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The Electronic Anthropologist: on sources of information, strategies, techniques and timing of online research

1. Introduction

Information of relevance and value to social scientists is scattered – as individual items as well as clusters and collections – across three vast and vastly different habitats of knowledge. The first of them is formed by the overlapping networks of interconnected, data-swapping computers. There the information is stored as electronic bits. The second habitat is a great planetary labyrinth of interacting and competing museums, archives, and libraries. This is the physical world where information is stored as tangible objects – books, manuscripts, microfilms, artifacts – and kept on shelves, or in vaults. Finally, there is the boundless archipelago of groups and clusters of people themselves. Researchers, experts, archivists, journalists, court-clerks, shamans, interested laymen, students, librarians, managers, and so forth form the third habitat of knowledge. There the information is stored in biological form, either etched in the memories of people, or created by them afresh.

This article is concerned with research uses of the first of those three informational environments, that is, with quests for digital pointers and digital contents that are available via the Internet. It represents an abridged extract from an extensive 2009 work entitled "The logistics of effective online information seeking", a research paper with a number of technical appendices, now available online at www.ciolek.com/PAPERS/logistics-of-online-information-seeking.html address.

Earlier studies of information-seeking practices

Literature on the uses of the Internet for research purposes tends to fall into five groups:

(1) Work dealing with types and characteristics of sources of online information (Beck 2008, Blackhurst 2008, C. Harris 2006, R. Harris 2008, NIASLINC n.d., Ravia 2000b, Zillman 2008).

(2) Quality and evaluation of information gleaned online (Alexander & Tate 1999, Blackhurst 2008, Harris 2007, Jacobson 2008, Kirk 1996, Ravia 2004a, Sebek 2007, Smith 2008).
(3) Discussions of the most useful information-seeking tools (Bergman 2001, Cohen 2008e, 2008d, Google 2008, Ravia 2008d).
(4) Analyses of the finer points of information-finding techniques (Cohen 2008a, 2008b, 2008c, 2008d, Harris 2000, Monash University Library 2004, Overture Services 2007, Ravia 2000a, 2002a, 2002b, 2004b, 2008a, 2008b, 2008c), and finally,
(5) Admonitions regarding the pitfalls faced by novices or careless online researchers (Cohen 2008d, Harris 1997, Mississauga Librarians 2008, NIASLINC n.d., Ravia 2008a).

All these works are feely accessible on the Internet where they are frequently updated to keep up with technological progress. This type of material does not need to be restated here. Instead, our attention will be focused on the evalutation of methods of electronic investigation that people can undertake within the domain of the Internet. Therefore, the questions posed by this paper are not "what are the best ways to obtain information online?", or "what are the best sources of electronic information?", but rather – "under what methodological circumstances is our online research most likely to succeed?" So it is not an enumeration of tools and opportunities, but rather a meta-assessment of these.

2. The Internet, the electronic environment of information

Two things about the Internet, the electronic environment of information, are immediately apparent to any observer: its dire lack of organization and its enormous physical size. The Internet is a highly unpredictable and confused place, and the materials it carries are of very uneven quality. Gorman (1995: 34) wrote:

> The net is like a huge vandalized library. Someone has destroyed the catalog and removed the front matter, indexes, etc., from hundreds of thousands of books and torn and scattered what remains... 'surfing' is the process of sifting through this disorganised mess in the hope of coming across some useful fragments of text and images that can be related to other fragments.

Tellingly, more than a decade later the situation remained unchanged. Thus Beck (2008), writing some thirteen years after the initial damning assessment by Gorman, concurs with the earlier criticisms by noting that the Internet continues to be "disorganised, volatile and dynamic. Web sites appear, disappear, move or mutate daily. [...] The useful and useless co-exist in cyberspace much as they would and do at a flea market".

