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How we lose information —an emerging model

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Abstract

Households constitute one of the most widespread forms of organisation yet their nature as an information system is essentially unstudied and thus ill-defined. As individuals and householders we have all experienced the phenomenon and frustration of 'losing' information without necessarily knowing how we came to lose it. Preliminary findings from the Household Information Practices Study reveal that losing information is a process that is complex, multi-faceted and an inherent part of household life. A preliminary model explaining how we lose information is offered consisting of nine contributing dimensions or factors.

Keywords: Information loss, households, disability, grounded theory, model.

1 INTRODUCTION

As individuals, we have all, at some time, lost information. Usually this is a frustrating experience that can have potentially serious consequences. Yet we are often unable to explain how we came to lose the information. For some of us, a sense of information overload makes it difficult to 'take charge' of information and extract what is important from the constant flow of information. And if we live with other people, it is often 'they' who are responsible for 'our' information loss; or so it seems.

How do we lose information? Does it matter if we lose information? Why do we feel overloaded with information? Should schools teach our children how to manage information, given that we live in an 'information age'? Will broadband internet connections, which allow people to download vast quantities of information in very short times—information overload on demand!—lead to greater information loss? Does illness or disability or old age increase our risk of losing information? How? Does living, or working, with others help or hinder information loss? In short, how can we ensure we do not lose important information? My research into household information practices (HIP) is intended to answer questions such as these.

This article provides an overview of some of the preliminary findings from this research into HIP, and outlines an emerging model for how households lose information. It ends with some suggestions for broader research opportunities in the study of HIP.

2 APPROACHES TO THE STUDY OF HIP

HIP, as an umbrella concept for what happens to **all** information within a household, is essentially unstudied. I have found no literature on how households process and manage the **totality** of their information resources: the daily inflow of the mass media, telephone calls, internet usage, mail, conversations, tax paperwork, school reports, books, music and so on. Equally, there is an apparent lack of literature on information loss and how information comes to be lost. But this does not mean that we know nothing about information processing and use in households. On the contrary, there is an extensive literature exploring what I call the 'structural context' of HIP as well as the information behaviour of people as individuals—individual information behaviour.

Structural context is the 'larger-scale and/or long-term processes' (Strauss 1978, p257) in society that affect HIP. Three such processes have been identified so far in this research: *information* (its media, quantity, uses, availability and pervasiveness), *information-related devices and services* (IRDS) (types, perceived affordances, capability) and *social* (work patterns and practices, nature and composition of households, complexity of life).

The structural context-based literature generally explores the impact on households, or householders, of changes in these contexts. For instance, the information context is represented by studies of the consumption of mainstream and new media (Silverstone 1994, Green and Davenport 1998), the rise, or otherwise, of the 'information age' (Compaine 2001, Feather 2000, Hobart and Schiffman 1998, Schement and Curtis 1995) and the notion of 'information overload' (Noyes and Thomas 1995, Tidline 1999). Studies of IRDS are equally extensive covering aspects such as adoption and use of technologies in households (Frissen 2000, LaCohée and Anderson 2001, Silverstone, Hirsch et al. 1992) and identification of ways of improving IRDS (Hindus, Mainwaring et al. 2001, Taylor and Swan 2005). And studies of social change and the households abound (Aldous 1977, Poole 2005).

Individual information behaviour has been studied extensively in terms of, for example, information seeking (McKenzie 2003, Wilson 2000), information needs analysis (Anwar and Supaat 1998, Dervin 1973) and time management (A.B.S. 1998, Daly 2002).

But missing from the literature is an analysis of HIP. This research is the first step towards developing a comprehensive understanding of what happens to **all** the information in a household.

3 ABOUT THIS STUDY

The current study is an exploratory one intended to develop an initial understanding of how households lose information. *How* questions lend themselves to the use of a grounded theory methodology, which facilitates the development of mid-range theories in a substantive area (Glaser and Strauss 1968). Accordingly, my research is being conducted using grounded theory, which, as Fernåndez (2005) noted, is being increasingly used in information systems research.

