The Great Green Toolbox:

Building a Web-based Environmental Social Research Tool

By

Holly Jean Smith

B.A., Randolph-Macon Woman's College, 1993

Thesis

Submitted in partial fulfillment of the requirements for the
Degree of Master of Arts in the Center for Environmental Studies at
Brown University

PROVIDENCE, RHODE ISLAND

MAY 1999

Acknowledgements

These last two years have been an interesting time in my life. I don't know when I last experienced such a wide range of emotions: from despair to absolute happiness. When I look back at my time here at Brown University, my thesis seems almost secondary to the lessons I've learned about human frailty, human nature, my own emotions and limitations and – most importantly – friendship, love and support. My time here would have been inconsequential without the following people, and my work is dedicated to them.

To Chris Zarcadoolas – for your inspiration, support and humor. I've told you before that there are certain people with whom I can sit for brief periods of time and feel that all is right with this world…you are one of those people.

To my readers – for written and spoken encouragement. Phil, I thank you for being so giving with your comments and advice. Kristen, your comments were integral to my thesis, and your praise did not go unnoticed.

To my friends – especially to Joanna, Christy, Cate, Kim, Malena and Shivani. For sharing fun and fears. For believing in me and reminding me of who I am, even when I seem to have forgotten.

To my parents – all five of them…Mom, Dad, Kathy, Frede, and Jim. So much of who I am and what I've done is the result of the guidance and love you have given me. Parental love and support can make or break a child's success, and I am truly blessed to have so many of you rooting for me.

To Jim – for everything. For your love and encouragement, seemingly endless and definitely unparalleled. For being the one thing I could count on to be steady and true even on my craziest of days. Thank you. You are my bliss.

Table of Contents

List of Tables and Figures

The Great Green Toolbox:
Building a Web-based Environmental Social Research Tool
Holly Smith, A.M. 1999

Abstract
The science behind an environmental issue is only part of the picture – human interaction

is the other part. Increased public concern over environmental issues can be seen in

voting patterns, government action, growing number of environmental controls and

regulations, media attention, public/citizen-led campaigns, membership in environmental

organizations, and the increased number of educational initiatives and environmental

publications. Even with public interest, one fundamental challenge behind environmental

problem solving is essentially social – people must act responsibly and live sustainably.

However, many examples of environmental behavior in humans indicate a discord

between people pledging to a sustained environmental behavior, but exhibiting

differently in reality. The first step toward resolving this discord is to attempt to better

understand the motivations, behaviors, opinions and attitudes of human populations

through applied social research – the focus of this thesis.

But, how can individuals without social science expertise learn the importance of

doing this research within their communities or learn a standardized set of

methodological basics in order to solve environmental problems and become more

empowered? By conducting participatory action research within its community, an

organization is better able to understand its participants, empower stakeholders, and

subsequently enact change or influence policy. In order for this to happen, however,

basic social research tools must be accessible and understandable. By providing a vehicle

to empower communities with the informational and methodological tools of basic social

research, the science of the research is demystified and becomes usable at a community

level. With these new skills, communities may even venture to form scientific alliances to bolster their expanded appreciation of research.

Is it possible to positively influence an organization's or individual's desire and ability to conduct applied environmental social research within its community by providing the necessary qualitative social research tools in the form of a virtual toolbox?

The premise of this thesis was to provide community-based, grassroots organizations and other individuals (including students of environmental studies) with an interactive Web-based tool – The Great Green Toolbox© – to empower and guide them through the basics of conducting social research in order to further explore the social motivations and ramifications surrounding environmental issues within their communities. The reach to potential audiences, interactivity and flexibility of the World Wide Web were the reasons behind my decision to use the Web as a vehicle for the Great Green Toolbox©.

For my thesis, I conducted research to determine a need for the Great Green Toolbox©, redesigned the original Web site, piloted and redesigned the site again, and conducted ethnographic observations on site users in order to revise the Toolbox once again. The final revision of the Great Green Toolbox© can be accessed at: http://www.greatgreentoolbox.com.

