

It's Here Somewhere

The Effects of Storage Methods on Job Performance



Every day, office workers are inundated with a tidal wave of information. The average *Fortune* 1000 worker sends and receives 190 messages, daily, in all media.¹ Much of the deluge is in print; from 1984 to 1998, office paper use increased by 2,809,000 tons,² with workers spending up to 60 percent of their time processing paper.³

Coupled with this, offices are shrinking—the International Facility Management Association (IFMA) indicates that the average space per person dropped from 410 square feet in 1997 to 355 square feet in 2001. This average includes common rooms, like lobbies, kitchens, and copy rooms, as well as “offices” of 40 square feet or less.⁴

In these shrunken offices, lack of storage space continues to rank high in worker complaints,⁵ while workers continue to perceive adequate storage as necessary to job performance⁶ and satisfaction with the workstation.⁷

Workers obviously place great importance on storage. This paper will examine the ways people store materials and some thoughts on how to increase their effectiveness as they deal with an apparently endless proliferation of paper.

A Place for Everything

Office workers, even before the advent of more paper and less room, have tended to gravitate toward either of two tried-and-true methods—piling or filing. At first glance, it seems that little can be said about piling methodologies, beyond their popularity. People simply put stuff in stacks wherever they can find room—on desktops, on the floor, on top of file cabinets, on any horizontal space.

One researcher, after observing 200 workstations and interviewing 24 occupants, concluded that (regardless of job description or office type) people use the primary work zone to stack work in process, personal artifacts, and frequently used tools and materials. They impose this pattern on whatever office layout they are given—stacking essential references and staging work in process on top of computer monitors or appointment books or whatever else falls within their primary work zone—leaving very few cleared areas for reading or writing.

The study concluded that, although this piling method does not do a particularly good job of supporting work in process—essential documents are often disorganized and difficult to access—people



consistently use it because it makes the information they need more visible and accessible than putting it into the available file cabinets, drawers, and overhead storage units.⁸

Everything in Its Place

The other response to paper in the office is to file it away. Traditional storage units come in many shapes and sizes—from the shelves, drawers, bins, and cabinets found within a workstation or office, to racks designed for archival, off-site storage. In between, there are bookcases, lateral files, credenzas, and shelving systems in team spaces, copy centers, and mailrooms.

In workplaces, storage is a dynamic activity that includes retrieving, organizing, displaying, staging, and storing. The contents stored can be visible, hidden, or locked away, and are not limited to reference materials. They include stationery and supplies; electronics and media; and a variety of personal items—food, dishes, coats, and souvenirs, for example.⁹

The act of storing something requires workers to successfully complete a number of preliminary activities: conceiving and setting up a system; analyzing and organizing the potential contents; and staging, labeling, and stowing each item. Retrieval includes remembering the item exists, recalling the name of the item or browsing for it in the general vicinity, and then locating and uncovering or opening it. These materials can move through stages of relevance, and be placed in active, intermediate, or archival locations.

Archival Storage

This is high-density storage that is typically located outside the workstation. While it has to support organizing, retrieval, display, and staging, these activities are occasional. Its primary function is to contain bulk supplies or files that are infrequently accessed. Archival storage usually consists of banks of files in central locations on-site or in off-site warehouses staffed by professional records managers.

Intermediate Storage

Intermediate storage is similar to archival, but on a smaller scale, with more frequent content organizing, retrieval, display, and staging. Intermediate storage can often support a small group, a work team, or an individual and tends to be located close to the work being done. Shelves, file cabinets, and overhead storage units provide the means to house intermediate materials.

Active Storage

Personal, active storage happens at the workstation's center of activity—the zone within reach of the seated worker. Many of the activities associated with storing occur here, too, including the development of complex relationships between items, temporary labeling, and frequent stowing and retrieving. However, unlike materials in archival and intermediate storage, materials in this zone are seldom shelved and almost never stowed away. Access is frequent and may be indistinguishable from the work process.

Piling or Filing?