At least three variants of grounded theory are available: those of Glaser (1992), Strauss (Strauss 1987, Strauss and Corbin 1990) and Schatzman (1991). All variants contain a common set of core, fundamental features and these were built into my data collection and analysis methods. Fundamental feature are:

- Take the subject's viewpoint—let householders define concepts like 'information'.
- The unit of analysis is the concept—'conceptual labels placed on discrete happenings, events and other instances of phenomena' (Strauss and Corbin 1990, p61).
- Conduct constant comparison—of HIP between households and within households.
- Perform theoretical sampling—select households to interview based on their expected ability to provide data to inform and 'densify' the theory.
- Continue sampling until 'theoretical saturation' is reached—until no new concepts are identified.
- Undertake simultaneous data collection and analysis by coding interviews and making copious memos or notes.

Data is collected primarily through a semi-structured group interview with all adult members of each selected household. The interview is generally centred around the question *Can you tell me what happens to information in your household?*. Interviews are transcribed and then analysed graphically to identify concepts. Concepts are then clustered into dimensions (Schatzman 1991) and sub-dimensions which are then combined to form the model of information loss.

In addition, each person interviewed completed a questionnaire quantifying the range and frequency of use of information and IRDS in the household. This allows four metrics to be calculated: 'information variety', 'information interaction', 'infomatedness variety' and 'infomatedness interaction' respectively. These metrics are, in turn, used as characteristics of the household along with basic demographics like household income, composition, location (urban, rural etc), education levels and self-perception of information-related skills, all of which are collected in the same questionnaire.

Households are selected theoretically. They may be suggested by other households, be directly approach by me, or approached through community groups, for instance, disability support groups.

Thus far eight interviews have been conducted (with a total of twenty householders) and theoretical saturation is approaching. Efforts are now focussing on densifying the theory of information loss.

4 PRELIMINARY FINDINGS

Initial findings from the study are both surprising and confirmatory of 'common sense'. Significant preliminary findings are outlined below but these need to be confirmed by further research.

4.1 The nature of household information

There is no agreement in the literature on what 'information' is though numerous attempts have been made to define it (Holgate 2002, Kaye 1995). Consistent with the grounded theory methodology used, householders defined 'information' in their own terms. Thus, several approaches emerged, not all of

which are appreciated in the context of information systems theory or research but all of which are involved in information loss.

For householders, information can be several things:

- Useful 'stuff; if it's not useful it's not information and thus has no value. This was the most prevalent view of information, a view that can create problems when one householder considers information to be 'junk' while another believes it is important.
- Memory or objects that evoke memories or allow people to share experiences and memories.
- Documents in the nature of 'records' or accounts of transactions.
- An object that connects a householder with the past and/or future, and is thus valuable to others as well as to the householder.
- A characteristic inherent in the nature of things, a sort of organising principle for objects, like Stonier's (1997) view of information.

But above all, information is manifest as objects or things as Buckland (1991) suggests. The main exception to this is what I call 'transient information', information in the form of conversations, TV and radio programs, etc that do not exist as objects unless specifically captured and converted to objects, for example, by taping a TV program. HIP is thus largely about processing and managing objects containing or representing information.

On this basis, a household may have around 200 different types of information or information objects (reflecting its information variety), depending on what is considered to be information. Similarly, a household may use around 70 different types of information-related devices and services (reflecting its infomatedness variety), again depending on what is included. (Is a tape measure or timepiece to be counted as an information-related device? They were not in this study.) No attempt was made to measure the number of information objects in a household, though one household interviewed insisted it had 30 000 photographic transparencies! Similarly, no attempt was made to measure the number of information objects flowing into, out of, or created within, a household each day. Notwithstanding these limitations, the household information environment was shown to be rich and complex, though not everyone felt overloaded by information; some believed they have effective control of information.

4.2 Information-related roles and responsibilities

Households do not manage or process information, individual householders do—for themselves and on behalf of other householders. Information-related roles and responsibilities are not consistently allocated; neither are they based on gender, type of information or skill. Mostly they are adopted or embraced by an individual householder based on the householder's interests, preferences or perceived self-competence. In some cases, it appears that other householders agree to such arrangements as a way of maintaining harmony within a household. In any case, roles tend to be clearly defined, for instance, financial investment information may be managed by one householder while another manages day-to-day financial information and children-related information.