I have concluded that participants judged the Toolbox to be a solid contribution to social research methods. A similar set of tools does not currently exist, and it is something that could benefit many users. My thesis focuses on the intersection between a community need for environmental problem solving and their need for greater empowerment. I explore how the Great Green Toolbox meets these needs. The Great

Green Toolbox$^{©}$ will continue to evolve as Web sites do, however, I believe that this thesis is successful in demonstrating a need, interest and desire within communities for such a Toolbox, and that the current tool fills a need among my target audiences.

Introduction

Increased public concern over environmental issues can be seen in voting patterns, government action, growing number of environmental controls and regulations, media attention, public/citizen-led campaigns, membership in environmental organizations, and the increased number of educational initiatives and environmental publications (Irwin 1995, Dunlap 1991). Even with public interest, one fundamental challenge behind environmental problem solving is essentially social – people must act responsibly and live sustainably. However, many examples of environmental behavior in humans indicate a discord between people pledging to a sustained environmental behavior, but exhibiting differently in reality. The first step toward resolving this discord is to attempt to better understand the motivations, behaviors, opinions and attitudes of human populations through applied social research – the focus of this thesis.

Chapter 1   Social Research and the Human Dimensions of Environmental Issues

1.1   Social Research

Social research is the multi-faceted study of human beings and their interactions with groups and sub-groups. By using social research methods it is possible to examine how humans interact with other humans and with the natural and built environments, one can explore how people behave in various situations, and how they perceive issues as a result of personal or collective experiences and actions.

1.2   Social Research and Environmental Issues

The science of an environmental issue is only part of the picture – human interaction is the other part (Sandman 1993, Dunlap 1991). Environmental issues are considered in the realm of social science disciplines such as population studies and demographics, industrialization and modernization studies, social stratification and inequality, and political sociology. Changes in the incidence of illness and population net growth, levels of living and the resources available, the distribution of those resources and associated risks, as well as political action in the distribution of resources can all be greatly influenced by ecological disturbance (Schnaiberg 1994). A key challenge behind environmental problem solving is essentially social – people must act responsibly and learn to live sustainable lives (Irwin 1995).

It is a generally accepted principle that much of the environmental degradation that occurs is the direct result of human actions (Schnaiberg 1994). Yet, as a species, humans are not immune to the effects of this degradation and ultimately are as vulnerable as other species to ecological collapse. It would seem then, that we – as a species – would have strong motivations to ensure environmental protection if for no other reason than self-preservation. There is, however, a certain disjunction between what we say that we will do, and what we will actually do to protect the environment (Schnaiberg 1994, Dunlap 1991, Yankelovich 1991). Large-scale efforts to solve environmental issues "…will fail unless they are linked to coherent, systematic, and culturally appropriate initiatives aimed at specific groups or individuals," (Bossi et. al. 1998: Web site).

The next two examples are used to demonstrate how human behavior and action are not always linked when it comes to environmental issues. In one study on newspaper

recycling behaviors, three groups were targeted. The first group of homes received a pamphlet on the importance of recycling, the second group was asked to verbally pledge a commitment to recycling, and the third group signed a commitment statement. When these groups were later revisited, the pamphlets had had no effect, and the verbal commitment led to an initial, but not sustained, behavior change. The only group that exhibited sustained behavior change was that which had signed the commitment statement. This is indicative of the disjunction between people pledging to a sustained environmental behavior, but exhibiting very differently in reality.

This disjunction is also apparent in Sandman's radon example (1993). Sandman asserts that between 1 and 3 in 100 homes in northern New Jersey present a lifetime lung cancer risk to residents. Yet even with these risky statistics, the State Department of Environmental Protection and Energy has difficulty convincing people to spend twenty dollars on a radon test kit. He also discusses the fact that if corporations were responsible for the radon in people's homes, then there would be an enormous response on the part of the people. Based on his closer study of homeowners' attitudes and opinions, Sandman concludes that this apathetic disjunction between risk and action is due to the fact that radon is a natural, not industrial risk (Sandman 1993).

