

WHAT DOES THE e IN -RESEARCH MEAN?

We often joke that adding the letter e in front of every noun we use is an unfortunate distinction of the early years of this Internet technology era. We struggled with the stigma of trendiness that will mark and date a text referring to e-research. In fact we fear a visit from the "Society for the Preservation of the Other 25 Letters" when they see the effusive use of the prefix used in this book! However, we think the term captures some of the excitement, breadth, and diversity offered by an ever-increasing and sometimes bewildering set of new Net-based tools and techniques. Only a few years ago (as in email) meant a tool that was primarily text-based, operated on a relatively insecure communications link, and provided a wide variation in performance and quality of service. In education, e-applications focused on the lowest common denominators so that students and faculty could access contents with even the slowest and most dated of hardware. Convergence of audio, video, and multimedia channels to a Net-based platform, which is continuing to fall in price and rise in power has resulted in an explosion of applications in almost every domain. This has also resulted in a change of our connotations of the Net or the e word. Generally, the e prefix means that the activity or noun modified takes place on a high-speed, digital network that is available "any time/anywhere." Today that network is the Internet.

WHAT EDUCATIONAL RESEARCH ACTIVITIES DOES e-RESEARCH ENCOMPASS?

The Net now supports a wide variety of communication modes and information processing tools. As such, it is becoming easier to define the subset of behaviors that can not be researched on the Net as opposed to those that can be the subject of research. Notwithstanding the dangers of missing novel ways of using the Net, we list below some of the most obvious manifestations of e-research.

- Distribution and retrieval of text-based surveys.
- Open-ended or structured text-based interviews conducted via email or computer mediated conferencing.
- Focus groups using real-time Net-based video or audio conferencing.
- Analysis of Web logs and other tracking tools for measurement and synthesis of online activities.
- Net-based telephone interviews.
- Analysis of text transcripts of learning or social activities.
- Analysis of social behavior in virtual reality environments.
- Online assessment and/or evaluation of performance or knowledge.

We expect that the increasing power and ubiquity of the Net coupled with its imaginative use by researchers will result in continuing expansions and variations of the scope of research practiced around the globe.

THE SPECIAL TASK OF -RESEARCH

The networked world is awash in volumes of data. E-research helps us to convert this data into information and present and disseminate this information in ways that

allow it to be transformed into knowledge and wisdom by the researchers, their sponsors, educators, and the general public. The quantity of information produced, coupled with the speed in which it can be accessed, filtered, sorted, and combined creates endless opportunity. However, this abundance forces e-researchers to be more selective and critical of the veracity of the data they gather. In addition, it is becoming increasingly apparent that we can no longer, if we ever could, gather all relevant data. Instead we must make judicious decisions about which type and what quantity of data is most helpful in answering our research questions.

E-research is more than a set of new research techniques. The quantum physicist studying subatomic particles realizes that the very act of viewing these tiniest of particles disturbs and changes the objects. The e-researcher is a component of the Net Researchers provide and create tools for analysis and conceptual understanding of human behavior as it develops on the networks. In some cases the e-researcher is the outside evaluator, in other contexts the practitioner e-researcher is both a participant and researcher of the environment in which the research occurs. E-researchers are also usually members of other Net communities, thus they bring their experience and insights into the way online individuals and groups communicate and operate. They act as Net-savvy artisans of a network culture. Informally, they interact with peers, family, and coworkers-investing their time in the development of new skills and in the process gaining "Net efficacy."

E-research takes its place alongside e-commerce and e-learning as alternative ways to act, understand, and create knowledge in a networked society. New tools require new skills, but also allow creativity and an ability to manipulate the world in different ways. These new tools span both the physical and temporal barriers. We are accustomed to conceiving of technology spanning geography-after all, humans have had nearly 150 years since the telegraph first allowed us to communicate in real time over geographic distance. The Net easily meets this challenge. But equally, the Net spans temporal distance. Users are now able to benefit from asynchronous interaction through the tools of email and voicemail, or the capture and time shifting of audio or visual presentation. New tools such as asynchronous voice conferencing and video capture" (an advanced form of picture mail) promise to allow full multimedia interaction in asynchronous formats.

Asynchronous communication has also been with us for a long time. From St. Paul's letters to the early Christian church to the friendships that have grown and flourished via pen pal letters - asynchronicity has provided a uniquely reflective means by which humans communicate and by which we are communicating with you at this very moment. However, asynchronicity has long been confounded with text literacy. Now we realize that text-based communication, supported either asynchronously or in real time (as practiced in ICQ-an online instant messaging program, MOOS-Mud Object Oriented, MUDs-Multi-User Dungeons, Palaces, and other Net-based chat systems), is but one form of communication. In an advanced, Net-based context, voice, sound, and video become as easily formatted, stored, and retrieved as text. Already, early versions of asynchronous voice conferencing (for example, see www.wimba.com) and asynchronous "virtual people speaking your email" animations of voice messaging (i.e., <http://www.lifefx.com>) are becoming available in addition to synchronous audio and video conferencing.

Because the Net so aptly supports both synchronous and asynchronous communication, it should be no surprise that e-research utilizes this capability to provide a wide variety of research methods and tool capacities. Research applications can be customized to take advantage of either synchronous or asynchronous formats-or both. For example, online focus groups allow the researcher to gather groups of subjects from widely disbursed geographic locations. These groups can be conducted synchronously using voice or text formats so that instant feedback is provided to both researchers and participants, and the immediate presence can be used to build common understandings and ideas. Alternatively

they can be conducted asynchronously, permitting reflective interactions that are not dominated by the participants who think and communicate most quickly.

E-research also utilizes the distributed data and information processing capacity of the Net. Stand-alone data processing applications including statistics programs registration systems, and programs that monitor network activity) are all becoming "Net-enabled" and thereby can be applied to locations and times that are noncontingent with the behavior or process being studied. Thus, e-researchers are able to use research tools, monitor activity, and collect data without traveling long distances or coordinating local time schedules.

E-research permits the exploration of new fields of knowledge. As more social and economic interaction takes place on the networks, new fields of human endeavor are created. Researchers can now study the ways in which students learn online or how online education and civic groups make decisions and conduct business. These new human activities grow in economic and political importance daily. These fields of study are not readily accessible to researchers who cannot access or who lack the skills to proficiently use the Net. Thus, this text is a guide that can be used for both instruction and motivation to acquire and effectively use the new tools and techniques of networked research.

If, as Benedikt (1991) argues, cyberspace "has a geography, a physics, a nature and a rule, of human law" (p. 123), then obviously it is an environment that can provide insight into human behavior and nature, through examination of the cultural and sociological constructs that humans create within this context. Thus, cyberspace as an evolving and extremely intricate human context attracts the researcher. It is unclear how many of the research tools that have been developed, tested, and normed in real communities will be as useful in virtual contexts. Likely, existing tools will need to be modified to maximize their usefulness in this new milieu. Moreover, it is certain that