

# A Review on Personal Information Management System

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## Abstract-

*Personal Information Management (PIM) is an emerging area of research in Computer Science and Information Systems that studies how people organize their information. It includes work from areas such as human-computer interaction, information systems, databases, information retrieval, and artificial intelligence, among others. PIM, as a field of study, is concerned with “the activities we, as individuals, perform to order our daily lives through the acquisition, organization, maintenance, retrieval, and sharing of information”. What sets PIM apart from all of these computing sub-disciplines is the balance between academic research and the study of actual personal information management practices.*

## 1. Introduction

Personal Information Management (PIM) is an emerging area of research in Computer Science and Information Systems that studies how people organize their information. It includes work from areas such as human-computer interaction, information systems, databases, information retrieval, and artificial intelligence, among others. PIM, as a field of study, is concerned with “the activities we, as individuals, perform to order our daily lives through the acquisition, organization, maintenance, retrieval, and sharing of information”. What sets PIM apart from all of these computing sub-disciplines is the balance between academic research and the study of actual personal information management practices.

In this paper, we report on the experience of teaching an advanced special topics course in Personal Information Management.

The course attempted to strike a balance between discussions of the literature in the field and the coverage of personal experiences in information management. The importance of teaching such a course goes beyond the typical technical preparation of our students. As we learned in our course, all participants (students and the professor like) learned and shared information

management practices that made all of us more cognizant of how we organize and manage our information. It also highlighted how information overload is more than some unique personal problem each of us faces; it was almost the rapeutical to share experiences and solutions to our information overload blues.

## 2. What To teach: Background

PIM is an interesting area of study because it intersects with many sub-disciplines of Computer Science, Information Systems, and Library Sciences. Furthermore, it represents a challenge for researchers because many of the topics of study cannot be studied in isolation in laboratories.

PIM research truly pushes us to study the users in the context of their work where activities, tools, environmental context, and personal preferences intersect and interact. PIM is surprisingly difficult to study because the behaviours exemplified are spontaneous, opportunistic, demand driven, and highly individualized. As stated by Diane Kelly: ‘People create and access their personal information collection over long periods of time, executing a variety of information management tasks and exhibiting arrange of behaviours that are often unique

to their collections, tools, environments, preferences, and contexts’.

Many attribute the initial vision of personal information management to Vannevar Bush. In his 1945 classic paper, “As We May Think”, Bush described, among other things, the problems of managing personal information. The ideas of encountering information, cataloguing it, and organizing it for future use are very much at the forefront of what his Memex machine was to be. Today, due to information explosion, we find ourselves overwhelmed by information at times, wishing we had Bush’s Memex available.

Research in PIM often studies how people find information, how they keep the information found and how they use the information kept. An area of PIM also studies how people try to get back to information they have previously seen. This is known as refinding. Studies have focused on factors that affect refinding information [8], strategies used to refind information, and how web search engines are reused to find and refind information. There is a lot of research currently exploring how to make search engines more personal. The goal is to try to make searching on the desktop as effective as searching the web.

One of the chief research problems that PIM attempts to solve, or at least mitigate, is the problem of Information Fragmentation. Information fragmentation is the condition of having a user’s data tied to different formats, distributed across multiple locations, manipulated by different applications, and residing in a generally disconnected manner. In current personal information management systems, information formats determine storage locations, means of access, addressing of individual pieces of information, and facilities to store or search collections. The problem of information fragmentation has been widely studied in the literature. Bellotti et al. explored the design of a PIM system iteratively by going back to the users for feedback. Boardman et al. studied the organizational hierarchies created by users for bookmarks, files and emails, and noted a significant amount of overlap between the file and email folder hierarchies.

For example, Bergman et al. describe the case of information fragmentation for a student who has a project-related data in three formats under three different hierarchies: documents, emails, and bookmarks. Since users associate information objects with their projects and tasks, rather than document formats, this represents a potential disconnect between information systems and users’ needs.

Jones et al. found that although some users used web browser features such as bookmarks or history lists to preserve website addresses for later access, a significant number sent email to themselves with the URL and a brief note about their personal interest in that webpage. In addition to sending bookmarks over email, Whittaker et al. observed that users often used email systems for purposes such as personal task management, task requests from collaborators, personal archiving, and asynchronous communication.

### **3. A course on pim**

This course was a graduate course focusing exclusively on personal information management. The course was organized as a readings course with weekly reading assignments from research papers. Upon completion of the course, the students were expected to be able to:

- identify particular characteristics that make PIM difficult
- design and implement solutions to PIM problems that are based on understanding of individual work habits and knowledge of the relevant literature;
- read and understand the research literature in the field.