A central assumption of this thesis is that applied social research has the potential to make ambiguous commitment more concrete by assigning personal responsibility (McKenzie-Mohr 1995).

1.3   Participatory Action Research

How can we better understand people's attitudes, perceptions, and knowledge of their environment? How can we understand disjunctions between action and attitude? How do we connect individuals and societies to their actions and non-actions? How do we create understanding and ultimately make change? How do we create culturally appropriate venues for environmental education and communication? The first step toward answering these questions is to understand the motivations, behaviors, opinions and attitudes of people in the context of their environment. Yankelovich (1991) asserts that if we want people to be agents of environmental change, we must first understand their attitudes and behaviors toward change by asking several questions:

- What is being perceived as an environmental problem?
- who is perceived as responsible for that problem? and,
- what is a specific population willing to do about finding a solution for that problem?

By asking these questions, and subsequently gaining a better understanding of specific populations, stakeholders can be created and empowered and policy can be better crafted.

The issue of empowerment is an important concept to explore. Throughout the technological age, there has been a widening gap between those who have technology, information, and subsequently the power, and those who do not. Historically, in political arenas there has been little weight given to common or experiential knowledge because of its unscientific nature. This devaluing of common knowledge has mystified scientific knowledge and processes and perpetuated the dominance of scientific over common knowledge (Irwin 1995, Gaventa 1993, Waste 1986).

With the electronic information age, and the ensuing decentralization of technology and information, many lay people and grassroots community organizations have attempted to overcome this dominance by developing their own information base through research *with* the people in their communities (Irwin 1995, Gaventa 1993). Although research *with* community people narrows the gap between the researchers and the researched, it has been found that research *by* the people is far more empowering and consequently has more potential to affect change (McKenzie-Mohr 1995, Gaventa 1993). In order to accomplish the inclusion of communities in social research, it is necessary to explore participatory action research so that it is more accessible to non-science individuals.

With participatory action research, potential beneficiaries of the research are considered participants, rather than subjects, and are intimately involved in creating and revising the research through direct contact with the researcher (McTaggart 1997, Whyte et al. 1991). A community organization that acquires methodological tools – once the intellectual property of experts – to gather information and produce action steps is empowered to prevent an ultimate dependence on expert knowledge.

True empowerment occurs in research *by* the people, for it "…is seen not only as a process of creating knowledge, but simultaneously as education and development of consciousness, and of mobilization for action," (Gaventa 1993: 34). The goal of many grassroots organizations is to encourage a sense of self-sufficiency in its community members, which can be important to enacting substantial change regarding that community's environmental issues (Mondros and Wilson 1994). Park outlines the goals of participatory action research as material well-being and sociopolitical entitlement –

essentially providing disenfranchised populations with the means to become, "self-reliant, self-assertive, self-determinative, as well as self-sufficient," (1993: 2).

There are many social, political and even psychological implications of participatory action research as evidenced by the words that action researchers use so often – collaborating, empowering, improving, transforming, consciousness raising. With community or commonly produced knowledge, expert knowledge can be demystified, and communities can *own* information and use it to better analyze policy and question established knowledge (Gaventa 1993).

1.4   Participatory Action Research as a Tool at the Community Level

"It takes the initiative of individuals, or more typically community or development agencies concerned with the welfare of the community in question, to insert themselves for the purpose of mobilizing and organizing the community for investigation and action," (Park 1993: 9).

By working with and understanding its community, an organization can determine what environmental issues are important to its target audience, as well as how information and services should be presented in order to secure a more positive response from its audience (McKenzie-Mohr 1995).

What role can scientists or experts play in participatory action research? According to Hall (1993: *xx*):

"Participatory research ought to be a tool which social movements, activists, trade unionists, women on welfare, the homeless, or any similar groups use as part of a variety of strategies and methods for the conduct of their work. If they wish to invite [experts] to become involved, they need to set up the conditions at the start and maintain control of the process if they wish to benefit as much as possible."

