"Excuse Me": Interrupting Working Spheres

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ABSTRACT

In today's information technology profession, the most common tasks are computer usage (document production, email usage, etc.), phone usage, meetings, deskwork, and different forms of verbal communication. Units of work including these tasks are organized into working spheres [1]. People change working spheres by naturally switching to another working sphere or they are interrupted. There are two forms of interruptions: internal and external. An internal interruption is a self-initiated switch from one working sphere to another. An external interruption is the switching of working spheres due to a condition in the working environment [1]. In this paper we will present empirical results that suggest people in the information technology profession allow an unspecified amount of time for interruptions before either returning to their previous working sphere or switching to another working sphere. We will present results from field observations of information workers. The workers were categorized into three different roles: analysts, developers, and managers. All of these workers experience a high level of discontinuity in their work.

INTRODUCTION

Currently, information workers are facing a number of demanding workloads. With an unstable economy, budget cuts, and layoffs, many companies are struggling to complete the same workload with fewer workers. The companies are also increasing the number of tasks for each employee. In order to complete these multiple workloads, workers use a variety of tools in their work: e.g. email, instant messaging, personal tools (cell phone, PDA, etc.), and paper documents. As a result, workers do not work steadily, but instead are interrupted throughout their work day.

The purpose of this study is to examine how people react to interruptions while working on multiple projects.

RESEARCH SETTING AND METHODOLOGY

In order to gain an understanding of how information workers react to interruptions during their working day, we conducted an observational study at ITS, an investment management company located on the west coast of the U.S. ITS is an outsourcer, providing information technology and accounting services for a major fund manager [1]. We concentrated our study on the day-to-day operations of one ITS team, the JEB team. The JEB team develops, tests, and supports major financial software modules used by their client. There are twenty-five information workers in the team including software developers, database administrators, financial analysts, and managers. Twenty-two members of the JEB

team work in cubicles in an open office environment; three have their own offices. All workers have email along with other activity management tools. In addition, six workers have a financial terminal which they monitor and perform tests for the software modules they develop. Printer and fax machines are shared and are located at the end of the cubicle aisle. This open office environment allows team members to interact and communicate with other colleagues without having to move from their own cubicles. Many of the workers communicate with each other through the cubicle walls or walk over and join conversations in other cubicles. The employees generally concentrate their work within their own cubicle.

Methodology

The study was based on two techniques: observation and interviews. The level of detail required demanded that we be able to capture as much detail of each informant and the activities they perform. However, indirect observation such as asking subjects to keep diaries or to estimate their activities at the end of the day would be disruptive and inaccurate. The researcher sat with the informant at their cubicle and shadowed them to meetings and other activities. The researcher sat close enough to the informant so it was possible to fully observe what their work, but distant enough to not serve as a distraction. In some cases, the researcher was able to read documents displayed on the computer screens, the ID caller display on the phone unit, the content of print outs, sticky notes, binders on the desk, etc. Every action of the informant was recorded by the researcher along with the time (to the second) and other details of the event. All interactions were also documented, including details about the topic of the conversation, documents used, and persons involved [1]. If the researcher had any questions, they noted it and asked the informant at the end of the day. A total of 477 hours was spent observing at the field site. Fourteen people were observed over a seven-month period for three and a half days each. The average time of formal observation for each individual was 26 hours. We analyzed our data to understand how the workers react to interruptions during their working day.

The employees

Among the fourteen team members observed, six were analysts, four were developers, and four were managers.

RESULTS: EFFECTS OF INTERNAL AND EXTERNAL INTERRUPTIONS

An overview of the data

Our study confirms our hypothesis and those of our colleagues based on our own day-to-day observations: information work is very fragmented. The reason work is fragmented is due to high number of interruptions. In a typical day, we found that the number of interruptions per time interval (Figure 1), from 5:00a.m. to 7:00p.m., is very concentrated from about 8:30a.m. until 11:00a.m. and then again from about 2:00p.m. until 3:00p.m. These intervals of concentration surround the interval from 12:00p.m. to 1:00p.m.

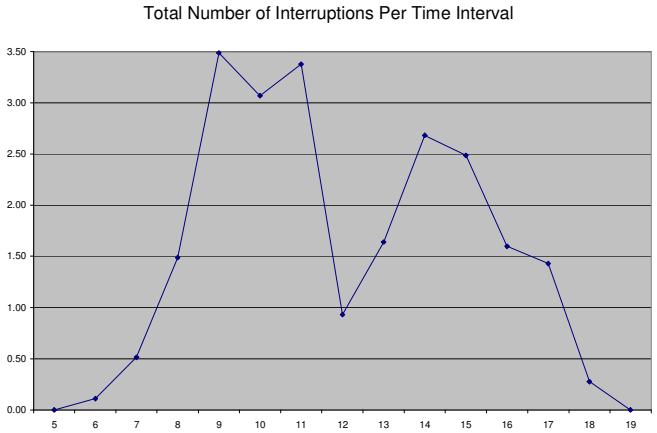

Figure 1

Some of the informants did not work a "typical" 8 to 4 or 9 to 5. Instead some arrived at work as early as 5:00a.m. and as left as late as 7:00p.m. In order to understand at when workers experienced the most interruptions during their working day, we found the number of interruptions per working hour (Figure 2). We noticed that the number of interruptions is very high at the beginning of the informants' work day. As the day progresses, the number drops, but then increases after the fifth hour of work. After the increase, the number drops again.