The course had a software-prototype-related research paper due at the end of the semester. This project had several deliverables throughout the semester to encourage the students to make steady progress towards the final outcome. For several of the deliverables, we did peer-review activities on the students’ work. These helped the students know what others were doing, provided the students an opportunity to receive feedback, and provided them experience on the publication process.

The second major part of the student deliverables was the “Day in the Life of My Information”. The next section describes this assignment and shows some samples of students’ presentations on that assignment.

### **4. A Day In The Life of My Information**

The goal of the “Day in the Life of My Information” project was to have students present their personal experiences in managing some of the information. In spite of great tools that address the management of information and method recommended by experts,

PIM is still highly individualized. Lots of personal experiences, contextual cues, and other characteristics shape how we manage our information. Students were

asked to prepare a 15-minute presentation on how they managed their own personal information.

They were recommended to present one of their 'types' of information, for example, to-do lists, email, calendar, file management, music management, etc. They were encouraged to focus not just on how they managed their information, but also on how they came to manage it in that particular way, over the years. They were instructed to indicate what works well and what does not, in their current setup. The following questions were use guidelines on what to present and discuss.

- Describe how you manage your information today.
- Which other approaches have you tried? Why did you move away from them? Would you try the again if things changed? What would have to change for you to switch?
- What do you particularly like about your current approach? What do you not like?
- Based on what you know about HCI and cognitive psychology, and what we have read and discussed in this class, which part of your approach agreement with existing theories? Which part of your approach works well, in spite of what theory or common practice tells you?
- What tools have you used? Commercial? Freeware? What tool do you currently use? Have you written a program to help you manage your information? Do you still use that program?

The results were fascinating in several ways. First, each presentation confirmed what we already know, namely that we are struggling to keep our heads above water in the ways we manage our personal information. Some practices were surprisingly simple, others extremely sophisticated. But on all accounts, the students reported not being completely satisfied with their solution. Most reported having problems at times with forgotten meetings, deadlines, or struggling to find information they knew they had with them.

Second, the sessions had a bit of the rapeutical value. It was amazing to see how many times students listening to another student would say "oh, that happened to me". Often, it was in the other direction, students providing alternative (e.g., "have you tried this tool?"). Given that PIM can be highly individualized and deeply personal, there were a lot of common aspects to the problems, strategies, and solutions that students employed.

Third, it was interesting to the students (and no surprise to the professor) to find all different types of strategies and behaviours described in the literature as examples in the students' PIM practices. Then four actions provide a

glimpse of some of these strategies and behaviours observed.

#### **4.1 Filers. Pilfers**

Malone observed that some people organize information into piles and use the layout of the piles to identify where information is stored. Others, according to Malone, use files, where actually organization of the file system helps people find their information. A similar effect has been observe dasuserspiling documents on the desktop of their computer. They often do so as a way to remind themselves about needs to process these files in some form. In studying users' email-related behaviours.



**Figure 1: Paper files**

and Sidner observed that users leave messages in their inbox as reminders for future processing. In all, 'piling' served valuable reminding function.

In the class, we saw examples of both. One student did not organize his notes; he simply kept piles of papers and post-it's all over his apartment. The location of the notes (e.g., desk vs. kitchen) served as a reminding function.

Another student used a filing scheme, which he claims, he 'perfected' after many changes over the years. He explained that he wanted a scheme that would let him file all the papers he read in a way that would let him grab all the papers on a particular topic as well as any individual paper by a unique ID.

This student used hanging folder bins as shown in Figure 1 where each hanging folder was labelled with a particular topic. Examples of such topics included affordances, SE-Agile, Standish group, standards, etc. He used a numbering rubber-stamp to imprint a number on a sticky note and attached that note to each paper he read. This numbers were unique and were incremented with each paper. The student then entered the citation of the paper into the bibliographic

software, End Note, and used one custom field in that software to store the unique number of the paper and another to store the name of the topic. So in essence, he created a filing system that allowed him to identify a particular paper by searching for it in End Note, getting the paper's unique number in one of the custom fields, ending the topic it was filed under in these custom field, and looking for that bin in his file folders.

He also went on to describe that sometimes when he was working on a paper or presentation and needed to refer to all the papers he read on a particular topic, he just had to grab that bin from his file folders and quickly glance at all the papers in that topic. When questioned on how he managed when he was away from his filing cabinets in his office, he described his 'backup' system: an electronic version of his filing scheme that was modified to leverage the limitations and affordances of the virtual world. He used a naming scheme shown in Figure 2 to file the electronic versions of the papers he read. Each file was labelled using the <Unique ID>-<topic>-<author> template.

