation or calculate the cost of email per employee according to the figures required. The figures obtained by using Equation 7.1 only provide an indication of the possible cost of email use within an organisation, as it is not been possible to validate the formula or prove the cost of email use within an organisation.

7.2.1 The Current Cost of Email use within 3M

The results from the questionnaire, discussed in Chapter Four show that employees from 3M receive on average 23 emails per day. According to the results from the first phase of the SBT (Chapter Six), it takes on average 76 seconds to read and understand each message they receive from their paired sender before the sender has received training. 3M Employees therefore spend on average 29 minutes per day reading email. This assumes that they read all the emails they receive, including those that might not be relevant to them.

If employees have their email application set to check for new email every five minutes (which is the default setting in MS Outlook), then the possible number of interrupts they receive in an 7.5 hour day is 90. In this organisation, employees received 23 emails per day, resulting in a maximum of 23 interrupts if their email application is set to check for new email every five minutes and all their email arrives at separate intervals. Since it is unlikely that all email will arrive at separate intervals, the author will assume that half a users daily email arrives at separate intervals giving a total interrupt recovery time of 12 minutes.

Using Equation 7.1 the daily cost of email use for 3M was calculated to be approximately £56,200, given that the organisation has 2850 email users. The annual cost is almost £13million and the cost per employee was approximately £4,500 per annum assuming an employees work 46 weeks per year.

7.2.2 The Current Cost of Email use within LogicaCMG

On average LogicaCMG employees receive 47 emails per day, which take on average 53 seconds to read and understand. This implies that employees within LogicaCMG spend on average 41 minutes per day reading email, assuming they read all the emails they receive, even those not relevant to them.

The total interrupt recovery time per employee will be 50 minutes assuming half of their email arrives at separate intervals and the user has their email application set to check for new mail every five minutes.

Using Equation 7.1 the daily cost of email use within LocigaCMG was calculated to be almost £190,000, given that LogicaCMG has around 6000 employees within the UK. The annual cost is over £43million and the cost per employee was almost £7,250 per annum based on a working 46 week year.

7.2.3 The Current Cost of Email use within PD

Employees within PD receive on average 47 emails per day, which take on average 48 seconds to read (based on the combined average scores for the SBT and SBT / CBT before training). Employees therefore spend on average 37.5 minutes per day reading email, assuming they read all the messages they receive. The total interrupt recovery time for each employee is 250 minutes, assuming half their email arrives at separate intervals and their email application is set to check for new mail every five minutes.

The total daily cost of email use within PD using Equation 7.1 was calculated to be almost £700, given PD has 23 employees. The total annual cost is almost£157,000 and the cost per employee per annum is approximately £6,800.

7.3 Optimising Email use within 3M

This section shows the potential financial impact of the SBT in reducing the cost of email use, if applied to all employees within 3M. The potential financial impact of removing non-value emails and reducing the frequency that an employees email application checks for new email are also shown.

7.3.1 Financial Impact of SBT within 3M

As a result of the SBT the 3M senders were able to write emails that take on average 10.5 seconds less time to read and understand than emails they wrote before they received training. This saving can be used to determine the financial impact of SBT if applied to the whole organisation.

The overall financial impact of the SBT is an 10% saving on the initial cost of email use identified within section 7.2.1. This equates to an annual saving of approximately £400 per employee and an organisational saving of over £1.2 million.

These values were calculated by comparing the cost of email use before and after the SBT In both cases Equation 7.1 was used to determine the cost of email, where the values t_1 and t_2 both represent the time spent interacting with email, which was reduced following the training.

The financial saving of the SBT does not include any reduction in the volume of unnecessary or irrelevant / untargeted email that may have resulted from the training. This is because only a small group of 20 sender / recipient pairs participated in the training and therefore the overall effect of training on the reduction of non-value email throughout the whole organisation could not be determined. The sender /

recipient pairs were also chosen because there was an existing business relationship between the two; therefore it was unlikely they would exchange unnecessary or untargeted emails.

When calculating the value that would be saved as a result of the SBT, it is important to consider how much it costs the organisation to run the training. If the cost of running the seminar training was more than the identified benefit, then it would not be viable to undertake email training. The duration of each training session was one hour, which would cost around £28 per employee, based on an average salary of £24,603 plus overheads of a further £24,603. The cost of setting up the training would be a one-off cost, assumed to be no more than a few hours work for the individuals involved. If the training was done once or twice a year then the benefits far outweigh the costs and to help save costs the training could be included in the induction sessions, when new employees join the company and whilst they are not up to speed in their new job. This assumes the training is run internally within the organisation. If an external trainer was bought in to undertake the training then the cost of the training would be substantially higher. This increase cost would have to be taken into account to determine if the training would be cost effective.

7.3.2 Targeting Further Savings within 3M

The SBT may be able to save 10% of the cost of reading email if applied throughout the whole organisation, but 3M can further reduce the cost of email by further optimising email use within the workplace. Table 7.1 shows the potential savings that can be made within 3M from a number of approaches that further optimise email use.

Chapter Four identified that up to 29% of the email received within 3M is either unnecessary or untargeted and does not need to be read. Even without SBT, this organisation could save approximately £1,300 per employee per annum on the cost of reading email if the unnecessary and irrelevant emails were removed.

Employees can become more efficient by increasing the duration in which their email application checks for new mail. If all email users from 3M were to set their email application to check for new email every 45 minutes instead of 5 minutes then the organisation would save approximately £750 per employee per annum on the cost of reading email, representing a saving of 17%.

No of email received per day	Employees received SBT	Remove cc'd / unnecessary email	Application check for new mail (mins)	Cost(£)*	Saving(£)*	Saving (%)*
23	No	No	5	4,500		
23	No	No	45	3,750	750	17%
23	No	Yes	5	3,200	1,300	29%
23	No	Yes	45	2,700	1,900	41%
23	Yes	No	5	4,100	400	10%
23	Yes	No	45	3,300	1,200	26%
23	Yes	Yes	5	2,900	1,600	36%
23	Yes	Yes	45	2,400	2,200	48%

Table 7.1 The potential financial savings on the cost of email per employee per year within 3M

*Monetary values are approximated, therefore may not tally correctly or precisely reflect the percentage saving shown

By combining the three approaches shown in Table 7.1, 3M could save up to 48% of the cost of reading email. This equates to a saving of around £2,200 per employee per annum. This represents the maximum potential saving as a result of fully optimising email use within the workplace. However, it may be difficult to achieve this level of saving in practice because it would be difficult to prevent all unnecessary and irrelevant emails from being generated and transmitted through the organisation. Although the proportion of unnecessary email is likely to decrease as a result of deploying seminar based email training throughout the whole organisation which will heighten awareness with the problems of sending unnecessary email.

7.4 Optimising Email use within LogicaCMG

Table 7.2 shows that LogicaCMG could reduce the cost of email use by removing all non-value email and/ or by increasing the duration in which their employees' email application checks for new mail. The possible financial impact of SBT or CBT is not known, since the training programme was not completed at LogicaCMG.

The questionnaire results (discussed in Chapter Four) showed that up to 37% of the email received by employees at LogicaCMG is irrelevant / untargeted or where the recipient is copied in unnecessarily. If these emails were removed LogicaCMG could save approximately £2,700 per employee per annum on the cost of reading email, although it could be difficult to remove such non-value email without providing the employees with some form of training.

The values in Table 7.2 show that LogicaCMG could save almost £2,200 per employee per annum on the cost of email use, if all employees changed the duration in which their email application checks for new email from five to 45 minutes.

No of email received per day	Remove cc'd / unnecessary email	Application check for new mail (mins)	Cost (£)	Saving (£)*	Saving (%)*
47	No	5	7,250		
47	No	45	5,100	2,200	30%
47	Yes	5	4,600	2,700	37%
47	Yes	45	3,200	4,000	56%

Table 7.2 The potential financial savings on the cost of email per employee per year within LogicaCMG

*Monetary values are approximated, therefore may not tally correctly or precisely reflect the percentage saving shown

The combined effect of both approaches highlighted in Table 7.2 could reduce the cost of email use within LogicaCMG by up to 56%, which equates to a saving of around £4,000 per employee per annum.

7.5 Optimising Email use within PD

This section shows gives an indication of the potential financial impact of both training approaches to reducing the cost of email use within PD if applied to all employees. The financial impact of removing non-value emails and reducing the frequency that an employees email application checks for new email are also shown.

7.5.1 The Financial Impact of SBT and CBT within PD

The results from Chapters Five and Six show that after participating in SBT or a combined seminar and computer based training programme employees at PD were able to write emails that take less time to read and understand than emails they wrote before the training programme. This resulted in initial savings of 4.04 seconds per email for employees that received SBT and a 6.59 second saving per email for those who received both SBT and CBT. The overall financial impact of the two training approaches can be calculated by comparing the cost of email before and after each training approach, where the cost of email is calculated using Equation 7.1.

The overall financial impact of the SBT is an initial 5% saving on the cost of email use identified within section 7.2.3. This equates to an annual saving of approximately £350 per employee and an organisational saving of almost £6,500.

An overall initial saving of 8% could be achieved through the deployment of a combined seminar and computer based training programme throughout the whole of PD. This equates to saving of over £550 per employee per annum and an organisational yearly saving of approximately £13,000.

These values represent the initial savings that could be achieved by deploying the training programmes throughout the whole of PD. The results of the SBT discussed in Chapter Six show that the initial impact of the training can fade over time. When the effectiveness of the SBT was measured after four weeks after the training, the average time taken to read and understand each email message was greater than the initial

improvement measured two weeks earlier. This implies the financial impact of the SBT would be less than the initial 5% saving, when calculated using the values measured four weeks after the training.

The overall financial impact of the SBT, calculated using values measured four weeks after training, is a 3% saving on the cost of reading email. This is equivalent to an annual saving of approximately £180 per employee and an organisational saving of approximately £4,200 per annum.

Chapter Six shows the impact of a combined seminar and computer based training programme is more sustainable than a sole SBT programme. The overall financial impact of the combined CBT/ SBT training programme, when calculated using the results four weeks after the training is a 21% saving on the cost of email. This represents an annual saving of approximately £1,500 per employee and an organisational saving of over £32,000 per annum.. The combined training programme lead to an even greater saving after four weeks, as the senders showed a further improvement in their ability to write concise emails that take less time to read and understand.

The financial savings highlighted in this section do not include any reduction in the volume of unnecessary or irrelevant / untargeted email that may have resulted from the training. This is because only a small group of sender/ recipient pairs participated in the training and the overall effect of training on the reduction of non-value email throughout the whole organisation cannot be determined.

7.5.2 Targeting Further Savings within PD

While PD could reduce the cost of email use within their organisation by deploying an email training programme, further savings can be made by removing the volume of irrelevant and unnecessary email, and by optimising the configuration of the employees' email application.

If all irrelevant and unnecessary emails were removed from circulation within PD, the organisation could save approximately £2,700 per employee per annum on the cost of reading email, representing a saving of 31%. If all employees were to change the duration in which their email application checks for new mail from five to 45 minutes, then PD could save almost £2,200 per employee per annum on the cost of email, representing a saving of 32%.

Table 7.3 shows the financial savings that can be made through a combination of approaches in reducing the cost of email use. The values in Table 7.3 relate to the cost of email four weeks after the training, as this give a more realistic view of the sustainability of each training approach.

No of email received per day	Employees received SBT	Employees received CBT	Remove cc'd / unnecessary email	Application check for new mail (mins)	Cost (£)	Saving (£)*	Saving (%)*
47	No	No	No	5	6,800		
47	No	No	No	45	4,600	2,200	32%
47	No	No	Yes	5	4,700	2,100	31%
47	No	No	Yes	45	3,200	3,600	53%
47	Yes	No	No	5	6,600	180	3%
47	Yes	No	No	45	4,500	2,300	34%
47	Yes	No	Yes	5	4,600	2,200	33%
47	Yes	No	Yes	45	3,100	3,700	55%
47	Yes	Yes	No	5	5,400	1,400	21%
47	Yes	Yes	No	45	3,250	3,600	52%
47	Yes	Yes	Yes	5	3,700	3,100	45%
47	Yes	Yes	Yes	45	2,200	4,600	67%

Table 7.3 The potential financial savings on the cost of email per employee per year within PD

*Monetary values are approximated, therefore may not tally correctly or precisely reflect the percentage saving shown

By combining the four approaches shown in Table 7.3 PD could potentially save up to 67% of the cost of reading email. This equates to a saving of approximately £4,600 per employee per annum. This represents the maximum potential saving as a result of fully optimising email use within their organisation. This level of saving may be difficult to achieve in practice as it would be difficult to prevent all unnecessary and

irrelevant emails from being generated and transmitted throughout the organisation. Although the proportion of unnecessary email is likely to decrease as a result of deploying seminar based email training throughout the whole organisation which will heighten awareness with the problems of sending unnecessary email.

7.6 Discussion and Conclusions

This chapter has met the fourth research objective of this thesis and has shown there is a cost associated with email use, which can be reduced by optimising email use within the workplace. The cost of email is related to the number of emails received and the duration it takes to read and understand each email. LogicaCMG had the highest cost of email per employee per annum, out of the three organisations discussed in this chapter, with 3M having the lowest.

Removing all irrelevant and unnecessary emails that flow around an organisation can reduce the cost of email use. LogicaCMG had the largest proportion of irrelevant and unnecessary emails (37%) of the three organisations, and therefore could potentially make the largest saving in this area. 3M and PD had a similar proportion of irrelevant and unnecessary emails (29% and 31% respectively) although PD could make a larger financial saving (per employee) than 3M because of the larger number of emails received within PD.

Each organisation can also reduce the cost of email use by reconfiguring each employee's email application. Increasing the duration in which a users email application checks for new mail can reduce the number of email interruptions therefore reducing the overall interrupt recovery time. The financial impact of increasing this duration from five to 45 minutes is determined by how many emails an employee receives during the day. LogicaCMG and PD could make larger financial savings (per employee) through this approach than 3M because of the larger number of emails received by employees within these organisations. While this approach can reduce the cost associated with email use, it can sometimes be impractical to have

your email application set to check for new mail over such a long period of time, as important tasks and deadlines can be missed.

Both 3M and PD could reduce the cost of email use by deploying SBT throughout the whole of their organisation. 3M could save an initial 10% and PD an initial 5% on the cost of email use within their respective organisations. The longer term impact of the SBT at 3M is not known, although within PD this was reduced to 3%, four weeks after the training. The results show that a combined SBT / CBT training approach can lead to more sustainable reductions in the cost of email use.

The figures presented within this chapter only provide an indication of the potential costs and savings possible within the three organisations. These values may not reflect the true costs or savings, as the author was unable to validate the equation used for the calculations. The costs and potential savings identified only focus on the time spent reading emails, and they do not include the cost associated with dealing with the actual email itself or in the time spent writing or responding to email. The cost of conducting the SBT also needs to be taken into consideration. If a third party conducts the SBT, the cost of the training is likely to be higher than if it is conducted internally. It should also be noted that any savings made through email training may not represent an actual monetary saving to the organisation as the employee's time will be spent on other tasks rather than email that might not be beneficial to the organisation.

