

From Novice to Expert: Personal Information Management Behaviors in Learning Contexts

Deborah Barreau

University of North Carolina at Chapel Hill

Chapel Hill, NC 27599

barreau@email.unc.edu

919-966-5042

ABSTRACT

This concept paper examines the role of PIM in learning environments and the relationship between PIM and expertise. A more detailed proposal is under development and not yet available, but a general method for investigating this relationship is proposed for discussion.

Author Keywords

Personal Information Management (PIM), Learning and expertise.

ACM Classification Keywords

J.4. Social and behavioral science: Sociology.

INTRODUCTION

Learning is a dynamic, ongoing, and complex process that occurs on multiple levels. One may acquire knowledge of the game of tennis, for example, by learning the rules. An experienced player who has mastered fundamentals no longer worries about them, but responds to each volley at physical and cognitive levels, sensing where the return will land and knowing instinctively how to answer it until faced with previously unencountered strength or method. If we could record the learner at practice, it might be possible to observe changes as the student moves from mastering fundamentals to developing personal strategies and style. Novices and experts behave differently and they process information from their environments differently [8, 14].

Traditional studies of expertise suggest that experts in a field are more proficient in problem-solving than novices are and that they are able to recall patterns and access information quickly [1]. On the other hand, studies suggest that experienced writers have more difficulty than novices in writing quickly and in recalling what they have written

[12]. For experts, writing requires more effort, revisions, wrong turns, and recall problems. Skilled writers are often interrupted in their writing by a thought or question requiring that they retrace their steps, revisit their plans, and update their scripts accordingly. Similar behaviors were observed in experienced readers who, encountering information through deep reading, reformulate domain knowledge and develop new ideas about what to do or how to handle the information.

PIM has been identified as “one of the central components of an individual’s learning processes. While learning, people collect information items...and store them” [6]. Others have explored the benefits of Memex-like personal devices for extending memory and providing mobile access to information in learning contexts [13], yet little has been done to examine the role of PIM in learning or to examine the effects of learning upon PIM. The purpose of this paper is to suggest ways that these issues might be explored.

Among the questions raised are: (1) Do expert learners behave differently from novices, so that there are those who are more effective at processing and using information as they learn? (2) Are aspects in the learning process observable in the personal information management behaviors of learners so that it is possible to distinguish novices from experts in a domain? (3) Can we help novices to become experts by improving their personal information management skills?

BACKGROUND

PIM research has typically assumed that a person is an expert about his or her own personal information. Much PIM behavior involves conscious acquisition, organization, and use of information to perform tasks or support hobbies and interests. But studies have also shown that subjects do not always remember why a particular file was kept and may acknowledge that there are things within the personal workspace no longer valued or even distinguished [3,4].

Examination of participant responses to a field experiment in a class on local flora reveals differences in PIM behaviors between those who were experienced in the subject and those who were not [2]. Experts were able to complete the task in less time and were able to evaluate and utilize the technologies for capturing data in the field more

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.

CHI 2008, April 5–10, 2008, Florence, Italy.

Copyright 2008 ACM 978-1-60558-011-1/08/04...\$5.00

effectively than novices. Although both experts and novices voiced similar concerns about the technology as they built personal collections in follow-up exercises, they employed different terminology to describe those concerns and they used different criteria in selecting samples.

Research has taught us quite a bit about why people keep (collect) things. We keep things because we need them to do our work, to be reminded of commitments, to share with others, and just in case we need them later [10]. The value of PIM is not in the keeping, but in how we use the information that we have. The usefulness of these things is complicated by the fact that the conditions in which we acquire and organize the information are often quite different from the conditions surrounding later needs. Further, our personal knowledge structures change over time so things that we associate with a subject at its introduction may no longer be relevant to our understanding at some later point in time. Investigation into how people use personal information, and particularly how they re-use information, can help us to understand a bit more about PIM processes and their relationship to learning.

COMMONPLACE BOOKS, PIM, AND EXPERTISE

PIM behaviors have been observed in a variety of settings. Early examples of PIM may be observed in commonplace books. Commonplace books date from the 15th Century and consist of information from varied sources bound into a unified source. In some cases, they resemble scrapbooks and may include recipes, articles clipped from a newspaper, flyers, etc., but, in other cases, they resemble journals and include ideas and passages copied from books to be remembered and used later. John Locke, for example, carefully indexed his commonplace books by topic as well as by source [5], and the commonplace books of Thomas Jefferson, Benjamin Rush, and others have been analyzed by researchers to explore how other authors or ideas influenced them as well as to determine what they reveal about the books' creators [7, 11, 16]. Thomas Jefferson kept his literary commonplace book from the time he was a boy until he was 30 years old. Through his entries and his annotations, it is possible to follow not only his literary interests, but stages in his intellectual development. We can also learn something about how Jefferson used the information since there are examples of passages copied into the book in the 1760s used in correspondence a decade later [16].

