

The Cost of Email Within Organisations

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A pilot exercise on the cost-benefit analysis of the use of internal email was performed at the Danwood Group. This forms part of a larger exercise to evaluate computer communication to help enhance performance throughout the organisation. The paper has resulted in the creation of an internal email costing process showing when it starts to become a more efficient means of communication.

In this study, the times taken to read, write and perform other functions with email were measured for a sample of employees. The email content was also monitored to determine which emails were business related. It was found that nearly two thirds of all emails were non-business related at the start of the research, but this decreased to a consistent 43% towards the end.

1. INTRODUCTION

Through communicating we exchange our thoughts, ideas, opinions, feelings with other people, at work, and in all aspects of life. The communication process is so commonplace that it becomes second nature, though analysis shows it is much more complex and much less efficient than is normally assumed.

As companies struggle to shed excess costs and to respond more nimbly to customers and competitors, they are being urged to adopt new organisational forms, tightened inter-organisational linkages, and improved management practices[1]. To support these “network” forms of organisation, more and more firms, especially those that are geographically dispersed, are turning to

electronic networks – advanced communication media, such as electronic mail[2]. By understanding the communication process we can optimise networks to increase communication efficiency with benefit to our productivity. As communication pervades nearly everything we do, even small improvements in the effectiveness and cost of our communication processes can have significant benefits. The paper builds on published work, by Solingen[3] and Jackson[4], identifying email productivity and efficiency costs and generating questions on how to enhance performance throughout an organisation using electronic networks.

As new communication methods are introduced into organisations it is important to understand how and why managers use the new media[5], as it is not the media per se that determines communication patterns, but rather the social processes surrounding media use[6]. By understanding communication methods, the mediums can be optimised to enhance performance within organisations. We still have much to learn about interactions among computer-mediated communication technologies, new organisational forms, and changes in work and communication[7], but the ability to monitor email now provides organisations with the opportunity to improve communication practices.

2. SOFTWARE TO RECORD EMAIL METRICS

The Danwood Group had no email usage policies that would restrict and bias monitoring, which was performed in two phases. The users were aware that email metrics were being recorded for research purposes in stage one, but not in stage two.

Stage one involved developing a special, client based email application, ‘The Danwood Mail’, to analyse the users activities whilst using email for internal communication (see Figure 1). The program records the message word length, how long it takes the user to read or compose the email, the subject, the recipient, the author, the time and the date the email was sent. The deletions of emails were logged but were not timed, as the time taken was insignificant.

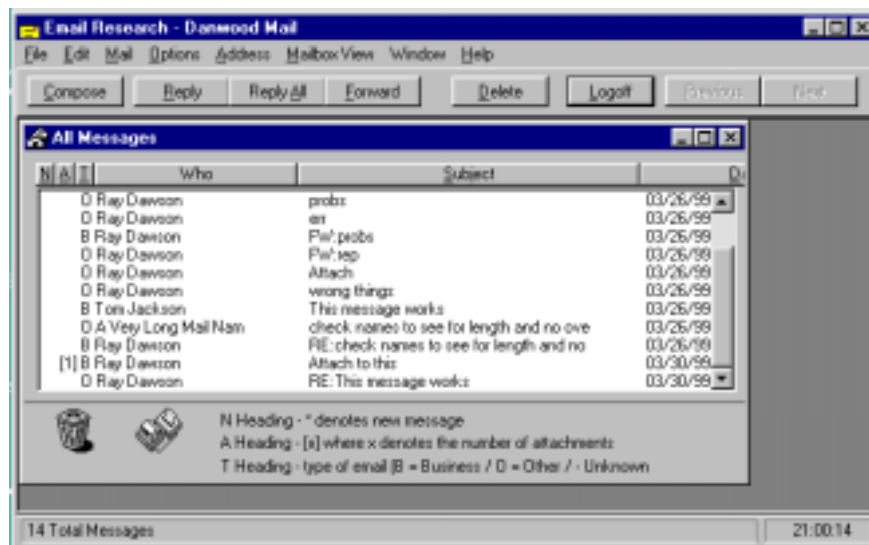


Figure 1 – The Danwood Mail Application

Stage two involved replacing the Danwood Mail application with Microsoft Outlook and using a new server based email recording application.

3. EMAIL COMMUNICATION ANALYSIS

The following results have been given in terms of business email (contains business related information) and non-business email (not business related, such as jokes or messages regarding social activities). It is assumed in this paper that non-business email implies it is non-productive, however, this is the subject of ongoing research.

At the start of stage one, 69% of email was non-business related and during stage two that figure decreased to at a consistent level around 43% for several months (see figure 4). The authors believe that this level of non-business email will not change unless an email policy or a different email application is introduced. The high non-business usage of email shown could perhaps be explained by the privacy that email offers compared to other communication mediums.