Overall, this chapter gives an indication to how an organisation can become more effective, by reducing the cost associated with email use through deploying email training and optimising email use within the workplace.

Chapter 8 Conclusions and Further Work

Chapter Preface

This chapter summarises the whole thesis and discusses the conclusions that can be drawn from this research. Recommendations for further work are included to provide a starting point for other research that can be carried out in the area of email effectiveness.

8.1 Research Overview

The overall aim of the research was to improve workplace communications by improving the way email is used within the workplace. The research aim was to be satisfied by achieving the following objectives:

1. Understand how email is used within organisations, specifically identifying the problem areas with email communication.
2. Determine the effectiveness of seminar based training (SBT) at improving email use within the workplace.
3. Determine the effectiveness of a combined computer and seminar based training at improving email use within the workplace.
4. Determine the cost of email use within organisations and how it can be reduced.

These objectives are discussed below in the context of the thesis in the following sections.

8.1.1 Understanding Organisational Email Use

The first research objective was achieved by determining how email was used within four organisations. While existing studies highlighted in the literature review (Chapter Two) had identified a number of problems with email use, the author wanted to research the specific email problems within a number of organisations with the intention of reducing the highlighted defects.

The state of email use within these four organisations was determined by asking email users to complete an online questionnaire on their views about email use within their organisations. Analysis of the questionnaire results revealed a number of deficiencies with the way email was used within the four organisations. These deficiencies were examined in Chapter Four, and relate to the written quality and quantity of email received as well as ineffective management and configuration of an organisations email system. These defects can increase the amount of time spent dealing with email and can lead to tasks being carried out incorrectly or not at all.

The problems identified within the author's research reflected many of the issues identified within the literature review, although the author's findings cannot be directly compared to some of these because many of the issues are only identified and not measured. The author's research confirmed Markus's (1994a) findings that email can be purposefully used in place of other forms of communication within the workplace, although the reasons for this were found to be different. Within the author's research email was used in place of voice communication for reasons of convenience, whereas Markus (1994a) found this was done to avoid social contact. The author's research also supported a number of studies that identified SPAM as a negative aspect of email use (Sillince et al., 1998; Brandenburg et al., 1999; Balter, 2002), Research by Kimble et al (1998), who found that some managers were

overloaded by email because of inappropriate use of the carbon copy function was also supported. The author's research therefore supports existing literature that implies a proportion of the email received within organisations is irrelevant and unnecessary. The author found that email can be a distraction within the workplace, supporting the earlier research undertaken by Jackson et al (2003). The findings from the questionnaire showed that only a third of employees from LogicaCMG indicated that the actionable email they receive stated what action is required of them. This finding was similar to that reported by Frazee (1996) who reported that 65% of emails fail to give the recipient enough information to act upon. This first section of the author's research has not contributed much new research to the existing literature on electronic communication, but verified many of the existing studies.

The results from the questionnaires also showed that employees from organisations that receive more email tend to have stronger views on some of the negative aspects of email use, than employees from organisations that receive on average less email. Similarly the demographic analysis from the 3M data revealed that more senior employees (in terms of age and job grade) receive more email than their junior colleagues and have stronger views about the negative aspects of email use within their organisation.

8.1.2 The Effectiveness of SBT

The second research objective was achieved through the deployment of the training programme as discussed in chapters Five and Six. The training programme involved employees evaluating emails they received from their peers both before and after their colleagues received training. The criteria by which emails were evaluated were derived from the questionnaire results in Chapter Four, and related to defects that could be identified within individual emails.

The effectiveness of a SBT programme in reducing email defects was discussed in Chapter Six. The results show that SBT can lead to significant improvements in the

way employees at 3M and PD use email, although the initial impact of the SBT can fade over time. This section of the author's research has contributed to the email communication literature as it has shown the impact of seminar-based training on improving organisational email use. While Hallewell (1998) earlier identified the need to train individuals on the soft side of email communication, the impact of the training, in terms of reducing a number of specific email defects has not been captured.

8.1.3 The Effectiveness of a Combined Training Approach

The third research objective was achieved through the deployment of the same training programme used to satisfy the second research objective. The combined training approach used SBT and CBT, in the form a 'real-time email trainer', discussed in Chapter Five.

The results of the combined training approach, as discussed in Chapter Six, shows the approach can lead to improvements in the way employees use email. These initial improvements were sustained for six of the nine evaluation criterions. Comparing the effectiveness of a SBT and a combined training approach revealed that the combined approach lead to a greater initial improvement in email use when compared to the SBT approach, and the initial impact of the combined approach was more sustainable than the SBT. This shows that the addition of CBT in the form of the 'real-time email trainer', to a stand alone SBT approach can lead to improvements that are more sustainable.

This section of the author's research contributes to the existing research on electronic communication by showing the development and effectiveness of a computer based 'real-time email trainer' at improving organisational email use. While other software tools have been developed that aim to help users manage their inbox (see section 2.4.1 of Chapter Two), no tools have been developed that identify potential problems with emails before they are sent. This section of the author's research also adds to the

training literature that compares different styles of training, as it compares the effectiveness of SBT with a combined CBT / SBT approach to improving email use.

8.1.4 The Cost of Email Use

The cost of email use was determined by calculating the amount of time employees spend using email and applying monetary values to this figure. The amount of time employees spend using email can be determined from the average number of emails they receive (obtainable from the questionnaire results in Chapter Four) and the average time it takes to read and understand each email (obtainable from the first evaluation phase of the email training programme). The monetary value was based on the average UK salary. The cost of email use for three of the organisations is shown in Chapter Seven.

Chapter Seven also showed how organisations could reduce the cost of email use by optimising email use within the workplace. This can be achieved by reconfiguring each employee's email application to check for new mail over longer periods. Removing all irrelevant and unnecessary emails that flow around an organisation can also reduce the cost of email use, although this may be harder to achieve in practice. The financial impact of both training approaches is also discussed in Chapter Seven, which shows the potential saving each organisation could make if the training was applied throughout the whole organisation.

8.2 Limitations of the Research

Although this research has shown that deficiencies in email use do exist, and can be reduced through email training, the author acknowledges there are limitations with the research.

While the questionnaires used in Chapter Four were designed to capture how email was used within each organisation and highlight the problems with email use, they

were unable to determine which groups within the organisation were contributing to problems and require the appropriate training.

The email training programme was only successfully administered within two of the four organisations that completed the questionnaire. The results from both training approaches would have been more credible if LocigaCMG and Danwood had participated further. The combined training approach was only administered within Professional Development (PD) as 3M employees were using Lotus Notes (which was not compatible with the email trainer software).

The number of participants within PD was limited for both training approaches due to the small number of volunteers. Ideally a greater number of sender / recipient pairs would have been used within the training programme, with an equal number participating in both the SBT and the combined training, to make the two approaches easier to compare.

The sender / recipient pairs that participated in the training programmes within both 3M and PD already had an established working relationship (hence the reason for their selection), therefore it was unlikely there would be a high degree of ineffective email use between the two. The overall average scores for both training approaches across both 3M and PD were all towards the lower end of the five point evaluation scale, even before the training, indicating that the participating senders were already good users of email.

The author was constrained by the timeframes imposed by the participating organisations when administering the training programmes. Ideally the impact of both training approaches would have been measured over a greater time period to gain a more accurate understanding of how the initial impact of the training is sustained over time.

While the impact of both training approaches did show improvements in the senders' ability to be more effective in targeting their email and their ability to choose the most appropriate communication medium, the impact of these improvements could not be

determined for the whole organisation as only a small number of participants undertook the training.

8.3 Recommendations for Other Organisations

The research within the thesis has been specific to mainly two organisations; however, recommendations can still be made to other companies to increase the effectiveness of their employees. It is recommended that companies look at their current email communication policies and take a snapshot of how employees use email. This will then give a company a good foundation from which to build in order to increase their employee effectiveness through email training. If an organisation decides to deploy an email training programme, it is recommended that it not only focus on the sender side of how to write more effective emails, but also on the recipient side, such as managing the inbox. Encouraging employees to use message rules and folders should enable them to manage and prioritise their email better, Encouraging employees to delete old messages and to archive emails can also reduce the disk space required to store email. It is also recommended that any training programme aimed at improving email use should also take into account other communication media used within the organisation, so that the effectiveness of communication in general can be improved.

8.4 Recommendations for Further Work

The author's research has shown that email training can lead to improvements in the way employees use email within the workplace. Further research into this area can address some of the identified limitations of the author's research. Both training approaches could be administered using a greater number of participants within other organisations. The timeframes between the evaluation phases could also be increased to give a more accurate indication of the sustainability of each approach.

The computer based real time email trainer could be developed further both in terms of its functionality and compatibility with other email applications. Developing the software for use within email applications other than Microsoft Outlook 2000 and 2003, would mean it could be used by a greater number of email users. The functionality of the software could be developed further to identify more complex problems with the body of an email, through the use of natural language processing.

The parameters and message rules on which the software is based could also be used to develop other tools for identifying and counting specific problems within email folders rather than individual emails. This could be used to periodically assess the quality of a users email by scanning their outbox and counting the potential problems. The message rules could also be built into an online version of the software where users could determine how effective they are at writing email compared to other email users.

The impact of the CBT software could also be measured on its own without the users receiving seminar-based training. The parameters could also be adjusted to make the software more or less sensitive to potential problems with email. The effectiveness of these different versions, with varying degrees of sensitivity could then be determined, It would also be useful to determine the effect of adjusting the sensitivity on the usability of the software, as users may become increasingly frustrated if more potential problems are identified within their emails.

Although this research has focused on the problems with email use within organisations, it has not taken into account how other forms of communication are used within the workplace. Organisations can still be communicating ineffectively via other media even if they are using email effectively. Further research could be undertaken that examines the effectiveness of all forms of communication within the workplace and training employees on the best practice accordingly.

While this research examined how email is used within organisations, it did not set out to explore what tasks email is used for, or which functions of their email application people use, and these are possible areas for future. Research could be

undertaken into what communication tasks email is used for and how knowledge contained within email messages is circulated within organisations.

8.5 Overall Conclusions

This thesis has shown that there are many deficiencies with the way email is used within today's organisations. These defects reflect the findings within a number of studies within the literature and relate to both the written quality, quantity of email received and the ineffective configuration of an organisations email systems. These defects can be reduced by training employees on the best practices of email use, although a combined computer and seminar based training approach is likely to lead to more sustainable improvements than a traditional SBT approach. This research contributes to the electronic communication literature by quantifying and determining the effectiveness of both SBT and a combined CBT /SBT approach to improving email use. This information would be of great value to organisations wishing to make email use more effective and reduce the cost associated with email use.

The author's research has made contributions to both academia and industry. The author has produced five conference papers and two journal papers, which are listed in Appendix I. The author's research has attracted interest from Leicestershire Constabulary, who are keen to assess how email use can be improved within their organisation. There is also the possibility that the training programme developed by the author may also be rolled out across other departments within Loughborough University and across other universities through the Joint Information Systems Committee (JISC).

The research outlined in this thesis can help organisations similar to the ones studied to become more effective in their email communication. The three main research areas (identifying email problems, seminar training and computer based training) can enable email senders and receivers to gain significant improvement in their effectiveness and efficiency with respect to their time at work, which has made a significant contribution to the aim of this thesis. The research has also made a

substantial contribution to identifying what areas of email training require further research to enable email communication to become further optimised within organisations.

Bibliography

Adams, J. S. and Beise, C. M. (1997). Career implications of electronic mail use and misuse: research in progress. Proceedings of the 1997 ACM SIGCPR conference on Computer personnel research, San Francisco, California, United States, ACM Press.

Agre, P. E. (1995). "My Top 10 Email Hassles." Communications of the ACM **38**(7): 122.

Alonzo, M. and Aiken, M. (2004). "Flaming in electronic communication." Decision Support Systems **36**(3): 205-213.

Answers.com. (2006). Computer-Based Training. at URL: http://www.answers.com/topic/computer-based-training (viewed 04/05/06)

Balter, O. (2000a). "How to replace an old email system with a new." Interacting With Computers **12**: 601 - 614.

Balter, O. (2000b). A keystroke-level analysis of e-mail message organisation. CHI 2000.

Balter, O. (2002). "A Longitudinal study of attitude changes in a medical service organisation after an email introduction." Interacting With Computers **14**(5): 503 - 519.

Balter, O. and Sidner, C. L. (2002). Bifrost Inbox Organiser: Giving users control over their inbox. Proceedings of the second Nordic conference on Human-computer interaction, Aarhus, Denmark, ACM Press.

Baron, N. S. (1998). "Letters by phone or speech by other means: the linguistics of email." Language & Communication **18**(2): 133-170.

Barron, G. and Yechiam, E. (2002). "Private e-mail requests and the diffusion of responsibility." Computers in Human Behavior **18**(5): 507-520.

Bawden, D., Holtham, C. and Courtney, N. (1999). "Perspectives on Information Overload." Aslib Proceedings **51**(8): 249 - 255.

BBC News. (2003). Email shrinks the world. at URL: http://news.bbc.co.uk/1/hi/technology/3132023.stm (viewed 14/04/05)

BBC News. (2004). Spam reveals its darker side. at URL: http://news.bbc.co.uk/1/hi/technology/3893363.stm (viewed 10/08/05)

BBC News. (2005). Net criminals 'customise' attacks. at URL: http://news.bbc.co.uk/1/hi/technology/4739709.stm (viewed 10/08/05)

Becker, K., Cardoso, M. D., Nichele, C. M. and Frighetto, M. (2000). Mail-By-Example: a Visual Query Interface for Email Management. Proceedings of the working conference on Advanced visual interfaces, Palermo, Italy, ACM Press.

Belew, R. K. and Rentzepis, J. (1990). HyperMail: treating electronic mail as literature. Proceedings of the conference on Office information systems, Cambridge, Massachusetts, United States, ACM Press.

Bellotti, V., Duncheneaut, N., Howard, M. and Smith, I. (2003). Taking Email to Task: The Design and Evaluation of a Task Management Centred Email Tool. Proceedings of the SIGCHI conference on Human factors in computing systems, Ft. Lauderdale, Florida, USA, ACM Press.

Bellotti, V. and Smith, I. (2000). Informing the design of an information management system with iterative fieldwork. Proceedings of the conference on Designing interactive systems: processes, practices, methods, and techniques, New York City, New York, United States, ACM Press.

Berghel, H. (1997). "Email - The Good, The Bad, and The Ugly." Communications of the ACM **40**(4): 11 -15.

Bergman, R., Griss, M. and Staelin, C. (2002). "A Personal Email Assistant." Hewlett Packard at URL: http://www.hpl.hp.com/techreports/2002/HPL-2002-236.html (viewed 04/07/05)

Best, J. (2003). "Phones 4U bans staff from email." ZD Net UK at URL: http://news.zdnet.co.uk/communications/0,39020336,39116502,00.htm (viewed 24/04/05)

Bohlen, G. A. and Ferratt, T. W. (1993). The effect of learning style and method of instruction on the achievement, efficiency and satisfaction of end-users learning computer software. Proceedings of the 1993 conference on Computer personnel research, St Louis, Missouri, United States, ACM Press.

Boone, G. (1998). Concept Features in Re:Agent, an Intelligent Email Agent. Proceedings of the second international conference on Autonomous agents, Minneapolis, MN, USA, ACM Press.