Hall (1993) goes on to assert that experts have skills that may be useful to community research as augmentation of the skills that the community has or develops on its own, but that the experts do not need to be in control of the research simply because it's a knowledge generating process. However, professional scientists, or experts, are usually averse to accepting lay research because it challenges their positions as professionals (Brown and Mikkelsen 1997, Irwin 1995). If scientific alliances can be formed, then the potential for synergy between experiential knowledge and expertise is that much greater. This can result in "…science that begins to meet the needs of ordinary people rather than the power holders, and only in such a way can we hope to see a constructive and humane science," (Merrifield 1993: 84).

This synergy is seen in the case of the Woburn, Massachusetts leukemia cluster. Based on common experience, a group of Woburn citizens charged several large corporations with the contamination of local wells which, they asserted, led to a cluster of childhood leukemia cases. These citizens formed a grassroots coalition, FACE (For a Cleaner Environment), compiled data and challenged expert knowledge at the local, state and federal levels of government. They eventually formed an alliance with the Harvard School of Public Health with the hope that the results from a shared study could be used as evidence in litigation[1]. Even with this alliance, FACE remained a primary force in the study and coordinated action between citizens and experts (Brown and Mikkelsen 1997).

Common knowledge can be augmented by expert knowledge, however, this is not to say that community groups necessarily need scientific allies in order to conduct this kind of research or to have greater validity assigned to the results. Hall (1993: *xx*)

---

[1] Although the data from the School of Public Health/For a Cleaner Environment study was never brought to litigation, the Woburn activists feel that the results could help in future legal cases (Brown 1997).

believes, "that countless groups make use of processes which resemble participatory research every day without naming it or certainly without asking for outside validation of the knowledge which is produced."

But, how do community organizations learn the importance of doing participatory action research within their communities? If they realize the importance of conducting this research, then how can they learn a standardized set of basic methodological tools rather than hiring expensive consultants[2] or freewheeling through the process?

1.5   Participatory Action Research Tools

The reality for many smaller organizations is that learning about and conducting participatory action research can be expensive as well as time- and people-power intensive. One driving force in the evolution of my thesis became providing a set of applied social research tools to empower community organizations and individuals with research needs and limited resources. These tools include background information clarifying the role for social research as well as the basic methodological tools to carry out the research at a community level.

The Toolbox has been created to provide community-based organizations and agencies working with them, as well as students of environmental studies with basic tools for:

- Learning about social research and its importance to environmental problem-solving,

---

[2] Hiring a consultant to conduct this kind of research within a community is expensive; a simple survey can cost upwards of $30,000 to develop and conduct – a single focus group can cost $3,000.

- Envisioning a participatory action research project – including the development of a central research question, the determination of respondents, and important ethical considerations;

- Learning the methodology of a project – participatory action research methods[3] such as surveys, interviews, observations, and focus groups are used to identify attitudes, perceptions, the degree and intensity of attitudes and opinions, and, in some cases, to track trends (Fetterman 1998, Miles and Huberman 1994);

- Designing and crafting interview protocols – including information on various types of questions and pitfalls that may occur both in question development and order, as well as the importance of piloting protocols;

- Conducting fieldwork – including preparing to "go into the field" as well as behavior and conduct while "in the field".

- Collecting, analyzing, presenting, and using data, as well as writing a final report.

Chapter 2   The Great Green Toolbox

In 1995, Christina Zarcadoolas, Ph.D., and Ellen Berrey created the Great Green Toolbox[©] as a primer to aid undergraduate environmental studies students in their study of applied social research. It was temporarily and rudimentarily published on the Web and was a success with students, yet the Toolbox remained untouched until 1998 when it became the focus of my Master of Arts thesis.