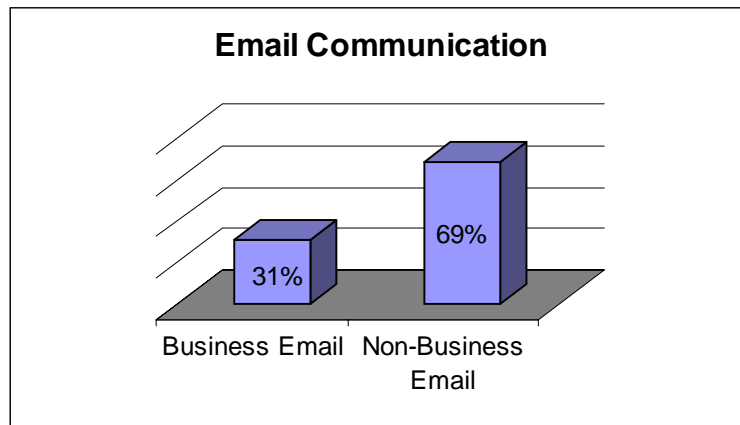


Figure 2 – A breakdown of email messages at the beginning of stage one[3].

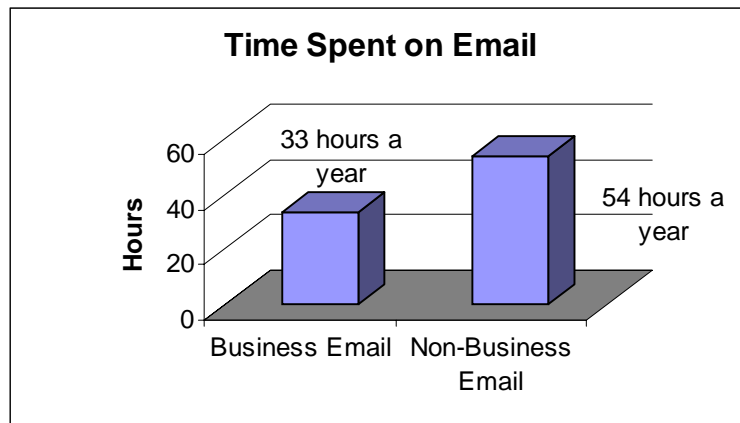


Figure 3 – The time the average employee spends on email communication

A level of 69% non-business email shows that employees spend an average of 54 hours in a working year on non-business communication (figure 3), or 14 minutes a day, even before any recovery time for each interrupt is added. It takes 15 minutes to recover from a phone call interrupt, according to DeMarco's research[8], so it is clearly going to take some time to recover from an email interrupt. The extent of the recovery time will vary from person to person; many employees appear to react to an incoming email immediately, implying the recovery time is likely to be similar to that of a phone call for these employees. Other employees wait until a more convenient moment and then deal with several emails together resulting in a much shorter recovery time.

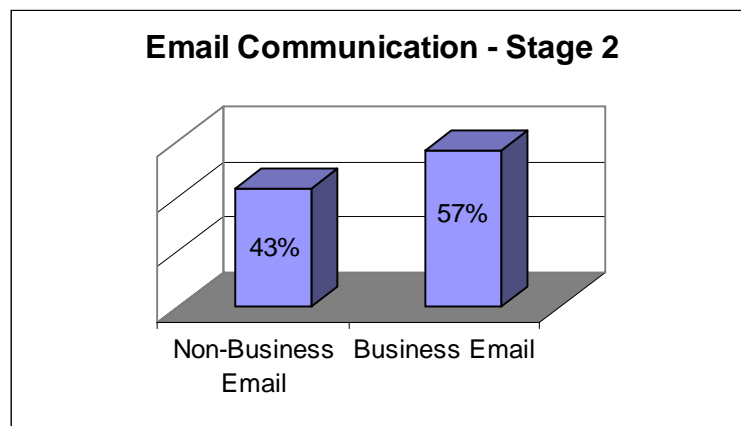


Figure 4 – A breakdown of email messages at the end of stage two

There are currently no figures for how long it takes an employee to recover from each email interrupt but an estimate based on an informal survey of user opinion is just over 1 minute, a saving of just over 13 minutes compared to the phone[4].

4. MEDIA SELECTION AND EDUCATION

A multi-method investigation by Markus[5] assessed the power of information richness theory, relative to alternative social theories, to explain and predict managers' use of email. Managers were found to perceive various media in ways that were relatively consistent with information richness theory, but to use email more and differently than the theory predicted. In particular, effective senior managers were found to use email heavily and even for equivocal communications tasks. The effectiveness of the manager could be related to the interrupt recovery time associated with the media, as email has a relatively low recovery time compared to the phone and face-to-face meetings. By educating employees on information richness and interrupts as shown by Solingen[3] in his research, an organisation can become more efficient in the way it communicates.

