Modelling Last-Minute Authoring: Does Technology Add Value or Encourage Tinkering?

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ABSTRACT
To measure the productivity gained from computer-based authoring systems, account must be taken of changes in the way the work is organised. An analysis of economists' authoring work, based on diary studies, suggests that much of this is performed at the last minute, just in time to meet deadlines. Benefits gained from word processing appear to be offset by authors' tendency to tinker with documents up to the last minute.

KEYWORDS: Documents, authoring, diary studies.

INTRODUCTION

Recent studies have questioned the widely-held view that interactive computer systems offer productivity gains to service industries such as banking, insurance and health care. For example, a 1992 study of the impact of 15 years of information technology investments at the World Bank could find no evidence of gains in productivity [2]. Landauer has quoted a number of similar cases in his general study of productivity trends in the service industries since the 1970s [3].

We have become interested in the question of whether interactive document systems pay for themselves through productivity gains. We have been able to pursue this question while conducting extended, in-depth studies in a large financial organisation broadly similar to the World Bank, an organisation we call "The Commission" and which we have described briefly in a companion paper [1]. We are able to report here some initial findings that may point the way towards explaining experiences such as the World Bank's.

THE STUDIES AT THE COMMISSION

The tangible output of the work of the Commission's staff is a stream of documents. Most of these are prepared by economists in order to convey recommendations to the Commision's Executive Board (e.g., in so-called "staff reports") or to report on specific aspects of national economies ("ad-hoc briefings"). In the old days these documents were drafted in longhand by the economist, typed by a personal assistant (PA) and then edited by hand (usually just once) before being corrected online and printed in final form by the PA. Like virtually every large service-sector organisation, however, the Commission has moved much of this document authoring work onto word processors and personal computers, giving them first to PAs and then to economists. More recently these have been networked to each other and equipped with printers, and now most economists have laptop computers as well.

The Diary Study

Our studies have focused primarily on the work of the Commission's economists. The groundwork was laid by the six-month ethnographic fieldwork project described in [1], and this has been followed up by a second, more focused field study coupled to a *diary study*. The diary study, which has been described in [4], involved gathering detailed accounts of the work activities of 25 Commission staff over a five-day period. Our subjects were drawn from four divisions, each division covering a group of countries. Subjects included division chiefs, their deputies, desk economists, research assistants and personal assistants (PAs). The results presented here are based largely on data gathered during the second field study and the diary study.

MODELLING THE AUTHORING PROCESS

We have experimented with several ways of modelling the activities of our subjects; we have gained most from building models of the *processes* by which documents were produced. Out of the 278 documents mentioned in accounts of activities we identified 68 that were undergoing authoring during the five-day period (the rest were used mainly for reference). We have constructed process flow charts of 30 of these 68 authored documents, examples of which are shown in Figures 1 to 3. Activities are shown as boxes, shaded or left plain to indicate whether the document was in electronic or paper form. The activities of each person contributing to the process are shown on a separate horizontal line, with time progressing from left to right and measured in minutes.

Temporal organisation of authoring work

By basing our process charts on diary data we have gained insights into the temporal organisation of authoring. In particular, we have identified two fundamentally different modes of authoring.

One mode of authoring is to work sporadically on a document over a period of weeks or months. Such a document-might be part of a worldwide survey, and the author updates

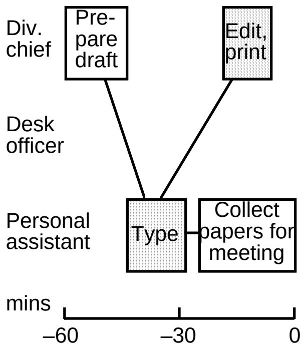

Figure 1. Process chart for preparation of a memo in time for a meeting.

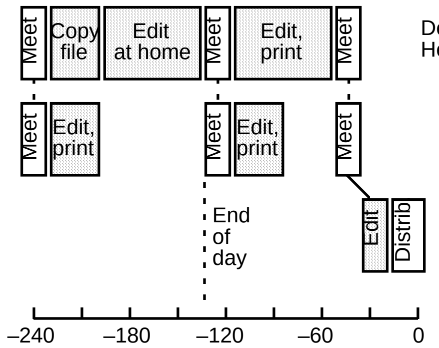

Figure 2. The final stage in preparing a Board document, jointly by division chief and desk officer.

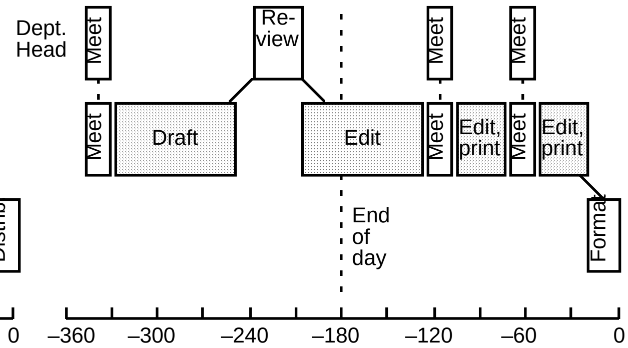

Figure 3. A department head prepares a speech, based on contributions and explanations from the desk officer during two days preceding the speech.

it when new data are received. At the Commission, relatively few documents are prepared in this “ongoing” mode.

A much more common mode of authoring is to take no action until there is just enough time to complete the document, and then drop all non-essential work so as to concentrate on getting the document completed in time. This “last-minute” method of authoring is applied routinely to staff reports and similar operational documents, to reviews of other documents, and to ad-hoc briefings. The three charts shown in the figures all represent last-minute authoring processes, involving between one and six hours’ elapsed time. Some documents involve days or weeks of work, but are invariably begun when there is just enough time to complete them.

To understand how last-minute authoring was affected by computer technology we looked in more detail at authoring activities (shown as separate boxes in the figures) were performed. We found that most of the work was done directly on personal computers; frequently this was continued in the evening, either at the office or at home using a laptop computer. Occasionally the economist resorted to the old method of drafting or marking up the document by hand so that a PA could type it or edit it; an example of this can be seen in Figure 1. This was often done immediately before an unavoidable, unrelated commitment, e.g., a high-level meeting.

ANALYSING COMPUTER-BASED AUTHORING

How effective, in comparison to earlier technologies, are computers in supporting last-minute authoring processes at the Commission? We have not yet been able to make any quantitative assessments, but we have noted some important qualitative properties of online, last-minute authoring.

When performed online, authoring activities appear to be delimited largely by time boundaries. Thus when the work is divided between two authors, as in Figure 2, we quite often see both authors working right up to the next deadline. Economists tell us that they have “worked all day” on an online document, or that they spent most of the day “tinkering”. Their work often consists of minor edits, polishing and “wordsmithing”. In contrast to their pre-computer work practices, they now appear often to be unable to resist fiddling with the text right up to the last minute.

Meanwhile, economists have other responsibilities besides authoring which they need to perform when time permits. These include learning languages, attending seminars and general background reading. As long as they are engrossed in online, last-minute work they appear unlikely to devote much time to these background activities. Some of our subjects remained thus engrossed for the entire week of the diary study. On the other hand, those who adopted the “pre-computer” technique of giving handwritten work to PAs were able then to find some time for other tasks.

Word processing has been hailed as a means of increasing productivity in knowledge workers like the Commission’s economists. We see definite instances of increased flexibility in work patterns, such as the ability to work more effectively at home, but we also see opportunities to adopt work practices that may be counter-productive. Further studies of this kind are needed, but our initial findings suggest that the use of online authoring tools may demand careful management to prevent excessive tinkering and to ensure that background tasks recieve due attention.

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