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Can Seminar and Computer-Based Training Improve the Effectiveness of Electronic Mail Communication within the Workplace?

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Abstract

Email communication has become an integral part of the communication structure within organisations. However, we are far from efficient in using this organisational communication and knowledge sharing tool. We aim to improve workplace communications by improving the way email is used within the workplace. We undertake extensive two-phase research to demonstrate the need to give employees training regarding email communication, and conduct both seminar based training and computer-based training. Findings indicate that email training can lead to significant improvements in the way that employees use email within the workplace with computer-based training (or e-learning) showing a greater improvement. This study demonstrates that while email is a powerful organisational and knowledge tool, it can be optimised to better leverage its benefits by training employees in its use

Keywords

Seminar based training, computer-based training, email, workplace communication,

INTRODUCTION

In late 1971, a computer engineer named Ray Tomlinson sent the first electronic mail (email) message. This initial email foray consisted of a number of test messages sent to himself from one machine to another (Campbell T. 1998). Unlike Morse and Bell, Tomlinson is not well known globally, even though he created the way that email recipients are addressed, selecting the @ symbol as the locator in electronic addresses. His invention undoubtedly launched the digital information revolution, and yet the breakthrough he made was such a simple evolutionary step that hardly anyone noticed it at the time.

Today email systems have become an integral part of the information systems structure within organisations.

Email communication is also becoming a burden for many employees and the way email is handled is far from efficient (Rohall et al., 2004). Employees are overwhelmed by the volume (Levitt, 2004), lose important items (Whittaker and Sidner, 2004), and feel pressured to respond quickly (often within seconds Anon., 2003), among many other concerns. The major research stream in this field is trying to reduce such "email defects" by designing and building improved email systems designed from an understanding of email usage (Rohall et al., 2004). Although such systems aim to improve email communication, could providing simple education to email users provide, at worst, an interim solution to reduce email defects?

It is reasonable to suppose that the end-user of an email application is the major source of the problem, as he or she creates and receives the email that periodically causes problems. The 'back to education' approach is based on identifying the *major* problems that users face with email and administering training (both seminar and computer-based to determine which has the more enduring effect) to help users to become more effective email communicators. Although the approach sounds simple and has been successfully applied in many other arenas, will it be successful for improving email communication?

To date, there is very little literature on the role of seminar and computer-based training in improving email communication. This paper aims to explore organisational email defects and their management by employee email training in seminars or computer-based modes. The research was conducted in two phases. In the first phase, four interpretive case studies were conducted within separate organisations to discover how email was used and viewed by employees. The second phase of the research involved an evaluation process that determined the effectiveness of two training approaches (seminar based and a combined approach of computer-based and seminar based training created by the author) to reduce the email defects identified from the first phase and improve the way employees use email.

WHAT ARE THE EMAIL PROBLEMS TO ADDRESS?

The problem areas (email defects) relate to the inefficient and ineffective uses of email within an organisation.

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 led to employees spending a considerable amount of time within email applications, which become their primary “electronic habitat” (Duncheaneut and Bellotti, 2001).

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 (CC). Users are also bombarded by unsolicited email, which now accounts for 75% of email traffic and was predicted to rise to 95% by the middle of 2006 (Spamhaus, 2005).

Organisations are 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 upon which to act, and ambiguous and poorly written emails can lead to misunderstandings that can cause tension within the workplace and may lead to incorrect instructions being followed (Frazee, 1996). Additionally, poor use of grammar and the overuse of abbreviations can also cause messages to be more difficult to decipher.