The other outstanding feature of the Net is its immense size, and the fact that it continues to grow very quickly. In late 1995 the world wide web (which is only one of many component parts of the Internet) consisted of approximately 300,000

servers and of 2 million WWW documents (Ciolek 1996:106). This explosive growth continued unabated for over a decade. Consequently, in mid-2008 there were approximately 175.5 m servers (Netcraft 2008) and over 8 billion web pages (Google 2008).

Importantly, all these figures refer only to the information that is visible to standard search engines and their data-harvesting "spiders". This is an important caveat. In addition to the popular surface Web, there is also a massive – approximately 500 times larger than the commonly defined World Wide Web – and largely unacknowledged constellation of other, i.e. non-WWW containers, of electronic information. These other resources remain largely invisible and unknown to Internet users at large, and to the search engines people rely on (Bergman 2001).

3. The logistics of online informationn seeking

Finding the right information in vast masses of all potentially relevant electronic materials is a complex undertaking. Therefore, it requires a work plan which correctly matches the available: (a) research strategies; (b) favoured sources of online information; (c) time available for completion and finally, (d) online research techniques. Each of these four key variables has its idiosyncratic aspects. Let's look at them, one by one:

The First Logistical Element: Research Strategy

Every research operation is based on the researcher's passionate involvement with their questions and answers, as well as with the relevant sources of data and knowledge. These questions, sources, and answers can be unambiguously and directly stated, or not. These are important distinctions, as explicit scholarly questions (as well as explicit definitions of sources of data, and explicit factual answers) are precisely those statements which one can argue with and subject to testing and refutation (see Popper 1969: 51-53, 1972: 242-244). At the same time, ill-defined questions, sources, and answers form a background intellectual fog which has the potential to generate endless future revisions and revolutions to the established frameworks of knowledge.

Firstly, there are Questions, which usually involve the traditional cluster of phrases revolving around such words as "Who?", "What?", "When?", "Why?", "Where?", "How?", "What If?" and "To What End?" If the researcher states his or her questions clearly and explicitly, then we will call them by their generic upper case label "Q". Should they remain at a given stage of investigations implicit, unstated, unarticulated, then they will be labeled here with the upper case character "X".

Secondly, there are the Sources that a researcher seeks and uses. Examples of sources are many: a book, database, web site, library, archive, newspaper, field notes, an expert, an interview, and so forth. Naturally, such containers of information –

whether large or small and whether electronic, analogue, or biological – in order to be of use to anybody need to be: (a) precisely defined, (b) located (i.e. learned about, identified, and found); (c) accessed (i.e. visited, handled, and unlocked), and (d) investigated (i.e. read, critiqued, consulted, verified, etc., etc.). Sources, depending on whether the researcher defines them explicitly or not, will be labeled here as "S" or "X", accordingly.

Thirdly, there always have to be some Answers. These are thoughts and ideas that the researcher pursues and which need to be stated, deduced, discovered, or just postulated on a purely temporary basis. Again, depending on the ontological status of these answers (i.e. depending whether the researcher states them explicitly or only hints at them), they will be accordingly labeled here either "A" or "X".

All this means that at any moment of any imaginable line of inquiry all investigators face a choice between one of the eight theoretically possible research strategies. Obviously, not all of them are used equally often. Which particular research strategy a researcher adopts fully depends on the explicitness and clarity (or otherwise) with which he or she has defined their Questions, information Sources, and Answers. Any of these strategies can be initial, or interim, or final. Moreover, they can be mixed and combined. Above all, they can be interchanged at a moment's notice.