It's a commonly held intuition, particularly among some managers, that filing is superior to piling, resulting in smaller, better organized, and hence more accessible archives. But in fact, according to research by Steve Whittaker and Julie Hirschberg of ATT Labs, people who prefer to file actually have larger archives, access them less frequently, often duplicate stored information under several categories, and have trouble purging obsolete or irrelevant materials.¹⁰

Alison Kidd, a researcher for Hewlett-Packard, suggests that when information is stored away, its worth diminishes. She argues that knowledge workers are valuable because of how effectively they are informed, not because of how large (or full) their databases or filing cabinets are. Once knowledge workers have understood and applied a piece of information, they often throw it away.¹¹

According to Whittaker and Hirschberg, people who file and people who pile are different in degree, not in kind, noting that members of each group use both strategies, at different times. They both require the same amount of filing space—but pilers need more work surface to be effective.¹²

However, a clean desk is still equated with clear mental processing for companies like United Parcel Service, which require employees to remove all evidence of work by the end of the day.¹³ Ms. Kidd proposes the opposite approach. She suggests that a clean desk with everything filed away is not the goal—that when information is held in storage, its value is not realized. Her position is that knowledge workers' entire value to their organization rests on how effectively they are informed, not on how large their databases or filing cabinets are.

In her research, knowledge workers had desks full of work in process. The layout of the material was highly relevant to the workers' thought process, functioning as a physical representation of what was going on in their minds as well as providing cues to action. The piled-up desk provides powerful and immediate contextual cues to recover a line of thinking, especially after interruption. Plus, piles on a work surface serve as a tangible demonstration of how much work is getting done.¹⁴

Piling also makes sense from the perspective of studies about how we learn and remember. The most robust area of long-term memory is visual. Data stored as an image or accompanied by an image is easier to recall than any other kind.¹⁵

People make mental images or maps of their desktop piles,¹⁶ often using a hard-to-articulate system of organizing their piles and a vague feeling about where specific documents are located. In one study, most subjects could recall where a document was located (when asked six months later) even if they recalled little else about it.¹⁷

While piles of stuff can serve as three-dimensional to-do lists, there is a diminishing return when too many piles accumulate. Neuroscientists at the National Institute of Mental Health have used MRI technology to study how the brain functions when submitted to a barrage of visual stimuli. They find that our capacity is finite and too many stimuli cancel each other out. "Visual clutter actually suppresses the brain's ability to respond; it reduces its activity."¹⁸

Researchers at the University of Michigan note that workers also lose time as they move from task to task and pile to pile on their desks. They point to two distinct steps involved that slow workers up: goal shifting (time to do something different) and rule activation (time to stop working *this* way and to start working *that* way).¹⁹

Computers and Paper Coexist

Any discussion of how people handle paper in the office must also include reference to the computer. Its influence has been significant, although essentially opposite the effect many experts spoke of when they predicted a "paperless office."

A recent survey of 28 companies and 1171 workers in the U.S and Canada indicated that people use computers 77 percent of the time; spend 48 percent of their time collaborating and on the phone; and work with paper 40 percent of the time.²⁰ A typical office has to have room for all these arenas of work.

The convention of the document that passed from office to office as it evolved has been replaced by the convention of the document that is stored on the server, where it remains available for all involved to work on. Yet users still download, print, and retain copies of material they consider important.²¹

Researchers Steve Whittaker and Julia Hirschberg noted that 36 percent of the material their subjects retained was publicly available—either in libraries or on the Internet. Interviewees rationalized keeping their own copies because immediate availability was a benefit, they lacked trust in external storage, they were reminded of it by having it in hand, or they needed to reference the item frequently.²²

Since it has a reason for being there, the paper that does come into an office tends to stay where it lands. There are printouts and faxes and copies of reports. There are journal articles and sales figures and spreadsheets. They all have to be read and digested and probably filed, although they are typically outdated so quickly they are rarely referred to again. An estimated 75 to 85 percent of all files are never opened again, once they have been placed in drawers.²³

Increasing Storage Effectiveness

Whether people are pilers or filers, they can improve the way they handle and store information. Here are several areas for consideration, beginning with the machine that continues to shape the use and quantity of information—the computer.

Locate Computers Logically

A major factor in integrating paper- and computer-based activities is some flexibility in positioning the electronic equipment. Workstation designs that dictate computer placement with fixed corner work surfaces or limited access to electrical outlets and communication ports often create conflicts between paper and electronic work in process.