Bowman, G. (1964). "What helps or harms promotability?" Harvard Business Review(January-February): 14.

Brandenburg, M., Wasson, L. E. and Woodall, K. L. (1999). "An examination of e-mail use among fortune 500 companies." Academy of Managerial Communications Journal **3**(2): 75 - 90.

Brown, M. H. (1995). Browsing the Web with a mail/news reader. Proceedings of the 8th annual ACM symposium on User interface and software technology, Pittsburgh, Pennsylvania, United States, ACM Press.

Burgess, A., Jackson, T. and Edwards, J. (2005). "Email training significantly reduces email defects." International Journal of Information Management **25**(1): 71-83.

Burgess, A., Jackson, T. W. and Edwards, J. (2003). Measuring Electronic Communication Defects and their Impact at 3M. Proceedings of 2003 Software Quality Management conference, Glasgow, Scotland.

Burgess, A., Jackson, T. W. and Edwards, J. (2004). The Effectiveness of Training in reducing Email Defects. Proceedings of the 2004 Software Quality Management conference, Canterbury, UK.

Burgess, A., Jackson, T. W. and Edwards, J. (2004). Tolerance Levels of Employees within the Workplace. Proceedings of the 2004 IRMA conference, New Orleans, USA.

Burrell, G. and Morgan, G. (1979). Sociological paradigms and organizational analysis. London, Heinemann.

Busha, C. H. and Harter, S. P. (1980). Research Methods in Librarianship: Techniques and Interpretation. London, Academic Press.

Cadiz, J. J., Dabbish, L., Gupta, A. and Venolia, G. D. (2001). "Supporting Email Workflow." Microsoft Research at URL: http://research.microsoft.com/research/pubs/view.aspx?msr_tr_id=MSR-TR-2001-88 (viewed 04/07/05)

Callahan, J. S., Kiker, D. S. and Cross, T. (2003). "Does Method Matter? A Meta-Analysis of the Effects of Training Method on Older Learner Training Performance." Journal of Management **29**(5): 663-680.

Camino, B. M., Milewski, A. E., Millen, D. R. and Smith, T. M. (1998). "Replying to email with structured responses." International Journal of Human-Computer Studies **48**(6): 763- 776.

Cavaye, A. L. M. (1996). "Case study research: a multi-faceted research approach for IS." Information Systems Journal **6**: 227-242.

Cloete, L. M., Snyman, R. and Cronje, J. C. (1993). "Training cataloguing students using a mix of media and technologies." Aslib Proceedings **55**(4): 223-233.

Cockburn, A. and Thimbleby, H. (1993). Reducing User Effort in Collaboration Support. Proceedings of the 1st international conference on Intelligent user interfaces, Orlando, Florida, United States, ACM Press.

Connell, J. B., Mendelsohn, G. A., Robins, R. W. and Canny, J. (2001). Effects of Communication Medium on Interpersonal Perceptions: Don't Hang UP on the Telephone Yet! Group'01, Boulder, Colorado, USA.

Cornford, T. and Smithson, S. (1996). Project Research in Information Systems - A Students Guide, MacMillan Press Ltd.

Cranor, L. F. and LaMacchia, B. A. (1998). "Spam!" Communications of the ACM **41**(8): 74-83.

Cuciniello, G. (1998). "How to write business e-mails." Training Journal(May 1998).

Cushing, K. (2002). Should we ban email? Computer Weekly.

Daft, R. L. and Lengel, R. H. (1984). "Information richness: a new approach to managerial behavior and organization design." Research in Organizational Behavior **6**: 191-233.

Daft, R. L. and Lengel, R. H. (1986). "Organizational Information Requirements, Media Richness and Structural Design." Management Science **32**(5): 554 - 571.

Daft, R. L., Lengel, R. H. and Trevino, L. K. (1987). "Message equivocallity, media selection, and manager performance: Implications for information systems." MIS Quarterly **11**(3): 355-366.

Davenport, T. H. (1997). Information Ecology, Oxford University Press, New York.

Davies, M. (2000). "Using a computerised case study to teach computer auditing: the reasons, the approach and the student response." Managerial Auditing Journal **15**(5): 247-252.

Dean, C. and Whitlock, Q. (1988). A Handbook of Computer Based Training, Kogan Page, London.

Dishaw, M. T. and Strong, D. M. (1999). "Extending the technology acceptance model with task-technology fit constructs." Information & Management **36**(1): 9-21.

Duane, A. and Finnegan, P. (2004). Managing email usage: A cross case analysis of experiencies with electronic monitoring and control. Sixth International Conference on Electronic Commerce.

Dudman, J. (2005). "Make e-mail work for you." ComputerWeekly.com at URL: http://www.computerweekly.com/Articles/2005/05/03/209692/Makee-mailworkforyou.htm (viewed 16/06/05)

Duncheneaut, N. B. (2002). "The Social Impacts of Electronic Mail in Organizations." Information, Communication & Society **5**(2): 153-188.

Duncheneaut, N. B. and Bellotti, V. (2001). "Email as Habitat: An Exploration of Embedded Personal Information Management." Interactions **8**(5): 30 - 38.

Epley, N. and Kruger, J. (2005). "When what you type isn't what they read: The perseverance of stereotypes and expectancies over e-mail." Journal of Experimental Social Psychology **41**(4): 414-422.

Farnham, S. (2002). Personal Map: Automatically Modeling the User's Online Social Network. CSCW 2002 Workshop: Redesigning Email for the 21st Century, New Orleans, LA, USA.

Filipczak, B. (1995). "Learning Styles Escape the Classroom! Panic in the City." Training **32**(3): 46.

Fink, A. (1998). Conducting Research Literature Reviews From Paper to the Internet. London, Sage Publications.

Frazee, V. (1996). "Is email doing more harm than good?" Personnel Journal **23.**

Galbreath, S. C. and Booker, J. A. (1998). "Make your e-mail powerful." The CPA Journal at URL: http://www.nysscpa.org/cpajournal/1998/1298/Departments/D581298.html (viewed 04/07/05)

Galliers, R. (1992). Information Systems Research - Issues, Methods and Practical Guidelines, Oxford: Blackwell Scientific.

Gimenez, J. "Embedded business emails: Meeting new demands in international business communication." English for Specific Purposes **In Press, Corrected Proof.**

Gjestland, C., Blanton, J. E., Will, R. and Collins, R. (2001). Assessing the need for training in IT professionals: a research model. Proceedings of the 2001 ACM SIGCPR conference on Computer personnel research, San Diego, California, United States, ACM Press.

Gorman, G. E. and Clayton, P. (1997). Qualitative Research for the Information Professional. London, Library Association Publishing.

Gross, B. M. (2002). Navigation, Organization, and Retrieval in Personal Digital Libraries of Email. Proceedings of the 5th International Conference on Asian Digital Libraries: Digital Libraries: People, Knowledge, and Technology, Springer-Verlag.

Gwizdka, J. (2001). Supporting Prospective Information in Email. CHI '01 extended abstracts on Human factors in computing systems, Seattle, Washington, ACM Press.

Gwizdka, J. (2002a). TaskView: design and evaluation of a task-based email interface. Proceedings of the 2002 conference of the Centre for Advanced Studies on Collaborative research, Toronto, Ontario, Canada, IBM Press.

Gwizdka, J. (2002b). Reinventing the inbox: supporting the management of pending tasks in email. CHI '02 extended abstracts on Human factors in computing systems, Minneapolis, Minnesota, USA, ACM Press.

Hall, R. J. (1998). "How to avoid unwanted email." Communications of the ACM **41**(3): 88 - 95.

Hallewell, B. (2000). "Softening the organisational impact of email." Training Journal(November 2000): 32-34.

Heathman, D. J. and Kleiner, B. H. (1991). "Future Directions for Computer Aided Training." Industrial and Commercial Training **23**(5).

Heckel, B. and Hamann, B. (1997). EmVis - A Visual E-mail Analysis Tool. Proceedings of the Workshop on New Paradigms in Information Visualization and Manipulation, Las Vegas, Nevada, USA, ACM Press.

Hein, K. (1996). "Managing to use email effectively." Incentive **170**(10): 29 - 32.

Henke, H. (1996). Learning Theory: Applying Kolb's Learning Style Inventory with Computer Based Training. at URL: http://sage.sdsu.edu/compswiki/uploads/CompsWiki/learningtheory.pdf (viewed 02/11/2005)

Hequet, M. (1997). "How Does Multimedia Change Training." Training(February): 20-22.

Hill, K. and Monk, A. F. (2000). "Electronic mail versus printed text: the effects on recipients." Interacting with Computers **13**(2): 253-263.

Hiltz, S. R., Johnson, K. and Turoff, M. (1986). "Experiences in group decision making: Communication process and outcome of face to face versus computerised conferences." Human Communication Research **13**: 225 - 252.

Hogg, C. (2000). Internet use and abuse, Chartered Institute of Personnel and Development.

Holden, R. (1992). "Integrating Computer-based Training: Exploiting the Best of CBT at Marks & Spencer." Education and Training **34**(5).

Holden, R. and Thackray, J. (1991). "Information Technology in Personnel Management: Teaching Computer-based Training." Education and Training **33**(1).

Huber, N. (2004). "HSBC head office staff gain two hours a week after e-mail training." ComputerWeekly.com at URL: http://www.computerweekly.com/Articles/2004/11/22/206905/HSBCheadofficestaffgaintwohoursaweekaftere-mailtraining.htm (viewed 28/06/05)

Hudson, S. E. and Smith, I. (1996). Electronic mail previews using non-speech audio. Conference companion on Human factors in computing systems: common ground, Vancouver, British Columbia, Canada, ACM Press.

Iivari, J. (1991). "A paradigmatic analysis of contemporary schools of IS development." European Journal of Information Systems **1**(4): 249-72.

Isbell, C., Amento, B., Whittaker, S., Bell, G. and Helfman, J. (2002). Ishmail: Managing Massive Amounts of Mail. UIST, Paris, France.

Jackson, T. W. and Burgess, A. (2003). Capturing and Managing Email Knowledge. Business Innovation in the Knowledge Economy - Abstracts from the IBM & Stratford-Upon-Avon Conference, Stratford-Upon-Avon, UK.

Jackson, T. W., Burgess, A. and Edwards, J. (2005). Optimising the Email Communication Environment. Proceedings of the 2005 IRMA conference, San Diego, USA.

Jackson, T. W., Burgess, A. and Edwards, J. (2006). "A Simple Approach to Improving Email Communication." Communications of the ACM **49**(6): 107 - 109.

Jackson, T. W., Dawson, R. and Wilson, D. (2001). "The Cost of Email Interruption." Journal of Systems and Information Technology **5**(1): 81 - 92.

Jackson, T. W., Dawson, R. and Wilson, D. (2003a). "Reducing the effect of email interruptions on employees." International Journal of Information Management **23**: 55 - 65.

Jackson, T. W., Dawson, R. and Wilson, D. (2003b). "Understanding Email Interactions Increases Organizational Productivity." Communications of the ACM **46**(8): 80 - 84.

Jakobs, K., Procter, R., Williams, R. and Fichtner, M. (1996). Some non-technical issues in the implementation of corporate e-mail: lessons from case studies. Proceedings of the 1996 ACM SIGCPR/SIGMIS conference on Computer personnel research, Denver, Colorado, United States, ACM Press.

Johnson, S. D., Aragon, S. R., Palma-Rivas, N., Shaik, N. and Bilsbury, N. (2000). Comparative analysis of online vs. face-to-face instruction. Cutting edge: Outstanding papers from the 1999 annual research conference. T. G. Hatcher, Baton Rouge, LA: Academy of Human Resource Development: 17-25.

Joinson, C. (1995). "Make your training stick." HRMagazine **40**(5): 55-60.

Kamiya, K., Roscheisen, M. and Winograd, T. (1996). Grassroots: providing a uniform framework for communicating, sharing information, and organizing people. Conference companion on Human factors in computing systems: common ground, Vancouver, British Columbia, Canada, ACM Press.

Kerr, B. (2003). THREAD ARCS: An Email Thread Visualization. In Proceedings of IEEE InfoVis, Seattle, WA, USA.

Kierkegaard, S. (2005). "Privacy in electronic communication: Watch your e-mail: Your boss is snooping!" Computer Law & Security Report **21**(3): 226-236.

Kiesler, S. and Sproull, L. S. (1986). "Response Effects in the Electronic Survey." Public Opinion Quarterly **50**: 402 - 413.

Kimble, C. and Abu Bakar, J. (2001). Information Overload and Electronic Mail: Tagging Message Content - A Partial Solution? Proceedings of the 6th UKAIS Conference, University of Portsmouth, Zeus Press.

Kimble, C., Hildreth, P. and Grimshaw, D. (1998). The role of contextual clues in the creation of Information Overload, Matching Technology with Organisational Needs. Proceedings of the 3rd UKAIS Conference, Lincoln, UK.

Kirkpatrick, D. L. (1994). Evaluating training programs: The four levels, Berrett-Koehler publishers.

Klob, D. A. (1984). Experiential Learning: Experience as the source of Learning and Development. Englewood Cliffs, N.J., Prentice-Hall.

Lawson, R. S. (1999). "Computer-Based Training: Is It the Next Wave?" Professional Safety **44**(6): 30-33.

Lea, M. and Spears, R. (1992). "Paralanguage and social perception in computer-mediated communication." Journal of Organizational Computing **2**(3-4): 321-341.

Lewis, C. E., Thompson, L. F., Wuensch, K. L., Grossnickle, W. F. and Cope, J. G. (2004). "The impact of recipient list size and priority signs on electronic helping behavior." Computers in Human Behavior **20**(5): 633-644.

Lewis, D. D. and Knowles, K. A. (1997). "Threading Electronic Mail: A Preliminary Study." Information Processing and Management **33**(2): 209 - 217.

Lucas, W. (1998). "Effects of E-Mail on the Organization." European Management Journal **16**(1): 18-30.

Lunt Crossman, P. (2004). "E-Learning for Short Attention Spans." Transform Magazine **13**(7): 37-43.

Mackay, W. (1989). "Diversity in the use of Electronic Mail: A Preliminary Inquiry." ACM Transactions on Office Information Systems **6**(4): 380 - 397.

Mackenzie, M. L. (2000). "The personal organization of electronic mail messages in a business environment: An exploratory study." Library & Information Science Research **22**(4): 405- 426.

Markus, L. M. (1994a). "Finding a Happy Medium: Explaining the Negative Effects of Electronic Communication on Social Life at Work." ACM Transactions on Information Systems **12**(2): 119 - 149.

Markus, L. M. (1994b). "Electronic Mail as the Medium of Managerial Choice." Organization Science **5**(4): 502-527.

Marold, K. A. and Larsen, G. (1997). The CMC range war: an investigation into user preferences for email and vmail. Proceedings of the 1997 ACM SIGCPR conference on Computer personnel research, San Francisco, California, United States, ACM Press.

Martin, J. (1999). Training help desk students: the never ending task. Proceedings of the 27th annual ACM SIGUCCS conference on User services: Mile high expectations, Denver, Colorado, United States, ACM Press.