#### 4.2 Filing for Remembering

As seen before, some people file information to help them in refinding information at a later date.

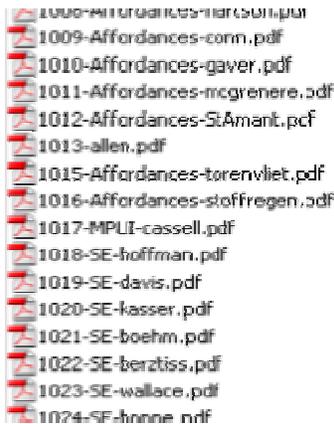


Figure2: PDF documents

approach to filing. He used very complicated file names, based not on what was stored in the file, but instead based on how he felt he would need to refindnbvzo=5

. the information. Straight from his classroom presentation: When filing, I think:

- In what context will I need this file?
- At that time, what will I be thinking of when I think of this file?

- Put those keywords into the filename.

Some example of files names that he showed were: "Visa Appointment Conurbation US Embassy Consulate December 2003.pdf", "Kingston1GB Compact Flash Card Rebate from Amazon.com.pdf", and "Insurance Claim Form Dentist Fortis Dental DHA.pdf".

This is quite an interesting filing approach, influenced by the idea of prospective remembering [21]. The emergence of keyword based search tools such as Google Desktop [15] and Apple Spotlight [1] has enabled faster ways to get at information than the traditional hierarchical navigation needed to traverse disk directory structures. By incorporating likely search keywords into the filename itself, this then becomes a method to 'tag' files with metadata at the time of creation or filing.

#### 4.3 No filling, Just Tag and Search

We saw examples of heavy users of search engines; one student uses Google Mail and does not do any filling of messages. He simply relies on tags applied by rule systems and searches his email archive to find things. He reported being quite comfortable with this approach and appears to have his email management under control. This is similar to findings in the literature and general research approaches where advanced tools are making organization less and less important. There are those that believe that better search tools will eliminate much of the need to organize your personal information [10].

4.4 Calendar A common them in the "Day in the Life" presentation show life changes triggered changes in the way students managed their calendar information. Students often expressed that they relied on their parents to inform them of important dates when they lived at

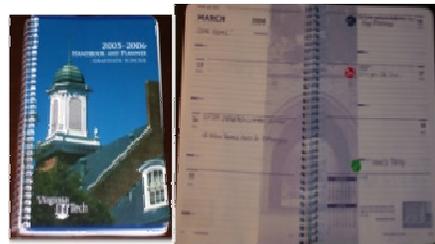


Figure3: Personal calendar showing stickier to mark events



**Figure 4: Use of a phone event scheduler and alarms as a portable to do list manager**

Home, but when they moved away, they had to adopt a calendar system of their own. Some students started off with “primitive” means of keeping track of their calendars, such as marking to-do’ son their hands or scrap pieces of paper. As their to-do lists became longer and their schedules busier, the students had to find another method for managing their information. Some students discovered that the university provided free paper calendars they could use.

Figure 3 shows a paper calendar used by a student, note how stickies are used to highlight events.

Other students discovered management technologies such as PDA’s and calendar software such as Apple’s iCal. Some students expressed that they now had to travel more than they used to, and opted for systems that could migrate with them; online calendars and to-do lists such as Hip Cal (<http://www.hipcal.com>) and calendar systems provided on their cell phones. One student used a paper calendar but switched to using his phone’s event scheduler and alarms as a to-do list manager. He would enter in this phone events and things to do and assign times when the alarm will remind him of to do them. Figure 4 shows a sample of his daily schedule.

## 5. Conclusions

Personal Information Management is an important area of study. Digital information reaches us via email and instant messages at rates never before experienced. Information is available for us to consume on the web, blogs, digital TVs, download able content, etc. We are inundated with information. Soon, we will have personal devices that will capture digital memories of all of our lives. Managing this overload of information is important if we are to be effective workers in the workplace.

But, studying this area as a research area is also important. As has been pointed out by many , there are as many PIM approaches as there are people doing PIM. We

need to understand the basic principles behind PIM (e.g., organizing information, fling information, reading information, etc.) as well as the unique practices (e.g., fling vs. piling).

The course described here was very effective at conveying to the students the importance of PIM research and of good PIM practices.

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