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Keeping Encountered Information

Utility, serendipity, and the pleasure of encountering what we save relies on more than search alone when using PIM tools.

Although the growth of the Web has brought widespread recognition of the potential of search, not all of the information that comes into our purview is actively sought to meet a clearly defined need. Information is often simply encountered in the course of our everyday activities; as such, it may not be immediately useful. Rather, it may have potential merit as a reminder, for its evocative qualities, for its educational value, for the ideas it spurs, for its potential utility as a reference, or as something to share. Deciding what to do with encountered information—whether to keep it and if so how—represents a key challenge for the field of personal information management (PIM).

We may come across an interesting article when reading a newspaper or magazine. A directed search may return an unexpected result that's potentially useful in another context. A colleague may email us a URL or document. A forgotten photo may appear when we explore an unlabeled disk. Even in this age of increasing personalization, filtering, and ranking, we still have many serendipitous encounters with information in our everyday work and home lives [2].

We keep information in many different formats and for many different reasons [1, 5]. We sometimes keep the same piece of information in several formats to be sure we can get back to it again later and to remind ourselves to do so. We might, for example, bookmark a *New York Times* article on the Web, then save the same page to our hard drives (in case it disappears from the Web site), and finally email ourselves the reference so we'll remember to look at it. The number of ways to keep and manage information has increased considerably in recent years, in step with the overall increase in the number of devices, technologies, and applications on which we rely. The attendant fragmentation of our personal information increases the chances of keeping something in the wrong place or form and forgetting we ever saw, heard, or read it in the first place.

Furthermore, encountered information may fall outside the usual assumptions underlying PIM technologies. For example, we may find work-related information while we're at home and home-related information while we're at work. Encountering unexpected, but potentially valuable, information may interrupt us rather than help us complete the current task. And we may not yet have the appropriate filing structure to store the encountered information (other than the "misc" folder). Encountered information may reflect potential interests—hobbies we haven't explored, projects we anticipate working on, trips we might take—and not adhere to our current relatively well-conceived organizational habits, structures, and systems.

As the capacity of cheap digital storage increases, it becomes possible for us to keep practically everything

we encounter (see the article by Czerwinski et al. in this section). But our capacity to attend to information is not increasing at the same rate [4]. Indeed, in field interviews directed at uncovering what people do (and hope to do) with the encountered material they keep, the term "pack rat" is often used to describe ineffective strategies that cause valuable material to be hoarded away [5]. Furthermore, we've observed that people often don't remember that they've already saved potentially useful or meaningful material when it might be brought to bear on the problem at hand. Search tools like the Implicit Query facility (see the article by Cutrell et al. in this section) may help call our attention to forgotten but relevant information. However, some skepticism is still valid. We've all had the experience of failing to notice something immediately in front of us because we just weren't looking for it.

Indeed, the act of keeping and organizing information appears to be important not only in determining whether we remember it but what about it we even notice [3]. As such, handling the material may be a useful step toward understanding it better. Moreover, we use the items we keep in ways not fully described by their searchable content [5]. What we keep may be emotionally evocative, reminding us of a place or event; we expect this type of material to stir memories through future re-encounters. Or, by contrast, what we keep may have a shorter lifespan as a visible reminder of what we plan to do; a review clipped from a newspaper might remind us to go to an art gallery opening or try a new restaurant. Much of the material we save actually falls into a middle ground of utility and permanence where we're unsure how long we'll need to keep it and what exactly we'll use it for.

Keeping is a balancing act. The material must seem sufficiently useful, necessary as a reminder, compelling as a source of ideas, or evocative to merit the cognitive overhead of keeping it and the risk of miskeeping it [4].

If information access and communication technologies have increased the amount of information we encounter and the fragmentation of what we keep, we may also look to tools and technologies for help. Good filters may already help by screening out junk email and deceptive Web sites. Tools that help us categorize the things we save may play a role as well by helping us match encountered information to areas of personal interest [6]. We can also develop a more uniform cross-application infrastructure for highlighting, annotating, and setting reminders to mark information for later use.

What broader implications does encountered information have for PIM tools? Our field research in a range of homes and offices suggests that allowing material to accumulate while relying on search to reclaim it at the right time is insufficient for ensuring we'll be able to return to it when we want to; the sense-making activities that surround keeping are critical for our ability to use things later when we most need them, whether these activities involve associating material with a particular taxonomy or establishing a stable sense of place (such as personal unifying taxonomies [4] or stable information geographies [5]).

A good match between how something is kept and its envisioned role or function is essential for using the material effectively and enjoyably. PIM tool developers must remember that the utility, serendipity, and pleasure of re-encountering what we have saved relies on more than search alone; it also requires attention to the many ways we interact with the information, as well as the vital roles (such as reminding and educating) it plays in our lives. C

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