Mayo, E. (1933). The human problems of an industrial civilization, Macmillan.

McDonald, D. S. (2004). "The influence of multimedia training on users' attitudes: lessons learned." Computers & Education **42**(2): 195-214.

Miles, M. B. and Huberman, A. M. (1994). Qualitative Data Analysis, Sage Publications.

Miller, T. (2002). Using Information Visualization to Manage Messages. CSCW 2002 - ACM Conference on Computer Supported Cooperative Work, November 16-20, Workshop Redesigning Email for the 21st Century, New Orleans, Louisiana, USA, ACM Press.

Mintzberg, H. (1973). The Nature of Managerial Work. New York, Harper & Row.

Mock, K. (2001). An experimental framework for email categorization and management. Proceedings of the 24th annual international ACM SIGIR conference on Research and development in information retrieval, New Orleans, Louisiana, United States, ACM Press.

Moody, P. (2002). Reinventing Email. CSCW 2002 Workshop: Redesigning Email for the 21st Century, New Orleans, LA, USA.

Moore, N. (2000). How to do Research The Complete Guide to Designing and Managing Research Projects. London, Library Association Publishing.

Muller, M. J. and Gruen, D. M. (2002). "Collaborating Within - not Through - Email: Users Reinvent a Familiar Technology." IBM Research at URL: http://domino.research.ibm.com/cambridge/research.nsf/2b4f81291401771785256976004a8d13/b5ab62165addd0ed85256c690070a2c8?OpenDocument (viewed 30/06/05)

Murphy, H. A., Hildebrandt, H. W. and Thomas, P. J. (1997). Effective Business Communications. New York, McGraw-Hill.

Nantz, K. S. and Drexel, C. L. (1995). "Incorporating electronic mail into the business communication course." Business Communication Quarterly **58**: 45 - 51.

National Statistics. (2002). Patterns of pay: results of the 2002 New Earnings Survey. at URL: http://www.statistics.gov.uk/articles/labour_market_trends/Patterns_of_pay_Dec2002.pdf (viewed 19/05/05)

Nelson, H. J., Armstrong, D. J. and Ghods, M. (2002). "Old Dogs and New Tricks." Communications of the ACM **45**(10): 132- 137.

Neumann, P. G. and Weinstein, L. (1997). "Spam, Spam, Spam!" Communications of the ACM **40**(6): 112.

Nguyen, D. and Truong, K. (2003). PHEmail: designing a privacy honoring email system. CHI '03 extended abstracts on Human factors in computing systems, Ft. Lauderdale, Florida, USA, ACM Press.

Oppenheim, A. N. (1992). Questionnaire Design, Interviewing and Attitude Measurement, Pinter Publishers.

Panteli, N. (2002). "Richness, power cues and email text." Information and Management **40**: 75 - 86.

Patterson, M. A. (2002). "Email in Daily Work." Carnegie Mellon University at URL: http://www.andrew.cmu.edu/user/mp72/email_in_daily_work.html (viewed 04/07/05)

Peter, I. (2004). "The history of email." Net History at URL: http://www.nethistory.info/History%20of%20the%20Internet/email.html (viewed 28/04/05)

Philip, G. and Young, E. S. (1987). "Man-machine interaction by voice: developments in speech technology. Part I: The state-of-the-art." Journal of Information Science **13**(1): 3-14.

Phillips, J., Pullman, P. and Wurtz, W. (1998). Info-line: Level 5 Evaluation: Mastering ROI, American Society for Training & Development.

Potter, J. (2000). Show me the money, in IT training. Proceedings of the 28th annual ACM SIGUCCS conference on User services: Building the future, Richmond, Virginia, United States, ACM Press.

Powell, R. R. (1985). Basic Research Methods for Librarians. New Jersey, Ablex Publishing.

PR Newswire. (2002). Email Usage to Exceed 60 Billion by 2006, According to IDC. at URL: http://www.prnewswire.co.uk/cgi/news/release?id=91415 (viewed 23/04/05)

Rand, A. (1996). "Technology Transforms Training." HRFocus 3(11): 11-13.

Rea, L. M. and Parker, R. A. (1997). Designing and Conducting Survey Research: A Comprehensive Guide, Jossey Bass.

Read, C. W. and Kleiner, B. H. (1996). "Which training methods are effective?" Management Development Review **9**(2): 24-29.

Robbins, S. P. and Coulter, M. (1999). Management, Prentice Hall.

Rocco, E. (1998). Trust Breaks Down in Electronic Contexts but Can Be Repaired by Some Initial Face-to-Face Contact. CHI 98, Los Angeles, CA, USA.

Rohall, S. L. (2002). Redesigning Email for the 21st Century: Workshop Position Paper. CSCW 2002 Workshop: Redesigning Email for the 21st Century, New Orleans, LA, USA.

Rohall, S. L., Gruen, D. M., Moody, P., Wattenberg, M., Stern, M. K., Kerr, B., Stachel, B., Dave, K., Armes, R. and Wilcox, E. (2004). ReMail: a reinvented email prototype. CHI '04 extended abstracts on Human factors in computing systems, Vienna, Austria, ACM Press.

Romm, C. T. and Pliskin, N. (1998). "Electronic Mail as a Coalition-Building Information Technology." ACM Transactions on Information Systems **16**(1): 82 - 100.

Romm, C. T., Pliskin, N. and Rifkin, W. D. (1996). "Diffusion of E-mail: An organisational learning perspective." Information & Management **31**(1): 37-46.

Rowe, F. and Struck, D. (1999). "Cultural values, media richness and telecommunication use in an organization." Accounting, Management and Information Technologies **9**(3): 161-192.

Russ-Eft, D. (1994). "Computer-based training, computer-assisted instruction, electronic performance support systems, and déjà vu." Human Resource Development Quarterly **5**(3): 207-213.

Russell, T. L. (1999). "The no significant difference phenomenon as reported in 355 research reports, summaries and papers: a comparative research annotated bibliography on technology for distance education." North Carolina State University: Office of Instructional Telecommunications.

Sambrook, S. (2001). "Factors influencing learners' perceptions of the quality of computer based learning materials." Journal of European Industrial Training **25**(2/3/4): 157-167.

Schein, E. (1972). Professional education. New York, McGraw-Hill.

Schmandt, C., Marmasse, N., Marti, S., Sawhney, N. and Wheeler, S. (2000). "Everywhere Messaging." IBM Systems Journal **39**(3&4): 660 - 677.

Schwartz, D. G. (1999). "When Email Meets Organizational Memories: Addressing Threats to Communication in a Learning Organization." International Journal of Human-Computer Studies **51**: 599- 614.

Seddon, P. B., Staples, D. S., Patnayakuni, R. and Bowtell, M. J. (1998). The IS effectiveness matrix: the importance of stakeholder and system in measuring IS success. Proceedings of the international conference on Information systems, Helsinki, Finland, Association for Information Systems.

Segal, R. B. and Kephart, J. O. (1999). MailCat: An Intelligent Assistant for Organizing E-Mail. Autonomous Agents, Seattle, WA, USA, ACM Press.

Sein, M. K., Bostrom, R. P. and Olfman, L. (1998). Re-conceptualizing IT training for the workforce of the future. Proceedings of the 1998 ACM SIGCPR conference on Computer personnel research, Boston, Massachusetts, United States, ACM Press.

Shayo, C. and Olfman, L. (1994). A three dimensional view and research agenda for the study of transfer of skills gained from formal end-user software training. Proceedings of the 1994 computer personnel research conference on Reinventing IS : managing information technology in changing organizations: managing information technology in changing organizations, Alexandria, Virginia, United States, ACM Press.

Shelbourne, M. (2002). Using Computer-Aided-Learning to train inexperienced surveyors in diagnosing defects in buildings. PhD: School of construction and property management, University of Salford.

Sheridan, T. and Ferrel, W. (1974). Man-Machine Systems: Information, Control and Decision Models of Human Performance, MIT Press, Cambridge, Massachusetts, USA.

Sillince, J. A. A., MacDonald, S., Lefang, B. and Frost, B. (1998). "Email Adoption, Diffusion, Use and Impact Within Small Firms: A Survey of UK Companies." International Journal of Information Management **18**(4): 231 - 242.

Sims, R. R. (1990). An Experimental Approach to Employee Training Systems. Westport, CT, Quorum Books.

Smith, C. D., Whiteley, H. E. and Smith, S. (1999). "Using email for teaching." Computers & Education **33**(1): 15-25.

Spamhaus. (2005). Increasing Spam Threat from Proxy. at URL: http://www.spamhaus.org/news.lasso?article=156 (viewed 23/04/05)

Sproull, L. and Kiesler, S. (1991). Connections: new ways of working in the networked organization. Cambridge, MA, MIT Press.

Sproull, L. S. (1986). "Using Electronic Mail for Data Collection in Organisational Research." Academy of Management Journal **29**(1): 159-169.

Stake, R. E. (1994). Case Studies. Handbook of Qualitative Research. N. K. Denzin and Y. S. Lincoln, Thousand Oaks.

Stern, M. K. (2004). Dates and times in email messages. Proceedings of the 9th international conference on Intelligent user interface, Funchal, Madeira, Portugal, ACM Press.

Suh, K. S. (1999). "Impact of communication medium on task performance and satisfaction: an examination of media-richness theory." Information & Management **35**(5): 295-312.

Sumner, M. (1988). The Impact of Electronic Mail on Managerial and Organizational Communications. Conference on Supporting Group Work, Palo Alto, CA, USA, ACM Press.

Thomas, B. (1996). "Using computers in employee assistance programmes. Employee Counselling Today." The Journal of Workplace Learning **8**(5): 17-21.

Thomas, D. (2003). "Retailer's e-mail ban highlights the dangers of lost productivity." ComputerWeekly.com at URL: http://www.computerweekly.com/articles/article.asp?liArticleID=125086&liArticleTypeID=1&liCategoryID=2&liChannelID=20&liFlavourID=1&sSearch=&nPage=1 (viewed 24/04/05)

Tracy, J. B. and Tews, M. J. (1995). "Training Effectiveness: Accounting for individual characteristics and the work environment." Cornell Hotel and Restaurant Administration Quarterly **36**(6): 36- 42.

Valacich, J. S., Paranka, D., George, J. F. and Nunamaker, J. F. (1993). "Communication Concurrency and The New Media." Communication Research **20**(2): 249 - 276.

Venolia, G. D., Neustaedter, C., Cadiz, J. J. and Gupta, A. (2003). Understanding sequence and reply relationships within email conversations: a mixed-model visualization. Proceedings of the SIGCHI conference on Human factors in computing systems, Ft. Lauderdale, Florida, USA, ACM Press.

Wagner, G. D. and Flannery, D. D. (2004). "A quantitative study of factors affecting learner acceptance of a computer-based training support tool." Journals of European Industrial Training **28**(5): 383-399.

Walsham, G. (1993). Interpreting Information Systems in Organisations, John Wiley & Sons.

Watson, G. (2001). "E-mail surveillance in the UK workplace - a management consulting case study." Aslib Proceedings **54**(1): 23 - 40.

Whalley, R. M. (1998). "Towards realising the full benefit of computer aided learning." Industrial and Commercial Training **30**(2): 53-62.

Whetten, D. A. and Cameron, K. S. (1995). Developing management skills. New York, HarperCollins.

White, G. and Zhang, L. (2004). "Sender-initiated email notification." Microsoft Research at URL: http://research.microsoft.com/research/pubs/view.aspx?type=Technical%20Report&id=831 (viewed 04/07/05)

Whittaker, S. (1996). Talking to strangers: an evaluation of the factors affecting electronic collaboration. Proceedings of the 1996 ACM conference on Computer supported cooperative work, Boston, Massachusetts, United States, ACM Press.

Whittaker, S. and Sidner, C. L. (1996). Email Overload: Exploring Information Management of Email. CHI Conference Proceedings, Vancouver, BC Canada.

Wilson, E. V. (2002). "Email Winners and Losers." Communications of the ACM **45**(10): 121 - 126.

Wilson, E. V. and Connolly, J. R. (2001). Effects of Group Task Pressure on Perceptions of Email and Face to Face Communication Effectiveness. GROUP '01, Boulder, Colorado, USA.

Woerner, S. L., Orlikowski, W. J. and Yates, J. (2004). The Media Toolbox: Combining Media In Organizational Communication. Academy of Management Conference, New Orleans, LA, USA.

Wray, R. (2003). "Phones4U boss says staff must face up to work without email." Guardian Unlimited Online at URL: http://www.guardian.co.uk/online/news/0,12597,1045417,00.html (viewed 24/04/05)

Xia, W. and Lee, G. (2000). The influence of persuasion, training and experience on user perceptions and acceptance of IT innovation. Proceedings of the twenty first international conference on Information systems, Brisbane, Queensland, Australia, Association for Information Systems.

Yee, K. (2002). Zest: Discussion mapping for mailing lists. In CSCW 2002 Conference Supplement, ACM Press.

Yin, R. K. (1993). Applications of Case Study Research, SAGE Publications.

Yin, R. K. (1994). Case Study Research: Design and Methods, SAGE Publications.

Yiu, K. S., Baecker, R., Silver, N. and Long, B. (1997). A Time Based Interface for Electronic Mail and Task Management. Design of Computing Systems: Proceedings of HCI International '97, Elsevier.

Zack, M. K. (1994). "Electronic messaging and communication effectiveness in an ongoing work group." Information & Management **26**: 231- 241.

Zeffane, R. and Cheek, B. (1995). "The differential use of written , computer- based and verbal information in an organizational context An empirical exploration." Information and Management **28**: 107 - 121.

Appendix I

List of The Author's Publications

Jackson, T. W., Burgess, A. and **Edwards, J.**, "A Simple Approach to Improving Email Communication." *Communications of the ACM,* 49(6), June 2006, pp107-109.

Jackson, T.W., Burgess, A. and **Edwards, J.**, "Optimising the Email Communication Environment" , *Managing Modern Organizations With Information Technology* , Khosrow-Pour, M. (ed.), Idea Group, Hershey, PA, US, IRMA , San Diego, California, USA, May 2005, pp. 819-820, ISBN: 1591408229 .

Burgess, A., Jackson, T.W. and **Edwards, J.**, "Email Training Significantly Reduces Email Defects" , *International Journal of Information Management* , 25(1) , February 2005, pp.71-83, ISSN: 0268-4012

Burgess, A., Jackson, T.W. and **Edwards, J.**, "Tolerance Levels of Employees within the Workplace" , *Innovations Through Information Technology* , Khosrow-Pour, M. (ed.), Idea Group, IRMA , New Orleans, USA, May 2004, pp. 205-207, ISBN: 1-59140-261-1 .

Burgess, A., Jackson, T.W. and **Edwards, J.**, "The Effectiveness of Training in Reducing Email Defects" , *New Approaches to Software Quality* , Edgar-Nevil, D., Ross, M. and Staples, G. (eds), British Computer Society, Software Quality Management , Canterbury, April 2004, pp. 345-354, ISBN: 1-902505-56-5 .