The computer's position in the work zone (whether it's a desktop or a laptop with a docking port) should relate to how much time users spend at their computers and what work they do on it. Is it a key reference point and work arena or an occasional one? Should it be at the center of the primary work zone, off to the side, or on a secondary work surface? In any event, an additional 12 to 15 inches of work surface space next to the monitor is usually required for paper used at the computer.²⁴

Support Knowledge Work

The activities of processing information that occur in the workstation are critical for the success of knowledge workers in the information economy. These are people whose value lies in being able to understand a body of knowledge and to generate new information from it that affects the organization or its customers. For them, the "messy desk" is an essential characteristic of their activity.²⁵

As Catherine Marshall and Frank Shipman noted in their research, people create categories as they manipulate information—and these categories become more complex as understanding increases. People then have to find ways to make their information space—their desktops—intelligible. They use a variety of tactics—labels, stack location, vertical location in the stack, horizontal fans, highlighters, sticky notes, or the frequency with which they sift through a given pile.²⁶ They also store materials on upright surfaces—tackable panels, document holders, paper holders, and clipboards.

Reevaluate Storage

Reconsider the value of information in the primary work zone. If it doesn't support work done today, tomorrow, or the next day, it may be better off somewhere else. Most organizational experts' first recommendation is to get all archival storage and as much intermediate storage as possible out of the workstation. Files, supplies, resource materials, and anything else that is not used on a daily basis can also be organized and stored more efficiently in another location. Time-management consultant Jeffrey Mayer says that 60 to 80 percent of the papers he clears from his clients' desks can be filed in the wastebasket with no ill effect.²⁷

Some experts in the field of organizational behavior and design advocate a general rethinking of the office that includes relocating much of the filing that is duplicated from workstation to workstation

into shared libraries or resource centers.²⁸ Many companies have developed information systems that give employees access to archival material through their computer, on shared servers or an intranet. And still others offer off-site archival storage.

Rethink Collecting Strategies

David Kirsh, of the Department of Cognitive Science at UC-San Diego, describes his theory of information collectors, which includes just-in-case accumulators who want it all and plan to keep it forever. They expect to need it, someday. As a result, information piles up with no limit, and the organizing and retrieving strategies get more taxed.

There are also just-in-time accumulators, who get the information they want when they need it and tend to discard it easily when finished. However, their grasp of the material may be shallow, especially if it is information that needs to be developed or understood over time.²⁹

Waiting too long to decide on an item's value can backfire. Almost all of the 25 percent of materials purged by the group Whittaker and Hirschberg studied was unprocessed information that had never been properly evaluated.³⁰

Support Active Storage

The consistent recurrence of a specific organizational pattern on the primary work surface indicates that the location of active storage is of central importance. The benefit of active storage is that it allows people to display significant documents in an organized fashion. Flexible organizational systems that exploit what people recall about the visual and spatial attributes of documents could cut down considerably on the time spent rifling through file drawers and desktop piles.³¹

There is a clear need to support active storage well, especially for knowledge workers. This includes using attributes of visual labeling and display to clarify and remind workers about what is important in each pile. It should also allow movement and adjustment to fit individual work habits. Good active storage also requires the use of good information-handling strategies, including regular purging, limited accumulation, and action-oriented labeling to reduce time lost during task switching. Rearranging the desktop for a better relationship between computer and paper processing areas may also help.

Storage is the most frequently reconfigured workstation component,³² and workers believe that storage affects their satisfaction and performance on the job.³³ Seventy-seven percent of the people who work in offices say that the “freedom to decide how they do their own work” is “very important.” The percentage is even higher among professional and technical workers.³⁴

In another survey, over half the people questioned said that they had sometimes wanted to rearrange things in their workspace; but most said they had never attempted to do so, either because they thought that it would be too difficult or that they would need permission to do so.³⁵

Thus, providing people with support for active storage that they can use while working, and allowing them some freedom in rearranging that support, could have significant payoffs in productivity and satisfaction. That is welcome news, since paper, and the need to handle it efficiently in the office, is here to stay.

Notes

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