---

[3] Qualitative research methods yield themes and expressions, not hard numbers, and for this reason are often attacked by positivists as yielding unreliable data. However, according to Miles and Huberman, "Words, especially organized into incidents or stories, have a concrete, vivid, meaningful flavor that often proves far more convincing to a reader…than pages of summarized numbers," (1994: 1).

The premise of the revised, interactive Web-based Toolbox is to provide community-based, grassroots organizations or individuals with the necessary tools for conducting participatory action research and guide them through the process so that they can further explore the social motivations and ramifications surrounding environmental issues with their communities.   The Toolbox has been created for:

- Community-based organizations and agencies working with them,

- Students of environmental studies, and

- Municipalities and agencies looking to conduct neighborhood-based explorations of environmental issues.

Many organizations miss their mark when attempting to communicate environmental issues because they have not been exposed to participatory action research or conducted previous research on specific issues and tracked attitudinal trends within their communities (McKenzie-Mohr 1995). In my discussions with local Providence community-based organizations, their ability to conduct this kind of research depends on the number of staff members they have at any given time, and the amount of time and energy that they can dedicate to any specific issue. One responded, "I have no idea how to even begin thinking about research in my community. We've tried mailings, classes, flyers…it doesn't seem like we're reaching the people, or maybe they just don't care." In notes to myself on this interview, I wrote, "Yes, they've tried mailings, classes and flyers, but did they try talking to or involving the community-members before canvassing the neighborhood? Probably not if they aren't getting a response." This and other interviews that I had with local organizations led me to believe that there was a definite need for applied research in these communities. The consensus that I reached was that if an

organization is able to conduct qualitative environmental social research even at a basic level, engage its community in the research, and share what it has learned with its community, then the organization is more likely to understand its community's environmental issues, create stakeholders and eventually effect change.

The following example[4] illustrates the usefulness of applied social research to environmental problem-solving at the community level. A community organization concerned with lead poisoning. This organization wants to form a Parent Action Group on the lead poisoning problem in its community. The parent group would be responsible for consistently attending action meetings, participating in lead poisoning advocacy and campaigns, drafting legislation and being able to critically analyze existing regulations and policies. The organization has had difficulty in the past with recruitment and is interested in knowing whether there are certain parents who might be more capable and willing to consistently, diligently, and proactively carry out these duties so that it can target these parents in a membership campaign. The key person responsible for developing the parent group would use the Great Green Toolbox℗ to learn to create and analyze a survey or interview protocol for potential parents, thus, the organization is better equipped to target specific parents for its Parent Action Group. In a forward-thinking scenario, the Toolbox empowered the community organization, the organization was better able to serve its community, and the community was better empowered to confront the issue of lead poisoning because of the formation of a parent group dedicated to advocacy and making change on an environmental issue.

---

[4] This example closely resembles a situation that occurred prior to the development of the revised Great Green Toolbox℗.

My central question, and one driving force behind my thesis became: *Is it possible to positively influence an organization's or individual's desire and ability to conduct qualitative environmental social research within its community by providing qualitative social research tools in the form of a virtual Toolbox?*

Chapter 3   Importance of the World Wide Web to this Thesis

The other driving force in my thesis was determining a venue for the Toolbox. The immense potential audience, interactivity and flexibility of the World Wide Web are several compelling reasons behind my ultimate decision to use the Web as the vehicle the Toolbox.

3.1   Immense Potential Audience of the Web

> *"We live in a continuously shifty state of realities in which the only predictable constant is the inevitability of change. This is the basic element of our Information Technology era [which is now] represented in embryonic form by the Internet,"* (Karaliotas 1997).

