AN EXPLORATORY ANALYSIS OF EMAIL PROCESSING STRATEGIES

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ABSTRACT- An essential mode of communication and information sharing in current organizations is email. In specific, emails have been known to cause disruptions in the processing of knowledge workers' primary tasks, thereby increasing information overload. There is a drawback, in terms of extra reimmersion time, related with every task that gets interrupted by email. So, in what way often should one process email? In this study, we have demonstrated and compared different ways in which this interruption influence of emails can be reduced. We use simulation to study the interruption effects on two different kinds of tasks (longer tasks and shorter tasks). Previous research has recommended that the best policy to respond to emails is every 45 minutes. Contrary to prior research, the findings of this study seem to suggest that, in most cases, knowledge worker performance could be improved by responding to emails 4 times in a given working day.

Keywords-Emails, interruptions, information overload, task analysis & simulation.

I. INTRODUCTION

Over the past few years, email has become the most predominant mode of information exchange and sharing in current business organizations. The prime reason for this massive popularity enjoyed by emails can be attributed to its asynchronous nature of communication that has many reported advantages over synchronous communication (telephonic communication, face-to-face meeting, etc). This extreme information-processing load due to emails is often termed as Email Burden and has been reported in many other studies [12] [13] [1] [7]. Recently, IDC reported that the amount of email exchanges will be getting 35 billion per day by 2005. These numbers highlight the developing importance of email as an necessary mode of communicating and sharing information in today's organizations. This problem turn into even more aggravated when interruptions occur in an overloaded effort environment. Email has become more of a environment than an application where people devote much of their workday .It has been found that the standard tendency of a knowledge worker is to reply to an email as soon as it arrives. This frequently results in the interruption of a chief task. Jackson and colleagues described that a knowledge worker takes an average of 1 min and 44 seconds to respond to a new email by activating the email application, with 70 percentiles taking less than 6 seconds and 85 percentiles taking less than 2 min. The time desired to switch from the present work medium to the email

medium is often referred to as interruption lag . Before restarting a task interrupted by emails, a knowledge worker devotes some extra time due to reimmersion. The reimmersion or recovery time due to interruptions produced by emails is also discussed to as resumption lag or penalty. This drawback has been recounted to be around 64 seconds for each interruption . Due to the great number of emails arriving everyday, the collective interruption lag and resumption lag can become large and hence increase the non-value added time of a knowledge worker. This results in reduced efficiency of the knowledge worker.

In this study, we explore the legitimacy and generalizability of results reported in prior relevant studies in order to find policies that might improve knowledge workers' performance measures including worker utilization & completion time for primary tasks as well as emails. Another objective of the study is to grow a heuristic chart that would help a knowledge worker to effectively handle email communication.

II. REVIEW OF RELEVENT LITERATURE

The phenomenon of information overload arises when

the requirements for timely processing of information exceeds the partial information processing capacity of a knowledge worker. Interruptions are often considered to be a provider to information overload. Many researchers from various disciplines have well-defined interruptions in different ways. The disruption theory offers a rather precise and technical definition of interruption by defining it as "an externally generated, randomly occurring, discrete event that breaks steadiness of cognitive focus on a primary task". This definition advises that discrete event simulation could potentially serve as a beneficial tool in modeling the interruptions as distinct events. Although research work on interruptions exists in other restraints such as human-computer interaction (HCI) , management, and cognitive psychology, it is still an underneath researched area in the MS/OR discipline.

III. RESEARCH QUESTION AND MODEL DEVELOPMENT

Little research has been done to examine the performance of a knowledge worker when both simple and complex responsibilities are present, simultaneously. Directing the time frame during which interruptions are processed allows for better consideration allocation. Also, according to Single-Resource theory , distracting resources to a secondary task (emails) frequently may decrease the performance on the primary task. This theory proposes that we split the total information processing hours per day into two categories for better allocation of a knowledge worker's attention: one, throughout which emails are given highest priority (email hours) and other, during which primary tasks are given highest priority (non-email hours). Thus, by separating the time during which interrupts and interrupted tasks are handled, we can control the number of interruptions as well as the timeframe during which interruptions are permitted to occur. By altering the length as well as the frequency of these email hour slots, we recommend that the number of interruptions can be effectively reduced without adversely affecting the act on primary tasks.

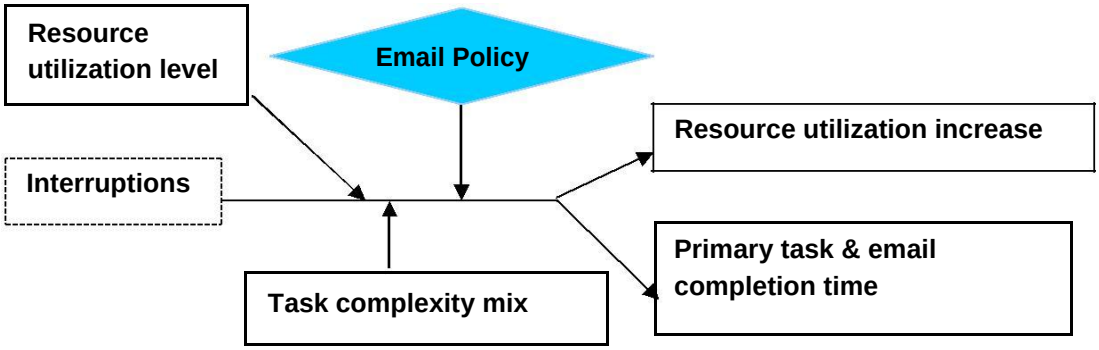

Figure 1. Research Model

Utilization is a broadly used measure of overload and is defined as the probability of the operator being in a hectic state. We have used utilization as a degree of knowledge worker's Information Overload in this study. Resource utilization level is an sign of utilization of knowledge worker in the lack of interruptions.

Scenario description

Four different scenarios were studied in order to better recognize the change in the performance of each policy under different effort conditions. The combination of two levels of resource utilization and two levels of job complexity mix resulted in 4 diverse scenarios (Table 2). The levels of task complexity mix were operationalized by changing the quantity of time spent on processing complex tasks.

Scenario		Scenario Notation
Task Complexity mix	Resource Utilization level	
Less S, More C	Low	LS-L
More S, Less C	Low	MS-L
Less S, More C	High	LS-H
More S, Less C	High	MS-H

Table 2: Scenario table

Model implementation

Simulation models were developed using Arena 7.0 simulation software . We modeled each policy type and scenario type using different parameters (please contact the authors for details about the parameters chosen). All task types followed an exponential inter-arrival distribution. 16 simulations were run for the duration of 500 days having a warm up time of 10 days. The warm-up time was determined externally by analyzing the data using Welch's method. Each simulation model was run for 20 independent replications. Data was collected for all four performance measures in evaluating the four different processing policies.

IV. STATISTICAL ANALYSIS

MANOVA was used to examine the data collected in two different ways. First, it was used to deliver an answer to the research question. Second, it was used to find mean differences among policies for each situation so that policy position could be achieved. This was a essential step to change a heuristic chart for email response processing. Post-hoc analysis was done for all 4 circumstances and results were examined independently.

V. CONCLUSION

Simulation served as a useful tool for producing the data needed for our statistical analysis. We evaluated the validity of consequences of prior relevant research and proposed a heuristic chart to aid a knowledge worker better manage his or her email processing. Dissimilar to prior research, we found that rather than checking emails every 45 minutes, the better policy is possibly to process emails 4 times per day. This study has mainly important meaning for those organizations where email is used widely for business communication, such as contact centers, geographically dispersed organizations, virtual teams, and several other service industries.

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