Jackson, T.W. and **Burgess, A.**, "Capturing and Managing Email Knowledge" , *Business Innovation in the Knowledge Economy - Abstracts from the IBM & Stratford-Upon-Avon Conference* , Abbot, J., Martin, L., Palmer, R., Stone, M. and Wright, L.T. (eds), De Montfort University, Leicester, UK, Business Innovation in the Knowledge Economy , Warwick & Stratford-Upon-Avon, UK, June 2003, pp. 28-29, ISBN: 1857213563 .

Burgess, A., Jackson, T.W. and **Edwards, J.**, "Measuring Electronic Communication Defects and their Impact at 3M" , *Process Improvement and Project Management Issues* , Ross & Staples (eds), Springer, Software Quality Management , Glasgow, Scotland, May 2003, pp. 343-353, ISBN:1-902505-53-0 .

Appendix II

3M Questionnaire: List of Questions Used

1. Please tick which age category you fall into:
   - Under 25
   - 25 – 34
   - 35 – 44
   - 45 – 55
   - Over 55

2. Please indicate your office location:

Atherstone	Aycliffe
Bangor	Bedford
Bracknell – 3M House	Bracknell – CTC
Bradford	Clitheroe
Dublin	Gorseinon
Home Based	Loughborough
Manchester	Milton Keynes
Minworth	Other

3. Sex: Male / Female

4. How long have you work for 3M:
   - Less than 5 years
   - 5 – 15 years
   - Over 15 years

5. Name of your department:
   - Corporate Marketing & Communications
   - Customer Service/Logistics

Engineering	Finance (European)
Finance (Regional)	Human Resources
Information Technology	Legal
Manufacturing	Procurement/Sourcing
Sales & Marketing	Six Sigma
Technical	Other

6. Job Grade

Upto JG8	JG 9 – 10
JG 11 – 13	JG 14+
Do not know	

7. How many emails do you receive daily?
8. How many of the emails you receive are for your information only?
9. How many of the emails you receive do you get copied in on unnecessarily?
10. How many of the emails you receive are irrelevant or untargeted?
11. How many of your received emails are either difficult to understand or you find the purpose of the message unclear?
12. Do you have pop-up notification when you receive new email? Yes/No

13. Email is too often used when face to face communication or the phone should be used instead. (1 – 5)
14. I understand most of the functions of my email application. (1 – 5)
15. I would say the emails I **write** are easy to read. (1 – 5)
16. I would say the emails I **write** are straight to the point
17. If I **write** an email that requires action it tells the recipient what is expected of them. (1 – 5)
18. If I **write** an email that requires action it states when the action is required. (1 – 5)
19. I would say the emails I **receive** are easy to read. (1 – 5)
20. I would say the emails I **receive** are straight to the point. (1 – 5)
21. If I **receive** an email that requires action it tells me what is expected of me. (1 – 5)
22. If I **receive** an email that requires action, it states when action is required. (1 – 5)
23. I get copied in on emails unnecessarily. (1 – 5)
24. I get irrelevant or untargeted emails. (1 – 5)
25. Email sometimes distracts me from more important work. (1 – 5)
26. I would benefit from training on the best practices of email. (1 – 5)
27. The subject line contains sufficient detail for me to access the importance of the email. (1 – 5)
28. The email 'Hints and Tips' were helpful in improving my effectiveness. (1 – 5)
29. How satisfied are you with the way 3M employees use email? (1 – 5)
30. Have you any general comments? (i.e. how to make email more effective etc.)

31. I feel well informed. (1 – 5)
32. I receive timely information to do my job. (1 – 5)
33. Do you feel there is the right balance of informal and formal communication within the company? (1 – 5)

Appendix III

LogicaCMG Questionnaire: List of Questions Used

1. Please tick which age category you fall into:
   Under 25
   25 – 34
   35 – 44
   45 – 55
   Over 55

2. Please indicate your office location:
   2420, The Quadrant
   400 Park Avenue
   Other : UK
   : Overseas

3. Sex: Male / Female

4. How long have you work for LogicaCMG:
   Less than 2 years
   2-5 years
   5-10 years
   Over 10 Years

5. Name of your department:
   Architecture (inc Agile Development)
   Business Development
   Global Operations
   HR & Finance & Quality
   Product & Solutions Development
   Product Management

6. Typically how many days per week are you based in the Bristol office:
   a. 1 day
   b. 2 days
   c. 3 days
   d. 4 days
   e. 5 days

7. How many emails do you receive daily? ____
   Approximately what percentage come from
   i. Colleagues in own department...___(%)
   ii. Other Mobile Payment staff.....___(%)
   iii. LogicaCMG staff, not Mobile ...___(%)
   iv. Customer/Supplier/Partner.....___(%)
   v. Other.....___(%)

8. How many of the emails you receive are for your information only?
9. How many of the emails you receive do you get copied in on unnecessarily?
10. How many of the emails you receive are irrelevant or untargeted? (Including SPAM)
11. I typically get a response to my email within _____ Minutes / Hours / Days (Delete as applicable)
12. How many emails do you send on average each day? ___
    Approximately what percentage are to
    i. Colleagues in own department...___(%)
    ii. Other Mobile Payment staff.....___(%)
    iii. LogicaCMG staff, not Mobile ...___(%)
    iv. Customer/Supplier/Partner.....___(%)
    v. Other.....___(%)

13. What proportion of your email do you never get a response to or have to re:send the message ____ %
14. Do you have pop-up notification when you receive new email? Yes/No

Please indicate what extent you agree with the following statements by choosing a number below (1 Strongly Agree ... 5 Strongly Disagree)

15. Email is too often used when face to face communication or the phone should be used instead. (1 – 5)
16. I understand most of the functions of my email application. (1 – 5)
17. I would say the emails I **write** are easy to read. (1 – 5)
18. I would say the emails I **write** are straight to the point
19. If I **write** an email that requires action it tells the recipient what is expected of them. (1 – 5)
20. If I **write** an email that requires action it states when the action is required. (1 – 5)

21. I would say the emails I **receive** are easy to read. (1 – 5)
22. I would say the emails I **receive** are straight to the point. (1 – 5)
23. If I **receive** an email that requires action it tells me what is expected of me. (1 – 5)
24. If I **receive** an email that requires action, it states when action is required. (1 – 5)
25. I am clear about who should be on the cc (carbon copy) list within the emails that I send. (1-5)
26. I get copied in on emails unnecessarily. (1 – 5)
27. You may get copied in on long chains of email. Please indicate what proportion of the email you get copied in on falls into each of the categories below according to when you are copied in on the message:

    Always from the beginning link (oldest part) _____%
    Generally from the beginning link _____%
    Midway though the message _____%
    Generally at the end link _____%
    Always at the end link (latest part) _____%

28. I get irrelevant or untargeted emails (including SPAM). (1 – 5)
29. Email sometimes distracts me from more important work. (1 – 5)
30. I would benefit from training on the best practices of email. (1 – 5)
31. The subject line contains sufficient detail for me to access the importance of the email. (1 – 5)
32. I find it easy to prioritise and manage messages within my email inbox (1-5)
33. How satisfied are you with the way LogicaCMG employees use email? (1 – 5)

34. Please rank the following communication mediums according to their importance to your job

    Fax
    Teleconference
    Memo
    Letter
    Post it note
    Email
    Telephone
    Other (Please specify)
    Other (Please specify)

35. Have you any general comments? (i.e. how to make email more effective etc.)

36. I feel well informed. (1 – 5)
37. I receive timely information to do my job. (1 – 5)
38. Do you feel there is the right balance of informal and formal communication within the company? (1 – 5)

Appendix IV

Danwood Questionnaire: List of Questions Used

1. Please tick which age category you fall into:
   - Under 25
   - 25 – 34
   - 35 – 44
   - 45 – 55
   - Over 55

2. Please indicate your office location:

Aberdeen	Belfast
Bristol	Bromsgrove
Castleford	Colchester
Dublin	Gateshead
Glasgow	Haslingden
Huntingdon	Iver
Leicester	Lincoln – Deacon Road
Lincoln – Eden House	Lincoln – Eyre Court
Lincoln – Harrison Place	Livingstone
London	Manchester
Norwich	Nottingham
Oxford	Southampton
Stockton on Tees	Home

3. Sex: Male / Female

4. How long have you work for Danwood:
   - Less than 5 years
   - 5-15 years
   - Over 15 Years

5. Name of your department:
   - Sales
   - Service
   - Distribution
   - Rebuild
   - Administration
   - Other

6. How many emails do you receive daily?
7. How many of the emails you receive are for your information only?
8. How many of the emails you receive do you get copied in on unnecessarily?
9. How many of the emails you receive are irrelevant or untargeted?
10. How many emails do you send on average each day?
11. Do you have pop-up notification when you receive new email? Yes/No

Please indicate what extent you agree with the following statements by choosing a number below (1 Strongly Agree ... 5 Strongly Disagree)

12. Email is too often used when face to face communication or the phone should be used instead. (1 – 5)
13. I understand most of the functions of my email application. (1 – 5)
14. I would say the emails I **write** are easy to read. (1 – 5)
15. I would say the emails I **write** are straight to the point
16. If I **write** an email that requires action it tells the recipient what is expected of them. (1 – 5)
17. If I **write** an email that requires action it states when the action is required. (1 – 5)
18. I would say the emails I **receive** are easy to read. (1 – 5)
19. I would say the emails I **receive** are straight to the point. (1 – 5)
20. If I **receive** an email that requires action it tells me what is expected of me. (1 – 5)
21. If I **receive** an email that requires action, it states when action is required. (1 – 5)
22. I get copied in on emails unnecessarily. (1 – 5)
23. I get irrelevant or untargeted emails. (1 – 5)
24. Email sometimes distracts me from more important work. (1 – 5)
25. I would benefit from training on the best practices of email. (1 – 5)
26. The subject line contains sufficient detail for me to access the importance of the email. (1 – 5)
27. I find it easy to prioritise and manage messages within my email inbox (1-5)
28. How satisfied are you with the way Danwood employees use email? (1 – 5)
29. Have you any general comments? (i.e. how to make email more effective etc.)

Appendix V

Professional Development Questionnaire: List of Questions Used

1. How many emails do you receive daily?
2. How many of the emails you receive are for your information only?
3. How many of the emails you receive do you get copied in on unnecessarily?
4. How many of the emails you receive are irrelevant or untargeted? (Including SPAM)
5. How many emails do you send on average each day?
6. Do you have pop-up notification when you receive new email? Yes/No

Please indicate what extent you agree with the following statements by choosing a number below (1 Strongly Agree ... 5 Strongly Disagree)

7. Email is too often used when face-to-face communication or the phone should be used instead. (1 – 5)
8. I understand most of the functions of my email application. (1 – 5)
9. I would say the emails I **write** are easy to read. (1 – 5)
10. I would say the emails I **write** are straight to the point
11. If I **write** an email that requires action it tells the recipient what is expected of them. (1 – 5)
12. If I **write** an email that requires action it states when the action is required. (1 – 5)
13. I would say the emails I **receive** are easy to read. (1 – 5)
14. I would say the emails I **receive** are straight to the point. (1 – 5)
15. If I **receive** an email that requires action it tells me what is expected of me. (1 – 5)
16. If I **receive** an email that requires action, it states when action is required. (1 – 5)
17. I get copied in on emails unnecessarily. (1 – 5)
18. I get irrelevant or untargeted emails. (1 – 5)
19. Email sometimes distracts me from more important work. (1 – 5)
20. I would benefit from training on the best practices of email. (1 – 5)
21. The subject line contains sufficient detail for me to access the importance of the email. (1 – 5)
22. I find it easy to prioritise and manage messages within my email inbox (1-5)
23. How satisfied are you with the way your colleagues use email? (1 – 5)
24. Have you any general comments? (i.e. how to make email more effective etc.)

Appendix VI

Real Time Email Trainer Usage Scenarios and Variables

Scenarios 1.x triggered by input within recipients field
Scenarios 2.x triggered by input within subject line
Scenario 3.x triggered by input within message body
Scenario 4.x triggered by attachments

Applicable output text displayed to the user under the following headings as appropriate:

Recipient field issues:
Subject issues:
Message body issues:
Attachment issues:

Variables that can be configured are identified in **bold**

Scenario 1.1: Message targeted to many recipients

If total number of recipients in To, CC and BCC fields > **MaxRecipientsBeforeWarning** then display:

"This message is being copied to X people. Do all of these recipients need to be copied in on this message?"

Conditions / scenario dependencies

If the message is a reply or forward then this scenario is ignored and either 2.3 or 2.5 are triggered as appropriately.

If the message contains an attachment then scenario 1.1 ignored and 4.2 triggered.

If there is an attachment and the message is a reply or forward then scenario 4.2 has priority over 2.3 and 2.5.

Scenario 2.1: Blank subject line

If subject line is blank or if it just says Re: or Fw: then display:

"You have not entered a subject line in your message. This will make it difficult for the recipient to know what the message is about."

Conditions / scenario dependencies

If this scenario true then scenarios 2.2 and 2.4 are ignored if triggered as they do not need to be displayed

Scenario 2.2: Subject line all in capital letters

If the subject line is all in capital letters then display:

"The subject line is all in capital letters. The recipient(s) of this message may regard this as aggressive behaviour on your part. Capitals should only be used to emphasize an important or urgent message."

Conditions / scenario dependencies

This scenario is not triggered if scenario 2.1 is true.

Scenario 2.3: A reply is targeted to many recipients

If total number of recipients in To, CC and BCC fields >
MaxRecipientsBeforeWarningRE AND message is a reply then display:

"Your reply is copied to X recipients. Is it necessary for all these people to see your reply?"

Conditions / scenario dependencies

This scenario replaces scenario 1.1 if the message is a reply.

Scenario 2.4: Short subject line

If chars in subject line < **MinSubjectLength** characters long then display:

"The subject line in your message is very short. Will this provide sufficient information for the recipient(s) to be able to tell what the message is about?"

Conditions / scenario dependencies

This scenario is not triggered if scenario 2.1 is true.

Scenario 2.5: A message is forwarded to many recipients

If total number of recipients in To, CC and BCC fields > **MaxRecipientsBeforeWarningFW**
AND message is being forwarded then display:

"You are about to forward this message to X recipients. Do all of these people need to see this message?"

Conditions / scenario dependencies

This scenario replaces scenario 1.1 if the message is a forward.

Scenario 3.1: A message is excessive in length

If the message body length in lines > **MaxBodyLength**
OR
If the total number of chars > **MaxBodyChar** then display:

"This email message is quite long. Would this message be better suited to another form of communication, such as the telephone or face to face conversation?"

Conditions / scenario dependencies

None

Scenario 3.2: Message body all in capitals

If the proportion of capital letters within the message body >
MaxBodyCapitalLettersPercentage then display:

"The message body is all in CAPITALS. The recipient(s) of this message may regard this as aggressive behaviour on your part. Text that is in capital letters is also harder to read than lower case."

Conditions / scenario dependencies

None

Scenario 3.3: Message not formatted into paragraphs

If (TotalNoOfLines / **NoOfBlankLines**) > **BodyMaxTotalToBlankLinesRatio**
AND
If TotalNoOfLines > **BodyMaxTotalLines1**
OR

If (TotalNoOfChars / **NoOfBlankLines**) >
BodyMaxTotalCharToBlankLinesRatio
AND
If TotalNoOfChars > **BodyMaxTotalChar1**
Then Display:

"The body of your message does not appear to be formatted into paragraphs. This can make it difficult for the recipient(s) to read and understand the message."