Research undertaken by Anon (2001) found that email can be a distraction within the workplace, and that once a distraction by email occurs, there is an interrupt recovery time. The researchers reported an average of 64 seconds to recover from an email interrupt and to return to their work at the same rate at which they left it (Anon 2001). The recovery period is related not only to the volume of messages received, but also to the configuration of a user’s email application. Anon (2001) illustrates 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 increased volume of emails sent and received within organisations has caused some employees to become overloaded by email. The International Data Corporation (IDC) predicted that 60 billion emails will be sent worldwide every day by 2006, up from 31 billion email in 2002 (cited in PR Newswire, 2002). Efficient processing of the volume of email is not helped by the reported lack of training given to workers to enable them to use email more effectively (Burgess et al., 2004). The problems associated with email – hereon termed “email defects” -, which are related to both the quantity and the quality of email, must be reduced for employees to become more effective users of email. Such effectiveness will, in turn, optimise employee time and reduce the cost associated with email communication.

IMPROVING EMAIL COMMUNICATION

There are several approaches to improving organisational email use for everyday communication. 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) suggests that organisations have policies on the retention and deletion of email, while Watson (2001) states that organisations should monitor employee email use to ensure that policies are followed.

Some organisations have taken a stand by banning email communication at certain times in an attempt to 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, but rather, simply avoids them.

Email education within organisations tends to focus on hardware and software issues without taking into account 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. However, Hallewell (2000) suggested that employees need training on the ‘human side’ of email rather than just how to use email. He argued that email training focuses on how to send and receive email messages, without being taught when it is appropriate to do so (Hallewell, 2000). Indeed, even the most educated of employees can lack basic skills for expressing themselves effectively (Davenport, 1997).

Several issues relating to the quality of written email messages have been identified. In order to achieve both fast 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

The above quality-oriented factors contribute to well written email messages. Several earlier studies have identified instances in which these factors have not been present, 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 the Whittaker and Sidner (1996) study commented that some employees failed to take into account the context of their message before they sent it. Participants stated that they would often receive one line replies to messages without knowing the context. Messages 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 may include content 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.

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. While these tools may be aiding users to manage their email on the recipient side, they do not help users to write effective emails, nor cover the most appropriate methods to do this. Missing from the literature on e-mail management are solutions and theories based on employee email training. One of the key questions in this emerging stream that needs to be determined is the effectiveness of both computer-based and traditional seminar based training in enabling employees to write more effective emails and reduce the problems often associated with email communication.

A MANAGEMENT SOLUTION: TRAINING IN EMAIL COMMUNICATION

For the training of employees in effective email communication, many training methods are available and the method selected depends on a number of different factors. Such factors include the organisation size and set-up, the nature of the organisation and its trade/business, and the systems and processes that are used.

Seminar based training (SBT) refers to traditional classroom training, taught by one trained in the skills required. Computer-Based Training (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). Henke (1996) stated in 1996 that computer-based training was a fast growing field. Even earlier, Filipczak noted 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). Considering that this statistic was noted more than ten years ago, 40% is quite a high figure.

As mentioned in the introduction, while the use of CBT has been documented and discussed, what is lacking from the literature is evidence of whether computer-based training has more enduring effects compared to seminar based training, and whether computer-based training is more effective for training employees in the use of email.

RESEARCH METHODS

The research seeks to improve workplace communications by investigating the way email communication is used and exploring the role of employee training in managing the issues identified. The research adopts an interpretivist approach, as the research takes place within an organisational environment, and although the research conducted was both qualitative and quantitative the research focuses on capturing information within a social environment in an organisation, rather than a laboratory (Walsham, 1995). Extensive two stage research involved four UK organisations. The four organisations were selected for convenience as they have advisory connections with the researcher's university and hence access was available. They 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 provide 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, **The Danwood Group** 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.