The eight theoretically feasible research strategies are:

- Confirm – Confirm details of the findings and/or details of the sources; verify and proofread the collected data; find another example of an answer that you already have. The logical structure of this research strategy is denoted by its acronym: QSA (= definite Questions, definite Sources, definite Answers).
- Link – Link your research to the correct sources; document the findings established thus far; test earlier findings against new, presently unidentified sources; collect additional answers from new, presently unidentified sources. Logical structure: QXA.
- Deliver – Deliver answers to the explicit research questions; identify the sources, access them and look for answers relevant to the questions; collect new data. Logical structure: QSX.
- Chase – Chase the promising sources to get answers to your explicit research questions; look afresh at the range of possible sources and think of new ways of investigating them. Think of new answers that they can yield. Logical structure: QXX.
- Form – Formulate your explicit research question in the light of the temporary findings supplied by the identified sources; look for the existing new questions to be asked of the known sources which have given us the current answers; contest the existing framework of thought and methodology. Logical structure: XSA.
- Match – Match your tentative inklings, your tentative and conjectural answers with the best questions and the most promising sources; use the answer you

already have to think of new data sources and new questions you could pose. Logical structure: XXA.
- Explore – Explore the located sources to formulate your explicit research questions; investigate the available materials; try inventing a new conceptual framework. Logical structure: XSX.
- Mull – Examples: Mull and brainstorm over the best questions, apt conjectures and the likely sources of data; look afresh at everything related to your research; be creative and iconoclastic. Logical structure: XXX.

So, for every potential research scenario we have a gloss, a mnemonic label, and a logical skeleton. In the above taxonomy the Confirm strategy is the simplest and quickest. At the opposite end of the scale rests the hazy, open-minded, time-hungry Mull strategy.

The Second Logistical Element: Online Resources

The Internet is a planet-wide archipelago of sources of online information connected by a lattice of general and directional pointers. These archipelagos of containers, contents and connections are furthermore surrounded by a comet's tail of contextual hints, oblique references, tags and metadata (Dublin Core Metadata Initiative 2003, National Academy of Sciences 2000). Some of these electronic resources and metadata reside on intranets and other protected sub-sets of the Internet. However, a great mass of informational resources is freely accessible to anybody with access to the Net.

There are no less than nine basic types of online information sources. For specific examples of those nine types of sources, and their online pointers (i.e. URLs) please see "The Electronic Anthropologist" paper at the online address mentioned above. All these resources can be summarised as follows:
- Databases – Containers of digital information in which data are organised in records, with each record comprising a number of precisely defined numeric, alphanumeric, or image-storing fields. Examples: Bookstore Catalogues and Bibliographies, Dictionaries, Directories of People, Library/Museum/Archive Catalogues, and Telephone Directories.
- Search engines – Automatically constructed indices of contents of such resources (see below) as Directories, Repositories, "Flowing" and "Frozen" websites, Collaborations and Gatherings. Search engines make every word and every image in the harvested online documents separately indexed and linked to its exact electronic address within the document, and within the resource itself, and within the Internet as a whole.
- Online directories – Manually constructed online bibliographies and catalogues of online resources. Examples: Bibliographies of links and Lists of web directories. Users of such directories can access stored information, and suggest addenda, deletions and modifications.

- Repositories – Online collections, warehouses, libraries, and archives of substantial and well-formed bodies of digital information. Examples: Bibliographies of Paper Publications, Digitised Books, Digitised Documents, Digitised Images and Documentary Photographs, Digitised Maps and Digitised Periodicals.
- "Flowing" websites – Containers of online information whose content, size and scope are heavily influenced by input solicited from or volunteered by their users/readers. The web sites act as small-scale repositories.
- "Frozen" websites – Containers of online information whose content, size and scope do not significantly change in response to input from their users. These web sites frequently resemble "flowing" web sites in terms of content and architecture. However, they do not have a policy of either inviting or acting on readers' input.
- Collaborations or collaborative environments – Containers of online information whose contents and, to some extent, architecture are either under the control of all, or only some of its readers (such as site administrators, registered co-editors, registered readers/commentators). Examples: Blogs and Wikis. Users of collaborative work environments can access the stored information, as well as add to it, delete from it, edit it, rearrange it, or annotate with a tag or comment.
- Gatherings – Two-way online communication systems used for the speedy exchange (i.e. sending and receiving) of digital information. Examples: Discussion Groups, Chat Rooms, Mailing Lists and information Bazaars.
- Feeds – One-way manual distribution channels for the sending of news and alerts from a source directly to the readers. Examples: Info/Alert/Update services. Feeds specialise in a great range of content: news, newsletters, updates on events in some organizations, details of new material published on some remote information system.