Conditions / scenario dependencies

None

Scenario 3.4: Fragmented message

If (TotalNoOfLines / NoOfBlankLines) < BodyMinTotalToBlankLinesRatio
AND
If TotalNoOfLines > BodyMaxTotalLines2
OR

If (TotalNoOfChars / NoOfBlankLines) <
BodyMinTotalCharToBlankLinesRatio
AND
If TotalNoOfChars > BodyMaxTotalChar2
Then display:

"The body of your message appears to have many large spaces between sections of text. This fragmentation can make it difficult for the reader to follow the message."

Conditions / scenario dependencies

None

Scenario 3.5: Ensures only the new section of a reply is parsed

If message is a reply only parses new part of message.
If triggered Parses up to -------Original Message--------

Conditions / scenario dependencies

None

Scenario 3.6: More than one question asked within a line

If there are more than 1 "?" on a line less than
BodyMaxSpacesBetweenQuestionMarks chars apart then display:

"It appears that you are asking several questions within the same paragraph in your message. This can make it difficult for the recipient(s) to read and respond to your questions. Each question should be on a new line, so that it is easy for the recipient to read."

Conditions / scenario dependencies

None

Scenario 4.1: Large attachments

If the total size of attachments is greater than **MaxAttachSize** KB then display:

"The total size of the attachments to this message is 2015KB. Is it necessary to send this attachment?"

Conditions / scenario dependencies

None

Scenario 4.2: Sending attachments to many recipients

If an attachment is about to be sent to more than **MaxRecipWithAttach** recipients. Then display:

"Does this attachment need to be sent to all X recipients?"

Conditions / scenario dependencies

This replaces scenario 1.1 if triggered.

Appendix VII

Slides Used for the Seminar Based Training at 3M

Slide 1

E-mail Effectiveness Training

Overcoming 3M's E-mail Overload

Slide 2

Agenda

- The e-mail volume trend
- The e-mail effectiveness questionnaire
- Project aims & plan
- What makes an ineffective e-mail?
- How to e-mail effectively
- How to manage your e-mail workload
- Next steps

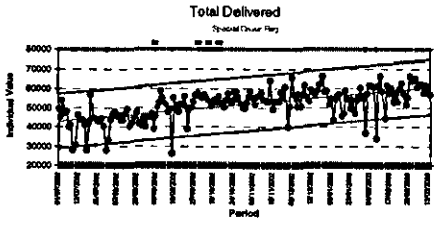
Slide 3

UK e-mail effectiveness Project

Quick-fix to e-mail template to remove "Reply to All" & "Reply to All with History"

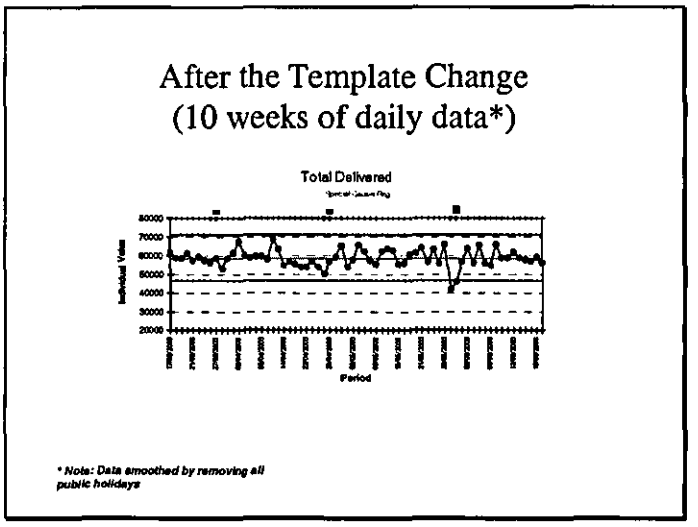
Slide 4

Baseline measurement up to the Template Change (37 weeks of daily data*)



Note: Data smoothed by removing all public holidays

Slide 5



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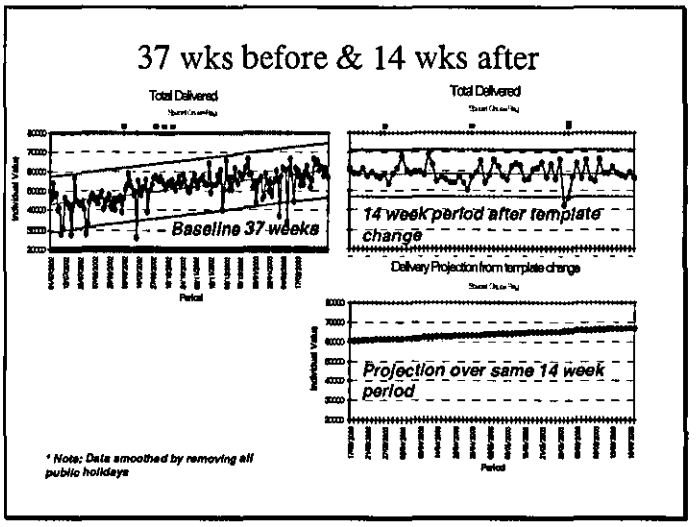


Slide 7

Improvements...

- After 37 weeks of measurement the last centre point value was 60552/day with a slope of 102
- The projected last centre point after a further 14 weeks was therefore 67182/day
- The actual last centre point after a further 14 weeks was 58289/day, 8893/day less
- 13.24% less than projected (15% growth eliminated)
- An historical growth of 1.1% per week has been eliminated in the 14 weeks following implementation.
- Real impact of global change would be higher as the improvements here are only due to mail sent by UK users to other UK users

Slide 8

UK e-mail effectiveness Project

E-mail effectiveness
questionnaire to all UK 3Mers

Slide 9

Questionnaire Results

• Location:	Bracknell 3M House	27%
	Loughborough	26%
• Depts:	Sales & Marketing	21%
	Technical	15%
	Customer Service/ Logistics	12%
	Other	11%
	IT	10%
• Male:Female	60:40	
• Responses:	875	

Slide 10

Questionnaire Results (2)

- Average No. e-mails received daily = 20
- Average No. received for info only = 7 (41%)
- Average No. copied in on unnecessarily = 3 (16%)
- Average No. irrelevant/untargeted = 2 (13%)

Slide 11

Questionnaire Results (3)

- 89% consider the e-mails they write to be easy to read; 45% consider the e-mails they receive to be easy to read.
- Over half of employees believe e-mail is too often used instead of other forms of communication.
- 49% find e-mail distracts them; 29% disagree

Slide 12

Project Aims

Improving the Health of the UK Organisation by reduction of Non-Value Added workload

- Reducing receipt of irrelevant e-mail
- Improving clarity of e-mail content
- Improving ease of assessing importance of e-mail
- Reducing use of e-mail when another medium is better.

Slide 13

Selection of Subjects for the Pilot Study.

- Using Lotus Notes billing data
- High volume sender – recipient pairs were chosen.
- Senders were invited to participate in the training.
- Their top recipients were invited to rate their e-mails.

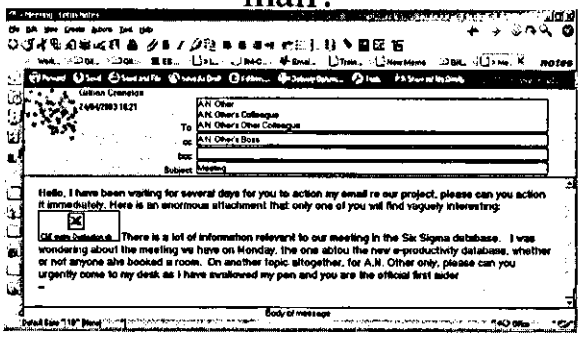
Slide 14

How your recipient will rate your e-mails…

	Example	Email 1	Email 2	Email 3	
The suitability of email as the communication medium	3				…
The email is easy to read	2				…
The email is straight to the point	3				…
The relevance of the message to me	2				…
If it is an actionable email:					
It tells me what is expected of me	4				…
It states when action is required	5				…
The subject line contains sufficient detail for:					
me to assess the importance of the message	2				…
me to know what the message is about	1				…
Approx how long did it take you to read and understand the message?	30 secs				…

Slide 15

What's Wrong With This E-mail?



Slide 16

Faults with the e-mail

- Subject line is vague
- No paragraphs or formatting
- No clear action points with names & deadlines
- Parts that are relevant to only one person should not be sent to everyone
- Covers several completely different topics

Slide 17

More Faults with the e-mail

- E-mail is the wrong medium for things that require instant action
- Only vague information is given – links to relevant pages in the Six Sigma database should have been included.
- Many people are in the 'to' field – is this really necessary?

Slide 18

More Faults with the e-mail

- Spelling is poor
- A.N. Other's Boss is copied in an attempt to shame A.N. Other into action. This is bad practice.

Slide 19

How to e-mail effectively

- How to get yourself read and understood amongst the tidal wave of e-communications...

Slide 20

What makes a good e-mail?(1)

1. Make the most of your subject line
   - If it looks like it doesn't apply, or looks like junk, or doesn't spark interest, then it may just be deleted unread.
   - It must reflect the content or it will provoke anger (and future mental filtering).
   - Using key words can help (FYI, ACTION, etc) but beware of overuse of URGENT, IMPORTANT otherwise you will be mentally filtered.
   - Remember, the whole message can be delivered in the subject
2. The first two sentences of the e-mail itself
   - Must capture the request or mains points at the front.
   - An "agenda" of the message
   - Multiple forwarding softens the impact – cut and paste relevant info and put in "value add" comments.

Slide 21

What makes a good email (2)

- Fundamental writing principles
  - The senders ability to write clearly (spelling, grammar, punctuation)
- Easy to read and respond to
  - Simple, limited number of points, short paragraphs, concise
- Appropriately detailed
  - Rich where needed (with no unnecessary distractions)
  - Knowing when to leave detail out
  - Use a signature
- Direct about expectations
  - Direct questions will get direct answers.
  - Detail exactly what is expected and by when.
  - But use a positive tone.

Slide 22

What makes a good e-mail(3)

- Targeted to key recipients
  - Distribution lists are not seen as important to individuals, and generally get skimmed.
  - People like to feel targeted.
  - Reply to all at your peril
  - Use bcc when sending to large distribution lists
- Reply without attachments

Slide 23

What makes a good email (4)

- Make your e-mails easier to read.
  - Use colours
  - Use sections
  - Use **formatting**
  - Use bullets
  - Use your spl chkr
  - But don't go ***over the top!***

Slide 24

Is an e-mail necessary?

A phone call may be more appropriate:

- If you are dealing with important information,
- If a personal approach is needed,
- If you are explaining detailed instructions,
- When a speedy response is needed,
- Or in a situation when many questions need to be asked or answered.

Slide 25

Sending Large Attachments?

There are alternative ways to share these files:

- Dropboxes – internal and external
  - Use these tools when sending a larger than average file or to a number of people
  - For more info on how to use these see the IT Site
- Collaboration Tools
  - Working together and sharing information within and across departments & countries, internally & externally
  - For more info on what is available see the IT Site

Slide 26

More Collaboration Tools

- Lotus Teamroom
- Instant Messaging
- Team Workplace
- Audio Conferencing
- Netmeeting
- E-Meeting

Slide 27

Send a Link instead

Instead of attaching or inserting the document, send a link to it:

- Document Links
  - If you use a shared database, you can send a link to it or to a document within it into an e-mail.
  - For more info on how to do this see the IT Site
- Hyper Links
  - Create links to enable others to click directly to a web page.

Slide 28

Managing Your Mail (1)

- Archiving
  - The archive function will transfer selected documents to a separate database stored on your PC, or other storage device. This will reduce the size of your mail file.
  - Archive mail files only reside locally. No automatically backed up is taken, so you will need to do this manually if necessary.
  - You have the option of archiving e-mails over N days old.
  - You can also manually select e-mails to archive
  - You can open your archive folder to read your e-mails
  - Instructions are available on the IT Site.

Slide 29

Managing Your Mail (2)

- Organising Your E-mails
  - Use folders.
  - Use the insert button on your keyboard to mark an e-mail as unread – this highlights important e-mails for you.
- Set your Out Of Office to inform people when you are away from work.

Slide 30

Avoiding Spam (1)

- Do not give out your internet e-mail address to any web site or company if you can avoid it.
- Avoid posting your Internet e-mail address on discussion or message boards on the Internet.
- If you receive unsolicited messages, do not unsubscribe if you do not know the sender or have not requested a subscription.

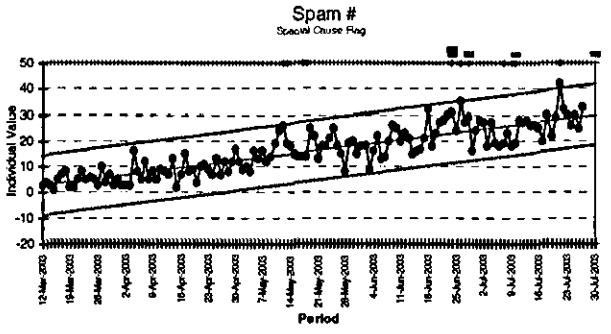
Slide 31

Avoiding Spam (2)

- Delete spam immediately without previewing or opening.
- Avoid filling in forms to send electronic greeting cards, news articles, or periodicals from web sites to other 3M personnel. Send a link instead.
- When using your out of office message, enable the 'Do not automatically reply to mail from Internet addresses' option.

Slide 32

SPAM growth in 20 weeks...



Slide 33

Dealing With Spam

- The most effective way to stop receiving spam is to change your internet address.
- If this is impractical for you, you may wish to filter your e-mail using rules. For example, you may choose to send any e-mail with the text 'sex' in it to a spam folder.
  - This is fine as long as you don't work with Sussex or Essex council!
  - Rules are a powerful tool & should only be used when you know what you are doing. Instructions are available on the Lotus Notes FAQs database.

Slide 34

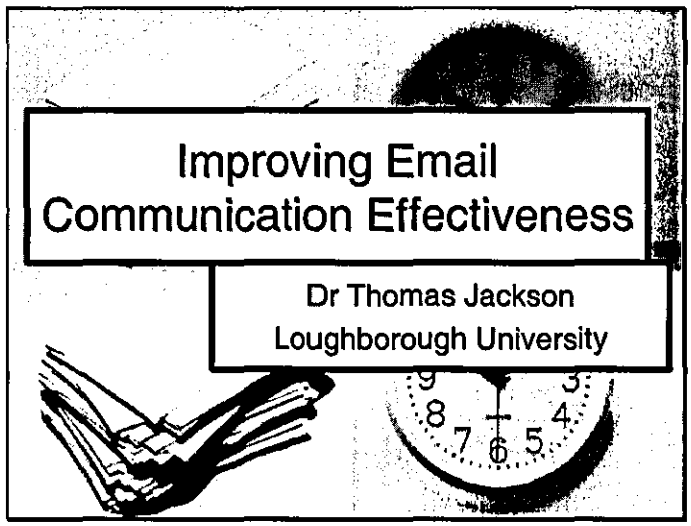
Next Steps

- Your recipients will rate your e-mails for effectiveness.
- We will analyse the data to evaluate any improvement.
- If significant improvement is detected, this training will be rolled out across the UK & Ireland region.