The first phase of the study was concerned with highlighting any problem areas in the way that email is used within organisations. This was achieved by establishing how email is used within the organisational environment. Email defects 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. In order to identify the potential problem areas with email use a web-hosted internal survey was conducted and a questionnaire was developed. This method was selected because the ability to distribute the questionnaires to a wide geographical area was vital due to a number of employees being based at different locations throughout the United Kingdom. Several open-ended questions were used to capture how many emails were received by employees and how employees categorised the importance and relevance of each email. A series of closed attitudinal questions were used to gauge how email was used and how the employees viewed organisational email use. Questions included questions such as “How many of the emails you receive do you get copied in on unnecessarily?”, “How many emails do you send on average each day?” and “I would say the emails I receive are straight to the point. (1 – 5)?”. The rest of the questions are available on request. Each questionnaire was live for a period of two weeks. In total, 875 employees from 3M completed the questionnaire in 2004. Given that the organisation has approximately 2850 email users, this gives a response rate of 31%. The questionnaire was sent out in 2005 to 138 employees at LogicaCMG with 77 responses giving a response rate of 56%. Some 167 responses were received from Danwood in 2005 and 16 from PD in 2006, giving response rates of 28% and 70% respectively. Such response rates are considered acceptable for sample sizes.

The second stage determined the effectiveness of both seminar-based and a combined seminar/computer-based training approach to reducing email deficiencies as will be described below. The research aims 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 were analysed, to determine if any improvements in email use could be sustained. Further details help explain the evaluation approach used, below.

Computer-Based Software Development

A real time email trainer application was developed by the Knowledge Management Research Group at Loughborough University, 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. The software was designed to work with Microsoft Outlook 2000, 2002 and 2003 as Outlook is well recognised as the defacto corporate email standard. The computer-based email training application has been built so that it flags potential defects within an email by parsing each email and highlighting the defects to the sender before the email is sent. 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. Details of the parsing algorithm used are published elsewhere (Burgess et al., 2005). 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 that 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 had full control over sending an email as this gave them confidence in using the system and being able to override it. 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.

The software was developed using Visual Basic as this enabled faster development than if a more complex programming language such as C++ was used. Installation of the software requires a file to be added to the registry to store the values for the variables associated with the parsing criteria. Editing this file and reapplying it to the registry could then alter the values for variables. The software was revised several times during the development process and was continuously tested on a group of six computers by the researchers 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 participating organisations. The development of this software enabled the author to determine the effectiveness of a combined SBT and CBT training approach at improving email use within the workplace.

Developing the Seminar Based Email Training Programme

The SBT summarised the common problems with email use that can exist within the workplace. Training was tailored for each organisation by focusing on the problems highlighted from the questionnaire results together with examples from other research. It was important to highlight the common problems with email communication in order to enable participants to understand the magnitude of some of the issues.

The training programme identified defects that individual employees can help reduce, by improving the way they use email. Employees were 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 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 whether another medium such as such as the telephone would be more appropriate. The employees were also asked to consider to whom they were sending their email message, and whether all recipients needed to be copied in (cc-ed). The participants were given advice on how to write effective subject lines and emails that contain clear concise messages. The training also covered other aspects of email best practice, such as managing the inbox. This was considered important, as it will enable participants to better manage and prioritise their incoming email.

Measuring Improvement

Both SBT and CBT were conducted using sender and recipient pairs in order to measure the effectiveness of both SBT and CBT. The senders had an established email communication relationship with their recipients, in that they made regular contact with each other via email. Steps consisted of:

1. Once the sender / recipient pairs were established, the recipients would receive training on how to evaluate the emails they receive from their pair(s).
2. The recipients evaluated up to 20 emails that they received from their paired sender(s) over a specified timeframe.
3. After the senders' email had been evaluated, the senders would then receive SBT on the best practices of email, even if they were going to use CBT.
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.

The recipients were asked to mark each email against a set of nine criteria derived from the email defects identified in the questionnaires. The difference in the scores before and after the sender received training would indicate the success or failure of the training. The recipients would be asked to date and evaluate the emails that 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 was limited.

Training was conducted in the four organisations and varied slightly to cater for numbers, time constraints and needs of the organisation. 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 results indicate which aspects of email use are most receptive to SBT.

RESULTS

Results from the Questionnaires

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.