The Third Logistical Element: Work Schedules

Researchers always need to consider the amount of time they want to allocate to the business of information seeking, as opposed to other research tasks and writing. Obviously, the amount of time earmarked for completion of the data-gathering stage of research varies from case to case, and from scholar to scholar. For our purposes, however, it will be useful to distinguish three types of research schedules:

- Urgent research – One to be completed swiftly in a relatively short span of time. This span can range from a mere few minutes to a handful of frantic days.
- Standard research – A schedule of work that needs to be completed calmly and systematically by some well-defined deadline while there is ample time to carry it out fully and satisfactorily. Normally, such projects last a few weeks, or longer. Sometimes they can stretch for several months.
- Long-term – A leisurely, open-ended research project; one which has no clearly defined completion date.

It is only natural that a good researcher spends short periods of time on information-seeking tasks that can be performed swiftly, and longer periods on tasks that require ample time for their development and refinement. A very good researcher, however, has one more logistical skill under his belt. He can tell in advance which of his research tasks will be which. Therefore, he or she can plan their commitments accurately.

The Fourth Logistical Element: Data-Gathering Techniques

Once decisions regarding preferred research strategies, viable resources, and adequate timetables are taken, but before any of the resources are actually located and accessed, one needs to pause and think about the best approach to the task of data collection itself. Thus Ravia (2008b) advises:

> Think About Your Query! Seekers do not 'plunge' into a search out of the blue. Like artists, they visualize the correct result before they begin. The 'perfect' answer is driving their queries. The perfect answer creates the correct question(s). What kind of results do you want? [...] Two skills a seeker needs: how to formulate a question correctly and knowing where to look. And this means knowing which resources you should use for your searches. And this means you must first of all know how to search those very resources you should use for your searches. In fact each 'part' of the web requires a different approach. [...] Before even beginning, think about your query: prepare your question(s) for the perfect result and decide which resources you will use.

In addition, throughout all information-seeking operations, there is the constant need to focus exclusively on the task of finding your target. Fjalar Ravia (2004b), himself an information-seeker extraordinaire, observes: " 'Focus always on your specific needs. Otherwise, you can spend a lifetime drifting through archipelagos of fascinating, but ultimately fruitless links'. I don't need to underline how true this is for Internet searching ...'.

There are at least ten distinct ways of conducting online research. Each data-gathering technique can be applied once only, or in a sequence, as a part of a longer and more complex information quest. Also, one technique can be used at a time, or in bulk, in parallel with each other. The ten online data-gathering techniques are:

- Ask – This involves using one's social skills to obtain in the shortest possible time the exact information we seek from experts (either directly, or via mail or email), and to do so without wearing out or antagonising our informants. Typically, such exchanges are about addresses/pointers, or commentaries and other metadata regarding online and offline resources relevant to our detailed research question.
- Query – This means quizzing electronic databases for pointers, contents, or metadata for online and offline target resources. Query works best if the researcher is thoroughly acquainted with the technical characteristics and informational architecture of the interrogated database.

– Search – The technique quizzes global or local search engines for details of content and the electronic address of the target information. Search is a very powerful technique, especially when conducted with the aid of judiciously selected search terms (Harris 2000, Ravia 2002b, 2008b). Its correct use also assumes that the researcher is thoroughly focused (yet flexible and adaptive) while working with the wide range of variously designed search engines.

Throughout all these online investigations, valid or promising results need to be recorded, put into a meaningfully named file, and safely stored. Details of the search engines used also need to be clearly recorded. Furthermore, the dates of the searches as well as details of the search techniques need to be written down. The reason is that searches conducted at various points in time seldom generate identical results: information located on one day will not necessarily be indexed by the search engine at a later date.