Appendix VIII

Slides Used for the Seminar Based Training within Professional Development

Slide 1



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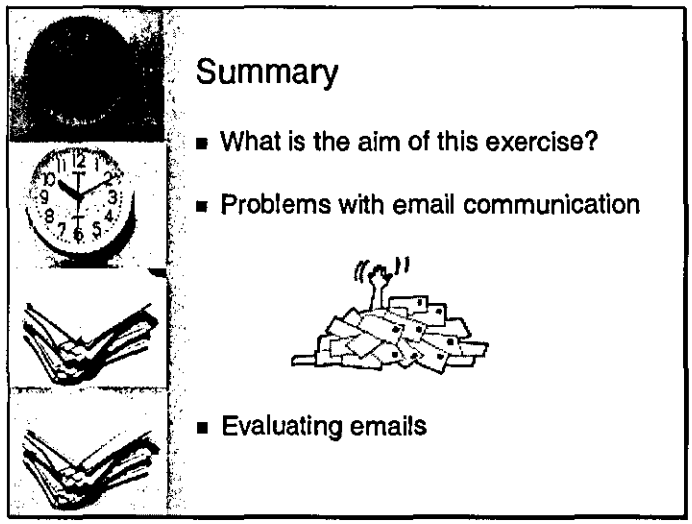

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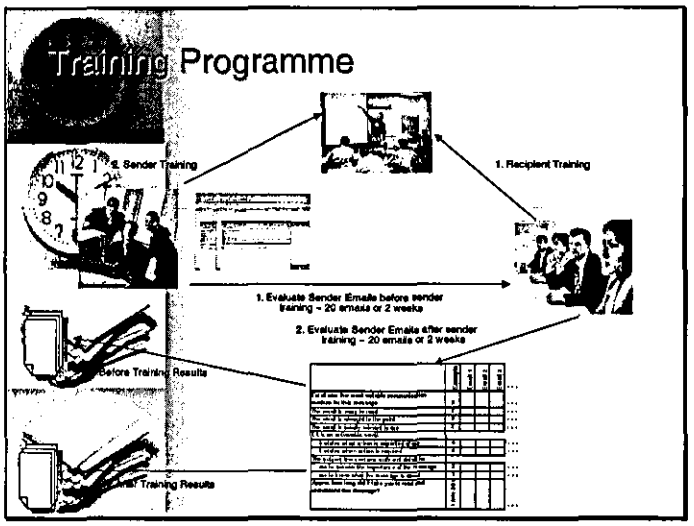

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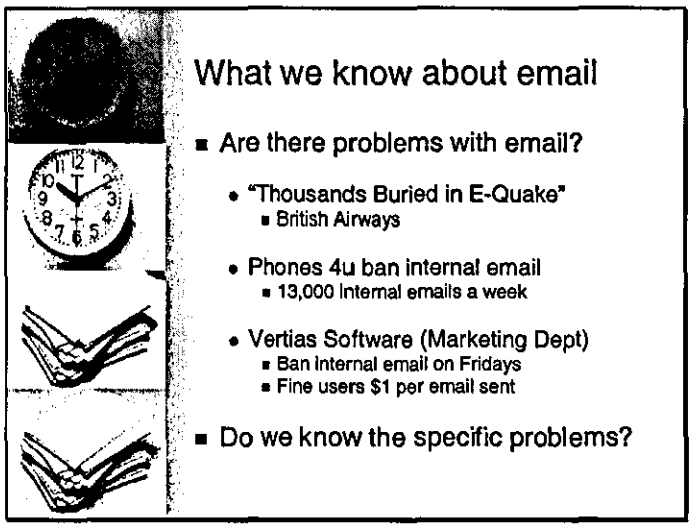

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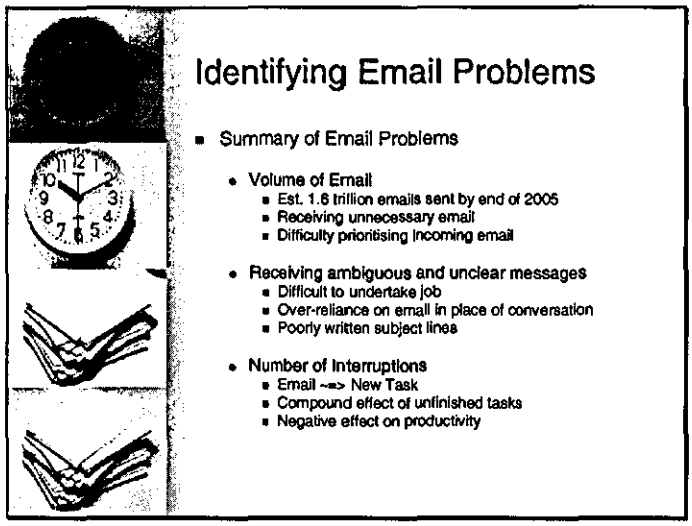

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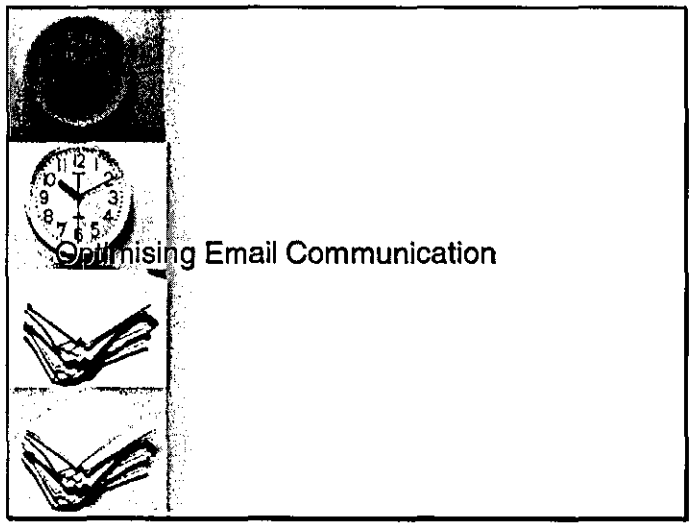

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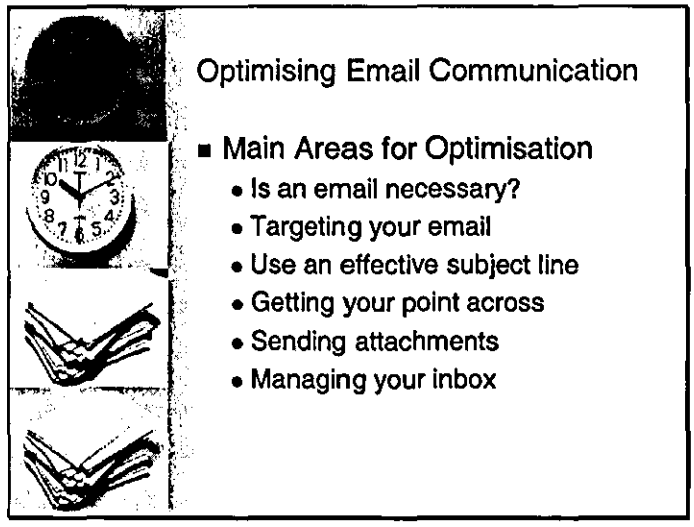

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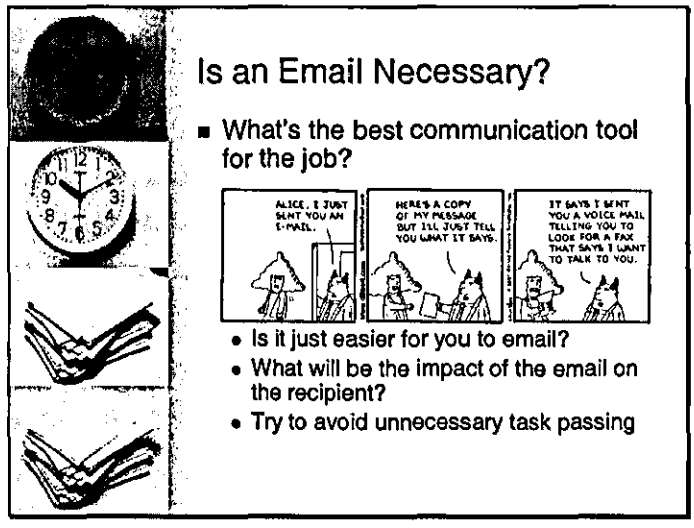

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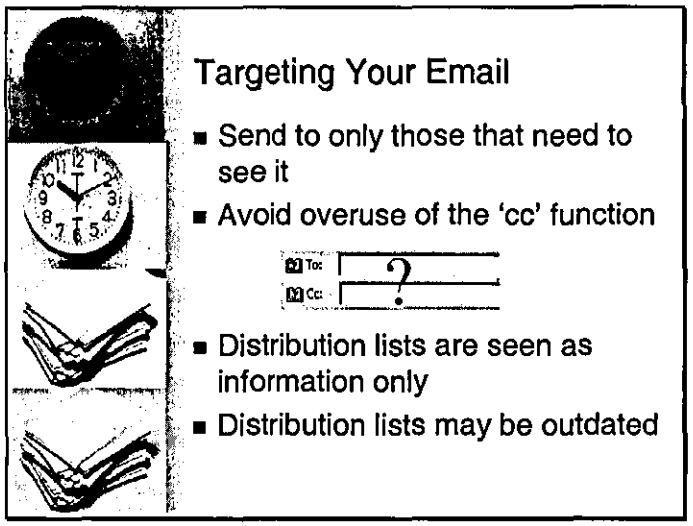

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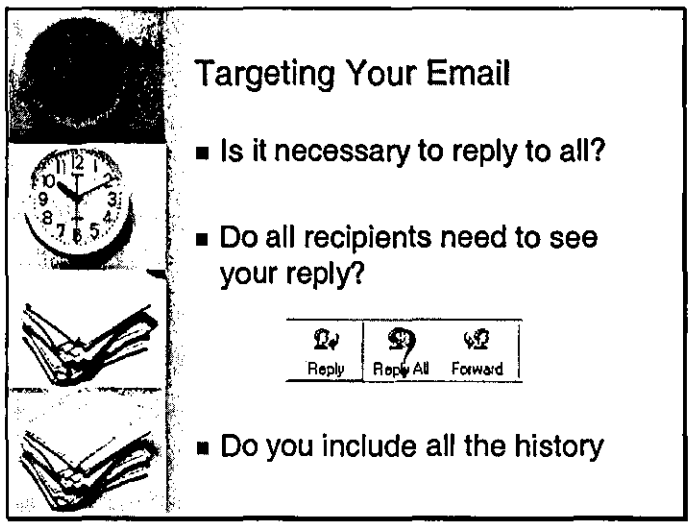

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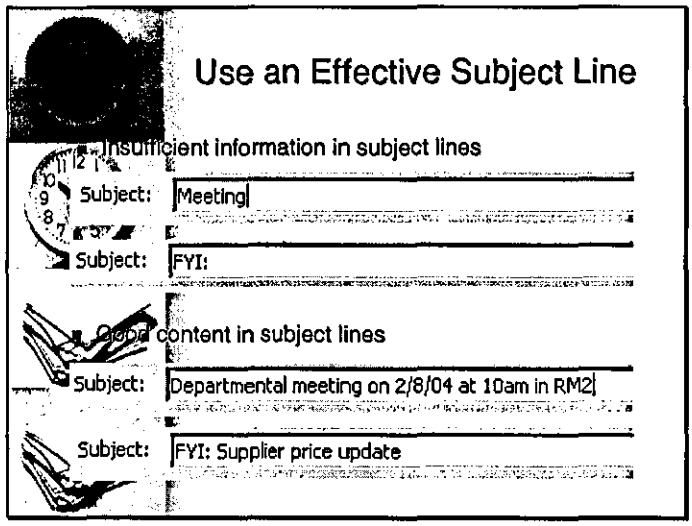

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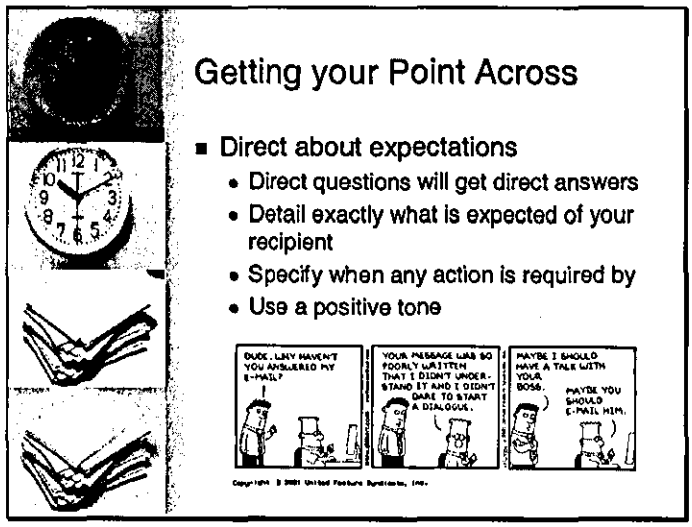

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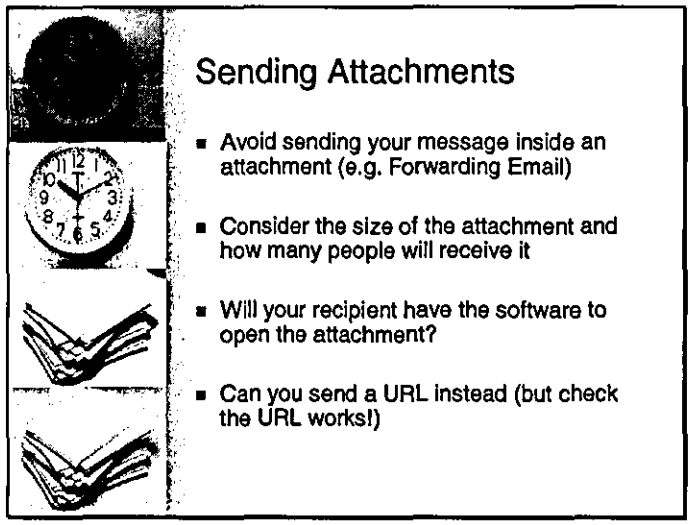

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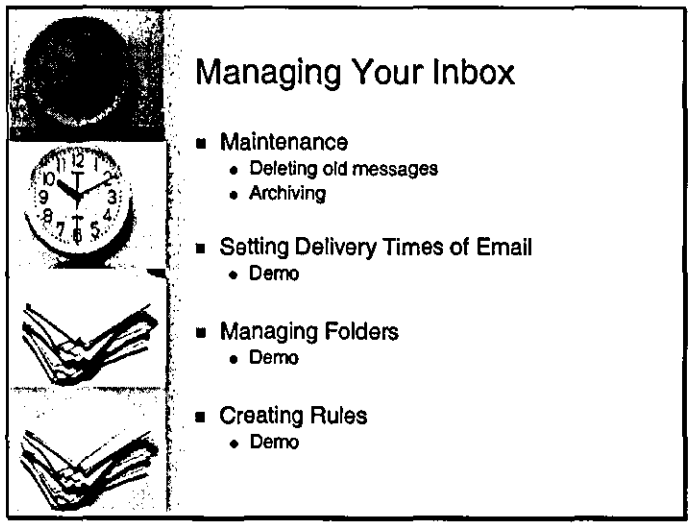