Due to the space limitations of paper size we present here only the main findings from the 3M questionnaire:

- 16% of emails received were copied in unnecessarily
- 13% of emails received were irrelevant or untargeted
- 41% of emails received were information purposes

- 46% of actionable emails received stated what action is expected
- 56% of employees agreed email is used too often instead of phone or face-to-face
- 45% of employees say their emails are easy to read

The email defects identified need to be reduced in order to increase the effectiveness of email communication in 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 that employees spend using email can be reduced by reducing the volume of unnecessary email and by improving the quality of written email. These aspects of email defects were then addressed within the SBT.

Results from the Training Programmes

Only two out of the four participating organisations took part in the SBT (3M and PD) and only one took part in the comparison between SBT and CBT (PD) due to unforeseen circumstances. Following SBT the t-test analysis shows that four out of the nine criteria showed significant initial improvements at both 3M and PD. 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.

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 1 - The overall mean effect of SBT on how emails were evaluated within PD in weeks two and three after training

The initial effect of the SBT can diminish over time, as shown by Table 1. 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 criteria. The only criteria where the effect of the SBT did not diminish 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 initial impact of the combined training (SBT and CBT) 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 criteria 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 in CBT had been sustained or had shown further improvement. The only criteria where the overall initial impact of the training had diminished 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 improvements four weeks later for the CBT. 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 results 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.

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 that the impact of the combined approach is more sustainable than the SBT on its own.

While the results have shown that email defects can be reduced and effective use of email improved by deploying SBT and CBT, what do the results mean in terms of cost? 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 and does not take into account the interruptive nature of email.

Assuming an average salary of £24,603 (monetary amounts are 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, 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).

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

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 1: The organisational cost of email use (per day)

Equation 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.

An Example: Worst Case Scenario of Current Costs for 3M

The results from the questionnaire show that employees from 3M receive on average 23 emails per day. According to the results from the first phase of the SBT, 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 8 hour day is 96. 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. The time taken by these email interruptions is 24.5 minutes.

Using Equation 1 the daily cost of email use for 3M was calculated to be £60,404, given that the organisation has 2850 email users. The annual cost is almost £14.5million and the cost per employee was £5,087 per annum assuming an employees work 48 weeks per year.

Using the same calculations, the daily cost of email use within LogicaCMG was calculated to be £216,195, given that LogicaCMG has around 6000 employees within the UK. The annual cost is almost £52million and the cost per employee was £8,648 per annum based on a working 48 week year. The total daily cost of email use within PD using Equation 7.1 was calculated to be £793, given PD has 23 employees. The total annual cost is £190,340 and the cost per employee per annum is £8,276.

Costs and Potential Savings

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 an 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 their organisation. 3M could save an initial 8% and PD an initial 4% 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 2%, 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. However, the cost savings do not take into account the operating costs of the training sessions.

The costs and potential savings identified only focus on the time spent reading emails, and do not include the cost associated with dealing with the actual email itself or the time spent writing or responding to email. 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. However, it is plausible that there is a cost associated with email use, which can be reduced by optimising email use within the workplace.

CONCLUSION

While existing studies identified a number of problems with email use, this project sought to research the specific email problems within a number of organisations with the intention of reducing the highlighted defects. While the generalisability of this research is impossible due to the study being of only four organisations, in the UK context, the findings are indicative, and suggest that there are many deficiencies with the way email is used within today's organisations. Such defects relate to both the written quality and quantity of email received and the ineffective configuration of an organisations email systems and can increase the amount of time spent dealing with email and can lead to tasks being carried out incorrectly or not at all. Several important implications arise from the study, as outlined below.

First, the study has added to current theory on email management in organisations by providing numerous insights relating to email defects in companies, and their management by various types of training. Second, the findings demonstrate that SBT can improve employee use of email, although the initial impact of the training can diminish over time. The results highlight that the impact of SBT can vary on the specific areas of email use that are improved, with some criteria showing greater improvement than others. However interestingly, the combined training approach (seminar based and computer-based training) did produce improvements that were sustained. Further research is needed to better understand this finding.