4.3 Types of information loss

In general conversation, when someone talks of 'losing' something, they tend to mean that the thing has been misplaced or that they cannot find it. This is one meaning of information loss that has emerged from this research, but it is not the only one. Given the various meanings householders apply to 'information' it is appropriate to adopt a broad interpretation of 'lost information'. Accordingly, I define 'lost information' to be *information that a householder believes they need or should have but which is not available to them when they want it and/or is not in a form which they can easily use*. Thus, information can be considered to be lost to a householder it if is:

- mis-processed—accidentally thrown out, mis-filed, overlooked etc
- destroyed—completely ruined in a fire, flood or by a technology failure, has been stolen or irretrievably thrown out

- withheld—not provided by the 'owner' of the information for their own reasons
- inaccessible—cannot be used because it is in the wrong form, format or media for the householder.
- un-processable—cannot be filtered or used by a householder because they have a disability.

4.4 The model of information loss

The model of information loss that is emerging from this research is shown in Figure 1. Nine dimensions comprise information loss (the *all* of Schatzman (1991)). Dimensions can contribute to information loss in their own right—for example, an overwhelming inflow of information is likely to result in wanted information being mis-processed—or act in concert with other dimensions. In the latter case, two dimensions may operate in a direct relationship—an increase/decrease in the level of one dimension produces a comparable increase/decrease in the other (represented by + sign)—or an inverse one—an increase/decrease in one produces a decrease/increase in the other (– sign). Sometimes the relationship can be direct or inverse depending upon the nature of a householder (∞ sign); thus some householders do not to always learn from their experiences of losing information.

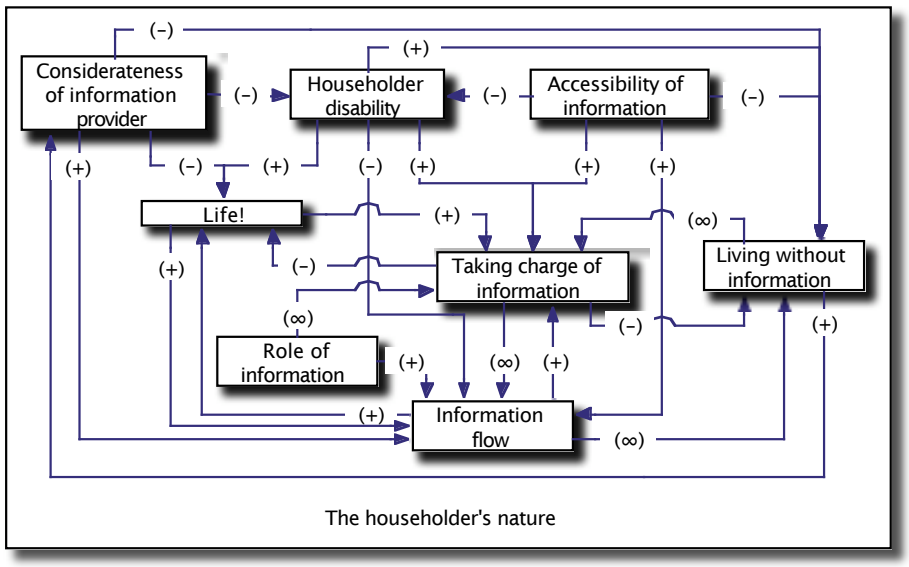

Figure 1 Preliminary model of household information loss

4.5 The dimensions of information loss

The characteristics of the dimensions of information loss identified in Figure 1 as they are currently understood are as follows.

Considerateness of information provider: the extent to which an information provider takes into account a householder when providing or granting access to information, or collecting information from them. It comprises respect for a householder (the extent to which the information provider considers the circumstances and info preferences of a householder) and information withholding practices (the provider's activities that restrict the supply of information to a householder).

Householder disability: the nature and extent of a cognitive, sensory, physical or other limitation of a householder that interferes with their information practices, including memory loss, illness and ageing.

Accessibility of information: the extent to which a householder is able to access the information provided to them. This involves both the nature of the technology needed to access and use the information (its media, perceived affordances etc) and the nature of the information itself (its understandability, language etc).

Life!: daily events, activities and circumstances that impede, or facilitate, a householder taking charge of information. This dimension relates to the demographics of a household (how many people, their age and the relationships between them), household resources and facilities (financial and physical), unforeseen daily events (accidents, distractions etc) and work flexibility (to respond to life's events).

Information flow: the amount of information a household must filter and process each day. This is determined by the channels a household uses to accept information (essentially the ways in which information can be 'pushed' into a household, usually a reflection of the household's infomatedness variety), the information gathering activities of the household (the information 'pull' arrangements) and the kept information that must be managed (tax records, music collections, book cases etc). Flow can be considered the extent of daily information interactions.