Commonplace books are interesting because of their similarity to at least two types of personal, digital information: blogs and electronic portfolios. Both blogs and e-portfolios allow individuals to acquire and reflect upon information. E-portfolios are used often in learning environments as a means of assessment, a way of demonstrating acquired skills and expertise. Similar to expert reading and writing described above, both blogs and e-portfolios encourage critical review and revision of ideas.

Methods

Analysis of commonplace books may suggest clues for analyzing personal information in digital environments. Annotations, tagging, selection, revision, and reuse are some of the behaviors observed from analyses of commonplace books that may be comparable to electronic documents as well, particularly as they reflect changing concepts and knowledge structures.

Researchers have experimented with other techniques for assessing how expertise is acquired [15] as well as methods of eliciting expert knowledge [9]. We propose to combine development of an electronic portfolio with elicitation of personal concept structures, and assessment of PIM at different points in time, to explore the relationship between expertise and PIM. Our target will be undergraduate volunteers from the beginning of their junior year, when they begin their major in information science, to the close of their senior year. "Snapshots" of their concept maps and of their personal information management structures will be taken at the end of each semester to assess changes over time. Assessment of the portfolio will examine their learning with respect to program objectives as well as personal development.

Summary

While PIM behaviors serve many functions, their relationship to learning is not yet clear. Past studies suggest that PIM behaviors are highly personal, idiosyncratic, and contextual and there is evidence that at least some behaviors persist over time. Whether we can distinguish the expert from the novice based upon PIM practices remains unclear. One of the goals of this study is to assess whether such a relationship exists and whether it is possible to facilitate the development of expertise through PIM.

ACKNOWLEDGMENTS

We thank CHI and the organizers of the PIM Workshop for this opportunity, and Kristina Spurgin, Terrell Russell, and Jacob Kramer-Duffield for their ideas and comments.

REFERENCES

1. Anzai, Y., Learning and use of representations for physics expertise. In Ericsson, K.A. and Smith, J. (Eds.), *Toward a General Theory of Expertise*. Cambridge: Cambridge University Press, 1991, 64-92.
2. Bailey, E., Baldwin, T., Barreau, D., Chrystal, A., Greenberg, J., Mendez, E., Oberlin, J. Sharma, A., and Shoffner, M. Augmenting memory for student learning: Designing a context-aware capture system for biology education. In *Proceedings of the Annual Meeting for the American Society for Information Science and Technology*, 2006.
3. Barreau, D., Context as a factor in personal information management systems. *Journal of the American Society for Information Science*, 46, 327-339 (1995).

4. Barreau, D., The Persistence of behavior and form in the organization of personal information. *Journal of the American Society for Information Science & Technology*, 59, 307-317.
5. Basbanes, N., *Every Book Its Reader: The Power of the Printed Word to Stir the World*. NY: Harper Collins, 2005.
6. Bergman, O., Beyth-Marom, R., Nachmias, R., The User-subjective approach to personal information management systems. *Journal of the American Society for Information Science and Technology*, 54 (2003), 872-878.
7. Corner, G.W. (Ed.), *The Autobiography of Benjamin Rush: His "Travels Through Life" together with his Commonplace Book for 1789-1813*. Princeton, NJ: Princeton University Press, 1948.
8. Hinds, P.J. and Pfeffer, J. Why organizations don't "know what they know": Cognitive and motivational factors affecting the transfer of expertise. In Ackerman, M., Piper, V., and Wulf, V. (Eds.), *Sharing Expertise: Beyond Knowledge Management*. MIT Press, 2003.
9. Hoffman, R. R., Shadbolt, N.R., and Burton, A. M., Eliciting knowledge from experts: A methodological analysis. *Organizational Behavior and Human Decision Processes*, 62 (1995), 129-158.
10. Jones, W., Bruce, H., and Dumais, S., Keeping found things found on the Web. *Proceedings of the 10th International Conference on Information and Knowledge Management*, 2001, 119-126.
11. Olsen, T.G. (Ed.), *The Commonplace Book of Sir John Strangways (1645-1666)*, Tempe, AZ: Renaissance English Text Society, 2004.
12. Scardamalia, M. and Bereiter, C., Literate expertise. In Ericsson, K.A. and Smith, J. (Eds.), *Toward a General Theory of Expertise*, Cambridge: Cambridge University Press, 1991, 172-194.
13. Starples, M., The design of personal mobile technologies for lifelong learning. *Computers & Education*, 34 (2000), 177-193.
14. Sternberg, R.J., What is an "expert student"? *Educational Researcher*, 32 (8):5-9 (2003).
15. Wang, P., Bales, S., Rieger, J., and Zhang, Y., Survey of learners' knowledge structures: Rationales, methods and instruments. *Proceedings of the 67th ASIS&T Annual Meeting*, 2004, 218-228.
16. Wilson, D.L.(Ed.), *Jefferson's Literary Commonplace Book*, Princeton, NJ: Princeton University Press, 1989.