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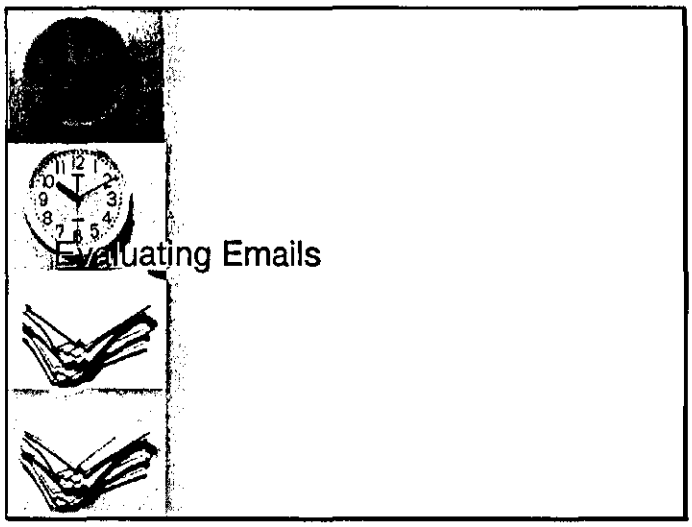

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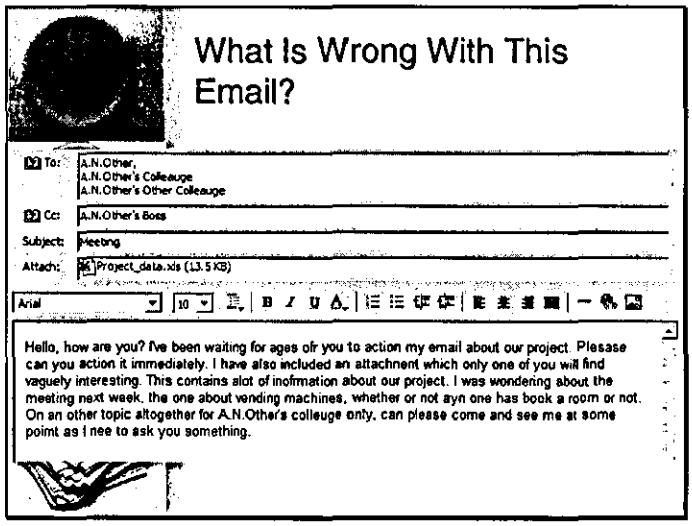

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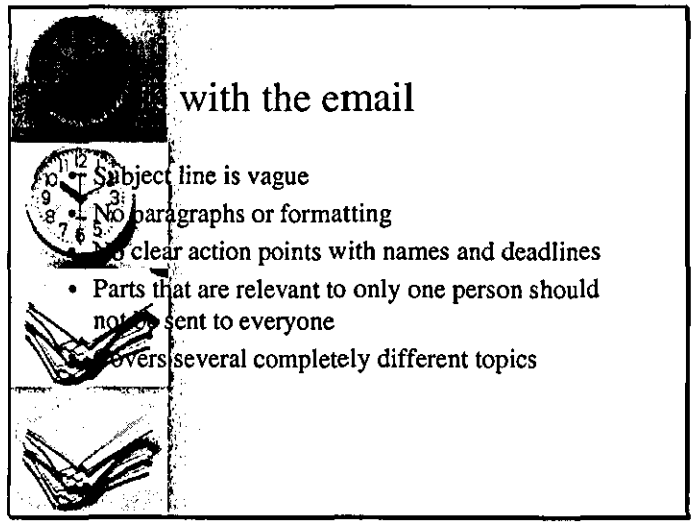

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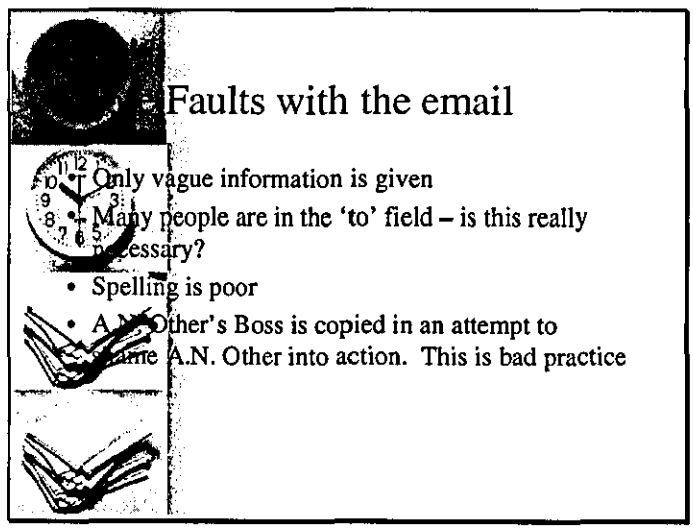

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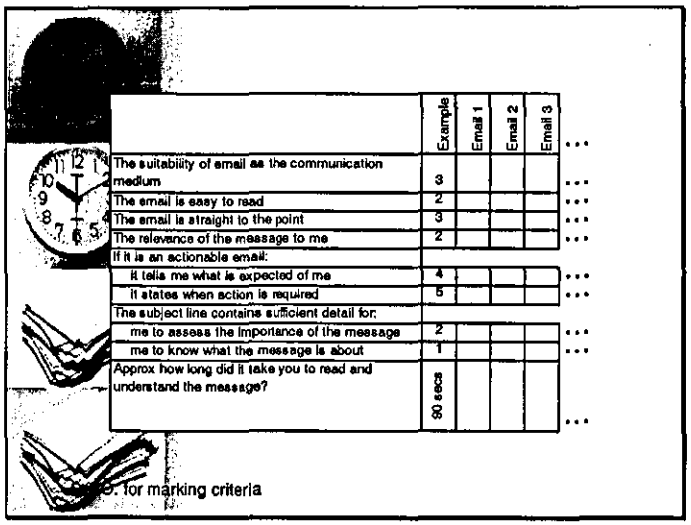

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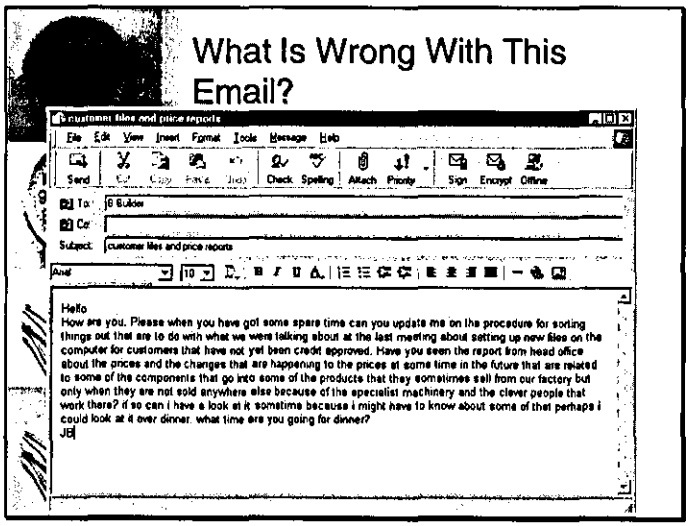

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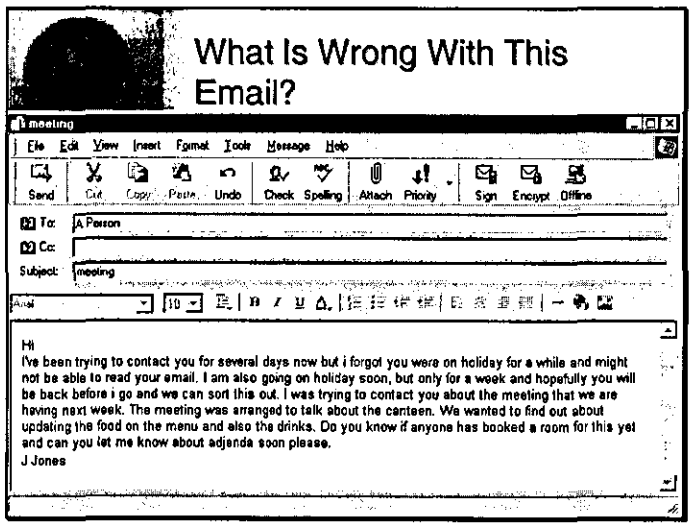

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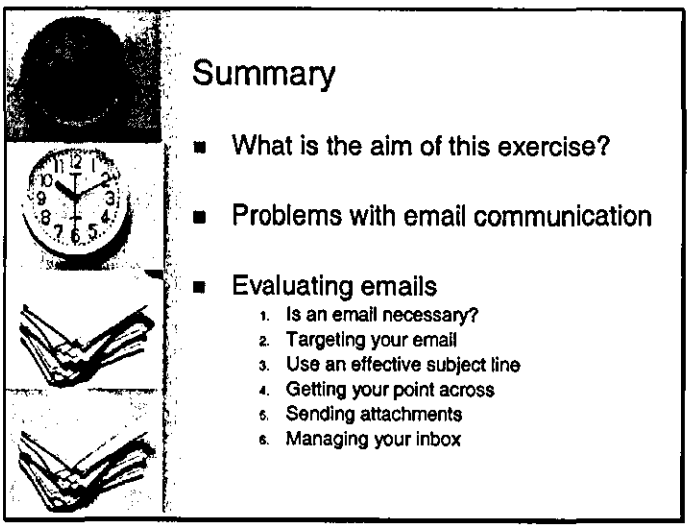
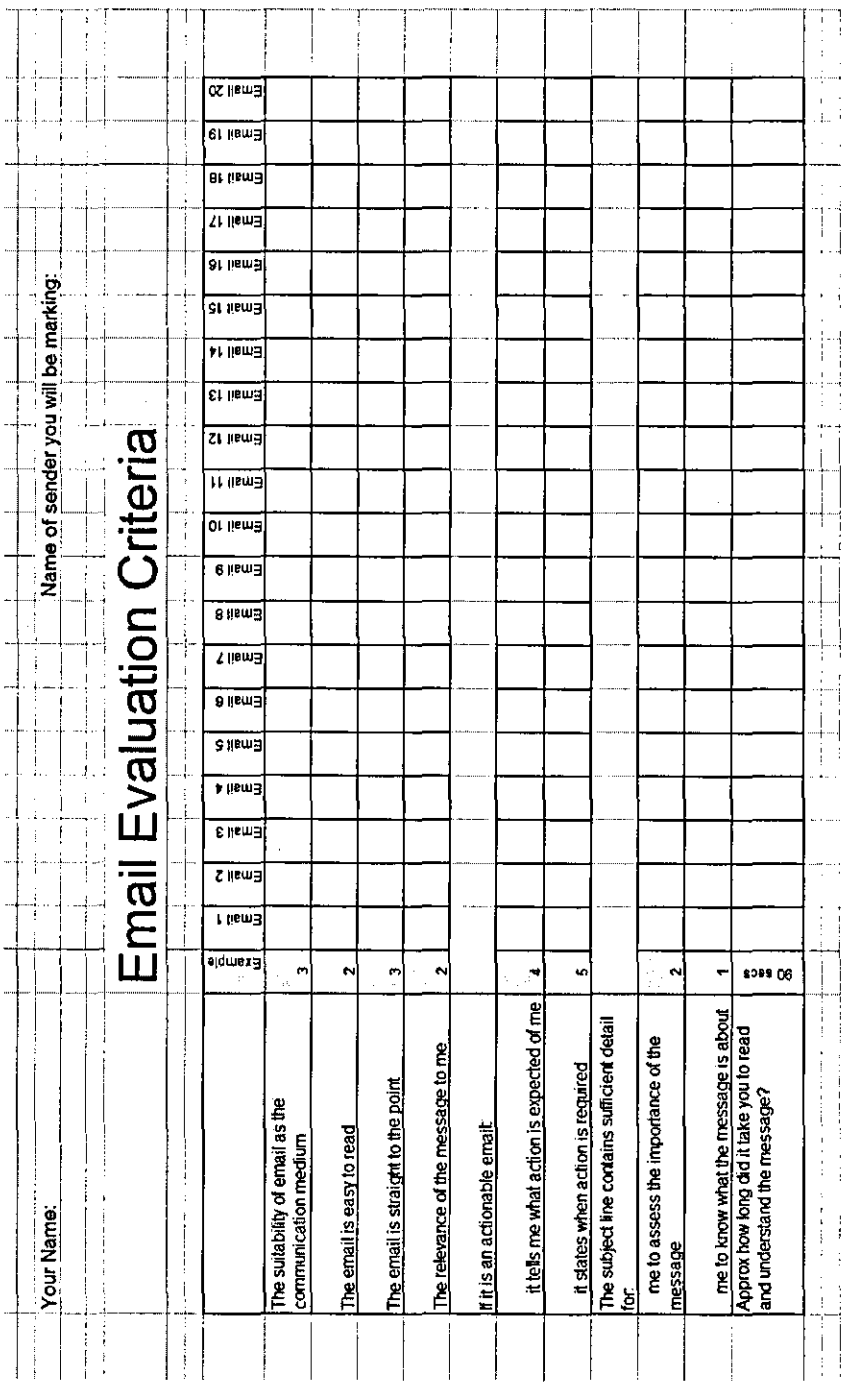


Appendix IX

Email Evaluation Criteria Sheet



Your Name:

Name of sender you will be marking:

Email Evaluation Criteria

	Example	Email 1	Email 2	Email 3	Email 4	Email 5	Email 6	Email 7	Email 8	Email 9	Email 10	Email 11	Email 12	Email 13	Email 14	Email 15	Email 16	Email 17	Email 18	Email 19	Email 20
The suitability of email as the communication medium	3																				
The email is easy to read	2																				
The email is straight to the point	3																				
The relevance of the message to me	2																				
If it is an actionable email:																					
it tells me what action is expected of me	4																				
it states when action is required	5																				
The subject line contains sufficient detail for:																					
me to assess the importance of the message	2																				
me to know what the message is about	1																				
Approx how long did it take you to read and understand the message?	90 secs																				

Explanation of Scale Used

	1	2	3	4	5
The suitability of email as the communication medium	Email was the most suitable medium for this message		Neutral		The message would have been better suited as face to face or the telephone
The email is easy to read	The message is very easy to read		Neutral		The message is very difficult to read
The email is straight to the point	The message is concise and straight to the point		Neutral		The message is long winded and unfocused
The relevance of the message to me	The message is totally relevant to me		Neutral		The message is totally irrelevant to me
If it is an actionable email:					
It tells me what action is expected of me	What is expected of me is very clear		Neutral		I am unaware what is expected of me
It states when action is required	The action deadline is clearly specified		Neutral		Deadlines for action are not clear
The subject line contains sufficient detail for:					
Me to assess the importance of the message	Any deadline / urgency is made clear		Neutral		Any deadline / urgency are totally unclear
Me to know what the message is about	The content of the email is well summarised		Neutral		The subject line gives me no idea of the content
Approx how long did it take you to read and understand the message?	Please answer in seconds				