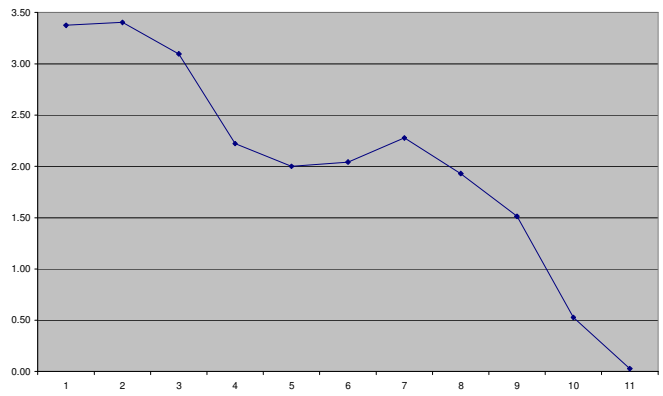

Figure 2

After observing the fluctuation of interruptions surrounding the fifth hour of work, we found the number of interruptions before and after lunch. After finding the lunch times for each informant on each day of observation then found the number of interruptions surrounding their lunch break (Figure 3). We found that the number of interruptions was in fact much greater in the hours surrounding lunch.

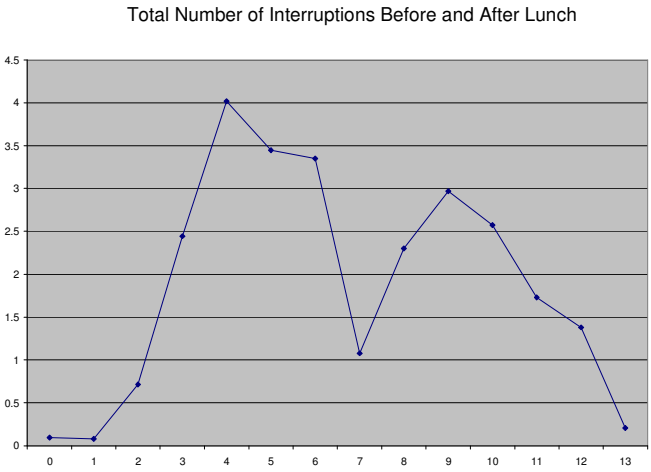

Figure 3

This data shows the overall distribution and concentration of interruptions throughout the workday of all informants. Although Figures 1-3 represent different variables of each workday, the overall result shows the same concentration of interruptions around midday.

Strategies for maintaining continuity in working spheres

Workers have their own strategies to help them maintain continuity as they switch between working spheres. Most of our informants commented that their preference is to work in a single working sphere until the job is completed. However, this is rarely the case because interruptions (internal or external) lead people to switch their attention into different working spheres [1]. Due to the frequency of interruptions some of the informants use special tools that help prioritize and maintain their attention over their working spheres. The tool is often updated throughout the day. A common implementation of this tool is having a special inbox folder in their email that contains messages related to central working spheres. A second form of such a device is the use of printouts of email messages; a preference of three of the informants. Some

workers keep piles of printouts or meeting notices on their desks. The printouts contain clarification notes and contact information. A third form of such a device deals with traditional activity management tools. Two informants used planners extensively to manage their working spheres. Each day they listed the central working spheres to cover and transferred pending actions, if any. A fourth form of such a device is the commonly used, post-it note. One informant places up to seven notes with references to various working spheres. The notes remain posted upon completion of the working sphere it is related to.

DISCUSSION AND CONCLUSIONS

We found that the longer a worker is distracted by an interruption, the more likely that they will continue to be interrupted and not resume the task in that same day. Also, external interruptions are more likely to be shorter which leads to the original working sphere being resumed. When the interruption was from a central working sphere the chance that the working sphere would not be resumed increased. This is commonsensical because peripheral working spheres are supposed to be ones that are not vital to the workers specific duties and projects and therefore are less likely to completely pull the worker away from their current task. The urgency of an interruption does not affect how likely a resumption of work is. This means that an urgent interruption is only likely to lead to the work being abandoned for the rest of the day if the interruption is also central. There is a slight trend that people are forced to resume their work after an internal interruption. We believe that this is due to the worker wanting to participate in working spheres that internally interrupt others.

Implications for information technology design

Information technology is designed to support independent events (i.e. word processing, e-mail, etc) rather than providing ways of integrating multiple functions required by working spheres. The design should consider how information workers the effects of multitasking and the causes of high levels of multitasking, interruptions. When working spheres use different resources and applications, it may help to have some sort of device that saves the state of the information particular to each working sphere, increasing productivity. Although some informants had a task management tool, they did not use it to support their working spheres. The devices developed by the JEB team members are useful because they are always visible and available. Perhaps the lack of visibility and availability is why the informants did not use the tool they had. People also prefer flexible forms of managing their working spheres which helps with communication thus improving productivity.

Limitations of the study

Our study has several limitations. While "shadowing" the informants the researcher cannot be a source of interruptions, which is why we waited until the end of the day, or when walking to meetings to ask questions about what we observed. Even with our best efforts, 15.81% of the events could not be matched with any working sphere and were consequently put in an Unknown category [1]. Our observations are also limited to one field site. We would need to conduct the same study at various field sites to understand how different organizational factors affect the management of multiple activities. We also only observed 14 people. We would need to study a larger group of

information workers at these field sites to obtain large-scale results.

ACKNOWLEDGEMENTS

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