– Browse – Browsing means keeping in mind well defined questions while surfing the Net from one online resource to another resource and purposefully exploring its nooks and crannies. Browsing is an activity only superficially similar to web surfing. Browsing is a focused investigation. It aims to achieve concrete intellectual results. Surfing is a mere pastime.
– Track – This technique resembles the actions of a detective conducting a criminal investigation. Here a researcher uses all their investigative and navigational skills to identify, in the wide range of online resources, any traces of the existence, nature, contents, and whereabouts of potential target information. Track is a slow-paced, forensic technique, and as such is very similar to Comb. Track makes heavy use of all other information-finding methods, especially Query, Search, Browse, and Monitor. Also, it relies on meticulous record-keeping and on the tricks-of-the-trade.
– Comb – The creator of the term 'combing', Ravia, explains: "[it is] searching those that have searched [well before you have embarked on your investigations] and are willing to share [...] you lurk around usenet, maillists and messageboards trying to find some authorities in the matters you are seeking. Then you use the cumulated knowledge of these savy-people [sic] to jumpstart on your search. [...] the 'combing' approach is useful in order to find treasures hoarded by people that are willing to share what they know and have found" (Ravia 2000a).
– Monitor – This technique aims to find in accidentally encountered resources pointers and metadata bearing on the target information. It works best when the researchers keep in mind a series of well-defined questions about the research problem. Only then will they be ready to perceive the significance of the snippets spotted while perusing their mailbox or visiting the Net on some other errand. Data gathering through monitoring is accelerated by joining a large number of complementary (topic-wise) Gatherings and information Feeds. However, such an approach has its downside: it usually results in a heavy overload of irrelevant or low-quality information.

- Collect input – This is another technique which taps knowledge carried by people. It involves the creation of online questionnaires (published as a web input form, or distributed as email circulars) and making them available to potential online informants (Coomber 1997, Mannion 2008, Sheehan & Grubbs Hoy 1999, Stewart 2003, and Zhang 2000). This technique collects data pro-actively. It combines questionnaire design skills with elements of computer programming.
- Trigger input – This online research technique requires very good social skills. Trigger is similar to the Ask, Collect input and Invite input (see below) techniques. All of them pursue knowledge that is predominantly stored in biological format, i.e. as human memory. However, unlike the other three techniques, it is a ploy; it acquires the target information indirectly. It does so by publishing online material which intentionally stirs readers and provokes them to express online their passionate comments, arguments, objections, and alternative viewpoints.
- Invite input – This method simply encourages readers to supply you with information you need. Invite input comprises five consecutive stages. Firstly, the researcher publishes online some preliminary but nevertheless serious and interesting body of information: data sets, raw materials, or draft conceptual frameworks. Secondly, next to the online offering he/she publishes a polite, and not too overbearing invitation for comments, addenda, and corrections. Thirdly, the researcher patiently waits for the possible arrival of useful input. This waiting period can stretch for weeks, months, or even years. Fourthly, all readers' input – when received – is promptly acted upon. This means that suggested corrections, emendations and additions are immediately implemented. It also means that the party who provided the submission is equally promptly thanked for their kind advice and assistance. Finally, and critically, in the documentation to the online materials themselves all readers' contributions are fully and publicly acknowledged online and – again – thanked for. The last stage is the crux of the successful deployment of the Invite technique. Without it, the chances that other readers would be inclined to contribute to the researcher's online work, and to translate this inclination into practical activity, are very slim.

4. Six constraints of information seeking

None of the above four logistical aspects of online research – the strategies, online resources, work schedules, and data-gathering techniques – ever occurs alone. On the contrary, they always work in concert, as a dynamic system. Together they form six unique combinations, in some of which these variables seem to "work together especially well", that is, when they appear to be supportive of each other, and appear (in the experience of this author) to be productive. The findings are of such comparisons are as follows:

Constraint 1: the compatibility of the eight types of research strategies with the use of nine types of online resources. Our analysis finds that in this context the four

most useful online resources are: Search Engines, "Frozen" web sites, and Repositories and Gatherings.