5. INTERNAL EMAIL COSTING FORMULAE

Table 1 shows that in the early days of implementation more time is spent on non-business email, though this decreases exponentially. The analysis has provided the Danwood Group with a baseline to work from in trying to increase employee productivity

Days Since Implementation	Non-Business Email	Business Email	Total
1 – 39 days	13.53 minutes	8.34 minutes	21.87
40 – 84 days	10.98 minutes	11.84 minutes	22.82
85+ days	8.43 minutes	15.33 minutes	23.76

Table 1 – Breakdown of time spent by an average employee on Email a day without Recovery Time

5.1. Cost of Internal Email

Days Since Implementation	Non-Business Email	Estimated Recovery Time	Total Minutes a Day
1 – 39 days	13.53 minutes	14 minutes	27.53
40 – 84 days	10.98 minutes	11 minutes	21.98
85+ days	8.43 minutes	8 minutes	16.43

Table 2 – A breakdown of time spent by an average employee on Non-Business Email and Recovery Time a day

The current cost of non-business email can be calculated by using Table 2 in conjunction with formula 1 below. To illustrate the costs, formula 1 is applied to a medium size company with 120 employees with the average wage at £320 per week and an assumed overhead of a further £320 per week, where the email system was installed more than 85 days beforehand.

$$\text{Cost} = \text{Total Minutes} * \text{Email users} * \text{Average Employee Wage per minute}$$

Formula 1 – Current Cost of Non-Business Email

The daily cost to the company for 120 employees to use the internal email system for non-business purposes is £524 making the cost for the year over £25,000.

Days Since Implementation	Business Email	Estimated Recovery Time	Total Minutes
1 – 39 days	8.34 minutes	8 minutes	16.43
40 – 84 days	11.84 minutes	12 minutes	23.84
85+ days	15.33 minutes	15 minutes	30.33

Table 3 – A breakdown of time spent by an average employee on Business Email and Recovery Time a day

The cost of business email can be calculated in the same way using formula 2:

$$\text{Cost} = \text{Business Email minutes} * \text{Email users} * \text{Average Wage per Minute}$$

Formula 2 – Current Cost of Business Email

The daily cost to the same 120-employee company to use the internal email system for business purposes is £968 making the cost for the year more than £46,000.

Formula 3 below can be used to calculate the joint cost of using the internal email system for both business and non-business activities.

$$\text{Cost} = (\text{Total Non-Business} + \text{Business Minutes}) * \text{Email Users} * \text{Average Wage per Minute}$$

Formula 3 – Current Cost of Running Email for a Day

The daily cost to the company for 120 employees to use the internal email system is nearly £1,500 with the cost for the year being over £71,000.

5.2. Cost of External Email

Little research has been carried out into the costs of using external email. Initial research carried out so far by the Danwood Group shows that 73% of the emails are non-business related, though further research is required to confirm this.

6. FUTURE WORK

If it is assumed that non-business email is unproductive, then the results highlight employee productivity could be significantly higher but further research is required to achieve this. In particular, the following points need investigating:

1. The recovery time after reading email needs to be more accurately quantified as opinion could prove to be unreliable for this type of measure. This could reveal issues of how and when people react to incoming messages, which may establish a need to educate employees in the best practices for handling incoming messages.
2. Informal observation by the authors shows that 50% of email could be handled in a one-line message. The authors are researching whether an add-on to Microsoft Outlook prioritising one line emails could reduce pleasantries at the beginning and at the end of traditional email messages and potentially reduce the time employees spend on communication.

7. CONCLUSIONS

While the results are not yet complete the study has already increased the understanding of use of IT within the organisation and has shown both the value of obtaining metrics on their activities and the difficulties involved. The company has also learned that the IT cannot simply be evaluated in isolation, but as an integrated part of the company processes it must be studied in conjunction with the effects on the surrounding people and environment.

This pilot exercise has successfully shown the value of carrying out a cost-benefit exercise on the company's IT infrastructure. The results obtained can provide the basis for communication usage policies and education, which could then reduce wasted time and improve employee productivity.

BIBLIOGRAPHY

1. Miles R.E., Snow C.C., “Organizations: New Concepts for New Forms”, *California Management Review*, No.28, pp.62-73, 3 (Spring).
2. White K.B., “Current Technology Practices: Perspectives from information Systems Managers”, *SIM Spectrum*, No.2, pp.1-5, December 1986.
3. Solingen R., Berghout E., Latum F., “Interrupts: Just a Minute Never Is”, *IEEE Software*, Vol.15, No.5, pp.97 – 103, September/October 1998.
4. Jackson T.W., Dawson R., Wilson D., “Improving the Communications Process: The costs and effectiveness of email compared with traditional media”, *INSPIRE – Training and Teaching for the understanding of Software Quality*, No.4, pp.167 – 178, September 1999.
5. Markus L.M., “Electronic Mail as the Medium of Managerial Choice”, *Organizational Science*, Vol.5, No.4, pp.502 – 525, November 1994.
6. DeSanctis G., Poole M.S., “Capturing the Complexity in Advanced Technology Use: Adaptive Structuration Theory”, *Organizational Science*, Vol.5, No.2, pp.121 – 147, 1994.
7. Daft R.L., Lewin A.Y., “Where Are the Theories for the ‘New’ Organizational Forms?”, *Organizational Science*, Vol.4, No.4, pp.I – IV, 1993.
8. DeMarco T., Lister T., “*Peopeware: Productive Projects and Teams*”, Dorset House, New York, 1987.