Second, the findings from this paper may help similar organisations to those studied to become more effective in managing their email communication systems. It is recommended that organisations examine their current email communication policies and develop a “snapshot” of how their employees use email. Such information will provide an organisation with a useful foundation from which to build their training in order to increase their employee effectiveness by email education. If an organisation decides to deploy an email training programme, it is recommended that it not only focuses on the sender side of how to write more effective emails, but also on how to manage the inbox from the recipients point of view. 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.

Overall, this research shows how the cost of email use can be optimised by reducing the volume of irrelevant and untargeted email and by reducing the frequency with which an email application checks for new email. While assigning a monetary value to this research is an oversimplification of impact, it is commonly used in risk management as an impact estimate, and certainly helps organisations to visualise the benefits of information systems training such as the e-mail training discussed in this paper.

REFERENCES

- Alonzo, M. and Aiken, M. (2004). "Flaming in electronic communication." *Decision Support Systems* 36(3): 205-213.
- 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.
- 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)
- 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.
- 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.
- 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.
- Campbell T. 1998. "The first email message." .
<http://www.howstuffworks.com/framed.htm?parent=email.htm&url=http://www.pretext.com/mar98/features/story2.htm>, Last accessed September 2001.
- Cushing, K. (2002). *Should we ban email?* Computer Weekly.
- Davenport, T. H. (1997). *Information Ecology*, Oxford University Press, New York.
- 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. and Bellotti, V. (2001). "Email as Habitat: An Exploration of Embedded Personal Information Management." *Interactions* 8(5): 30 - 38.
- Duane, A. and Finnegan, P. (2004). *Managing email usage: A cross case analysis of experiences with electronic monitoring and control*. Sixth International Conference on Electronic Commerce.
- Fraze, V. (1996). "Is email doing more harm than good?" *Personnel Journal* 23.
- Filipczak, B. (1995). "Learning Styles Escape the Classroom! Panic in the City." *Training* 32(3): 46.
- Hallewell, B. (2000). "Softening the organisational impact of email." *Training Journal*(November 2000): 32-34.
- 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)
- 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., R. Dawson, and D. Wilson, "Understanding Email Interaction Increases Organizational Productivity," *Communications of the ACM*, August 2003, pp. 80-84, ISSN: 0001-0782 .

- 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.
- Lea, M. and Spears, R. (1992). "Paralanguage and social perception in computer-mediated communication." *Journal of Organizational Computing* 2(3-4): 321-341.
- Levitt, M., "Email Usage Forecast and Analysis, 2000-2005," IDC Report # W23011, September 2000.
- 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)
- Nantz, K. S. and Drexel, C. L. (1995). "Incorporating electronic mail into the business communication course." *Business Communication Quarterly* 58: 45 - 51.
- 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)
- Rohall, Steven L., Gruen, Dan., Moody, Paul., Wattenberg, Martin., Stern, Mia., Kerr, Bernard., Stachel, Bob., Kushal, Dave., Armes, Robert., Wilcox, Eric., ReMail: a reinvented email prototype, Extended abstracts of the 2004 conference on Human factors and computing systems, April 24-29, 2004, Vienna, Austria
- 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.
- Spamhaus. (2005). Increasing Spam Threat from Proxy. at URL: <http://www.spamhaus.org/news.lasso?article=156> (viewed 23/04/05)
- Walsham, G. (1995) The Emergence of Interpretivism in IS Research, *Information Systems Research*, 6(4), 376-394.
- 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.
- Whittaker, S. and Sidner, C. L. (1996). Email Overload: Exploring Information Management of Email. CHI Conference Proceedings, Vancouver, BC Canada.
- 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)

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