Constraint 2: the compatibility of the three types of work schedules with the use of nine types of online resources. In this context the three most useful online resources are: Databases, Search Engines, and Gatherings.

Constraint 3: the compatibility of the three types of work schedules with the use of ten types of data-gathering techniques. In this context the three most useful data-gathering techniques are: Ask, Query, and Search.

Constraint 4: the compatibility of the eight types of research strategies with the use of ten types of data-gathering techniques. In this context the four most useful data-gathering techniques are: Search, Browse, Track, and Invite Input.

Constraint 5: the compatibility of the eight types of research strategies with three types of work schedules. In this context the three most useful research strategies are: Confirm, Link, and Answer.

Constraint 6: the compatibility of the ten types of data-gathering techniques with the use of nine types of online resources. Our analysis finds that in this context the four most useful data-gathering techniques are: Search, Browse, Track and Combs. In the same context the three most useful online information resources are: Collaborations, Gatherings, and "Frozen" web sites.

Conclusions

This study leads to three conclusions:

1. Not surprisingly, long-term research projects are especially advantageous to a serious student of the world. They enable researchers to make better use of the passive and pro-active data, and knowledge-gathering techniques. All the above mentioned people-centric techniques need ample time to start blossoming, and they are definitely worth careful cultivation, and fine-tuning. Ultimately, it is more efficient to be either sporadically or regularly supplied with the factual or theoretical information we need, than to try to locate it all by ourselves in a cyber-mangrove forest. However, any advantages we may gain in our work are necessarily always relative, and always contextual. Whenever we choose any particular way of doing our research, we are bound to compromise in our selection of suitable research strategies, or time frames, or sources of information, or data-gathering techniques. To gain an advantage in one area necessarily means losing some advantage in another.

2. Serious online research is a technically and intellectually demanding activity. It involves patient and systematic thinking, long attention spans, heightened attention to detail, and the ability to make quick inspired guesses with regard to logical connections between seemingly unrelated bundles of electronic, paper and human pointers and contents. Such a research requires (a) staying perfectly focused on primary objectives; (b) keeping systematic and detailed records of operations, so that one does not go in circles or miss a vital step; (c) consulting and mining as many

information resources as possible. This is because they all store slightly different – in terms of the details and volume of their contents – groups of target information, and they do so by using different data architectures and formats. This all means that the actual task of information gathering goes far beyond the rushed, non-reflective use of any of the well-marketed search engines, or copying off the screen materials published by the Wikipedias and their cohorts.

3. Voluminous amounts of hitherto untapped and insufficiently tapped high-grade research information is known to exist in the form of memories and notes kept by other people. Gatherings and Collaborative work environments are especially seminal types of online resources. However, to mine them effectively we still need to determine – by observational as well as experimental means – under what exact social circumstances such forms of scholarly interactions are most productive and most informative. It would be good if more attention of anthropologists and social psychologists were to be paid to the social and cultural organisation of the Internet and its academic users.

In other words, while at the surface level the Internet appears to be defined mostly by our interactions with the disembodied, cold-headed technology, ultimately the full research value of the Net is best realised through multifaceted intellectual relationships that we can form with other human beings that are contactable online. Seen from this point of view, the modern Internet becomes a virtual bridge which links the three habitats of information. Firstly, the Internet almost instantaneously connects the researcher with the online containers of digital information he or she seeks. Secondly, it spans the gap between a res..archer and the pointers to the masses of analogue data preserved in libraries, archives, historical monuments, and museums. Thirdly, the Net is a superb tool for the closure of the gap between a researcher and the wealth of skills and wisdom of his or her colleagues, no matter who they are, and where they work.

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