The **role of information**: the purpose for which information is used by a householder and by which a householder gains meaning from using information. This reflects the interactionist view that people interact with objects, like information, because such interactions are meaningful for them. Information is used by a householder to help them live their values and maintain their self-identity, allow them to maintain linkages between past and future generations, experience life (enjoy music, friendships etc), manage life (keep appointments, lodge tax returns, get the kids to school on time) or not miss out on opportunities (weekly supermarket specials, meet their hero, ensure the kids go on all school excursions etc). Roles are the basis of the filters used to take charge of information.

Taking charge of information: adopting specific actions and strategies to obtain, filter, use and manage information. Taking charge is essentially the information practices of a household. These practices centre on filtering the flow of information coming into a household (and then keeping, sharing/giving away or throwing out the information), improving the accessibility of information (changing its media and organizing kept information), protecting kept information (backing up hard drives etc), compensating for disadvantage (a disability or limited household resources or facilities) and doing without information.

Living without information: the consequences for a household or householder of not having information. Consequences may be potential, real or perceived. They relate to disruption to one's life or the lives of others (forgetting a wedding anniversary), missing out on important things (not submitting a paper on time), gaining a new opportunity (losing an old dictionary allows one to buy the latest edition) and being non-compliant with legal obligations (no tax return submitted).

The **householder's nature**: the characteristics of a householder as a person that influence their information practices. These characteristics relate to a householder's interests, information-related skills, personality, self-image and information preferences (paper or online, visual or aural etc) and affect all the other dimensions to a greater or lesser degree.

4.6 Example of the operation of the model

The information practices of households can be explained in terms of this model, as demonstrated by the following simple analysis drawn from one of the households interviewed for this study. More complex analyses, of course, can be built using the model.

Household four consisted of a couple with two young children. The wife/mother was losing her sight but could read if she could bring her eyes close enough to the text. Her friends were now sending her emails when in the past they would have phoned her (representing a change in the IRDS structural context), which is more appropriate given her blindness (poor accessibility of email compounded by lack of considerateness by information providers, related to a particular type of disability). As a result, she often missed activities mentioned in the email (personal disruption) including meetings she was leading (disruption to others). This made her feel inadequate (personal disruption) at letting down others (not being true to herself). Thus she decided to obtain (taking charge) improved technology (improve accessibility of information and compensate for disadvantage) though she believes this will be expensive and potentially impossible (limited household resources). Further, she is concerned that

the technology *she* wants may not be available (poor considerateness of technology suppliers so limiting the accessibility of information). Meanwhile, she has arranged for someone else (taking charge) to read her email for her (compensating for disadvantage), identify those she should see (so accepting some potential loss of information), print them on paper in large font (improve accessibility) and give them to her (relying on the other's considerateness for all this assistance).

5 CONCLUSION

Overall, it is clear that households are complex information systems. The variety of information they deal with (information variety) and the range of information-related devices and services they use (infomatedness variety) is potentially very large, much larger than typically found in most workplaces. And unlike workplaces, households have no formal arrangements and resources to assist with information processing and management. Neither are there any formal mechanisms for advising householders of their information-related responsibilities like obligations under legislation. Under these conditions it is surprising householders do not have more information-related problems. Even so, information loss continues to be an issue for many households, especially those having someone with a disability.

While the final version of the model of information loss will not stop anyone from losing information, it will help us, as householders, understand why we lose information and suggest ways we can mitigate such loss. Future work will finalise the model by sampling more households and increase the richness of explanation. Beyond that a number of possible extensions to the model have been identified including validating the model against workplaces (after all a household and workplace are just different forms of organisation), developing a diagnostic tool to assess the likely extent of, or propensity towards, information loss, and developing guidelines for minimising information loss.

Other broader research opportunities have been identified as well. Better tools to quantify and describe information are needed ('information variety' and 'infomatedness variety' will remain crude metrics until they are based on an agreed ontological framework for categorising (household) information). Information flows, or information variety, might be able to be used as proxies for such social issues as the level of social isolation of a household or personality disorders (Heinström 2003, Verrengia 2005). And understanding how information is lost is just part of understanding the totality of HIP and its role in our lives. Until we begin to systematically study the household as an information system we do not know what opportunities it contains and what insights it can provide.

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