As societies around the world, and especially in the United States, moved from an industrial age to an information age, the technology of the Internet and the World Wide Web became increasingly ubiquitous (Eastmond 1998). The decentralized nature of the Internet and lowering technology costs are making it possible for enormous and rapid growth (Sterling 1992). The Internet now connects more than 110 million people worldwide and estimates are being made that there will be over 200 million users by the end of 1999 (Benen 1998), and over 250 million by the end of 2000, with Americans accounting for 68% of all users worldwide (Burton 1997). According to Keohane and Nye (1998), "Computing power has doubled every 18 months for the last 30 years

[costing] less than one per cent of what it did in the 1970s. Similarly, growth of the Internet and the World Wide Web has been exponential. Internet traffic doubles every 100 days," (Keohane et. al. 1998). While there exists a disproportionate number of low-income households that are not connected to the Internet, the demographics of connectivity are becoming more representative of a general cross-section of the American public; it should also be stated that an increasing number of small businesses and community agencies are connected to the Internet (Cahoon 1998).

Originally created to handle high-level scientific computation and collaboration, the Internet is now becoming a mainstay in many elementary level schools (Sterling 1992). According to the American School Board Journal, "…27% of America's classrooms [have Internet access]," (ASBJ 1998). Although this percentage may seem discouraging, it has increased steadily since the early 1990s.

We can now say with confidence that computer- and Internet-based skills are becoming a necessary "tool for life" (Schofield et. al. 1997: 373) and learning in the United States. In Schofield's work, children in the third grade were being oriented to online environments; other students used the Internet to access online math problems and submit solutions, email foreign-language pen pals, and publish a Web version of their school newspaper. As we learn more about the potential for information exchange on the Internet, our education system is beginning to acknowledge the importance of Internet exposure to educators and students of all ages.

The federal government is cognizant of the need for improvement in this area and the need for initiatives to reach otherwise disadvantaged populations. The Department of Education recently released Requests for Proposals for education and technology grants.

The first, *Educational Technology: Preparing America for the 21st Century,* is setting aside $75 million "to ensure that tomorrow's teachers can integrate technology effectively into the curriculum, and can understand the new styles of teaching and learning enabled by technology," (DoED[1] 1998). With the enormous amount of information available on the Internet, a large part of teaching teachers how to use the Internet most effectively will involve teaching them how to teach their students to critically interpret that information.

The second grant program being initiated in FY 1999 is specifically directed at distance learning. The *Promoting High-Quality Distance Education: Distance Education Demonstration Programs and Learning Anytime Anywhere Partnerships* grant program will work to increase access of distance learners to higher education (DoED[2] 1998). Distance learning, the "dissemination of educational material and information through electronic and hardcopy media rather than face to face," (McArthur et. al. 1998) is already an accepted and growing facet of our educational culture as students of nontraditional student age (over 25) comprise the fastest growing student cohort (Eastmond 1998).

Americans are leading the way on the information superhighway in their use of the Internet and the World Wide Web; this use is becoming more effective, with users efficiently manipulating the Internet to provide them with individualized, personal information and education (Georgia Tech 1998, ETRG 1997). According to a survey conducted by Georgia Tech in 1998, 29% of the participants also responded that they were likely to participate in adult education via the Internet within the following twelve months. This ranked second only to on-line banking in a list of the top five intended

adult uses for the Internet.   With the exponential and diverse growth of the Internet,
learners are in position to seek and gain an enormous amount of information and
education.

3.2   Inherent Interactivity of the Web

Interactive learning has been shown to not only increase learners' enjoyment of the
education process, but also to increase the long-term retention of information and
material (Hallgren et. al. 1999, Dewey 1963). One widely held theory of learning
development is "constructivism" in which students compile complex knowledge
structures based on personal motivation and experiences by constantly trying to derive
meaning from something they are being exposed to. Constructivism was first theorized
by Jean Piaget who, in his stages of cognitive development, emphasized the importance
of learning through play, or learning by doing (Piaget 1963). Ackermann (1996) adds a
counterpoint to Piaget's theory by emphasizing not only the importance of interactivity in
learning, but also the importance of stepping outside of the experience in order to reflect
upon it.

        Seymour Papert, a student of Piaget, summarized the shortcomings of our
education system: "We try in our school systems to decide what people will learn in [a]
top-down centralized way and, for [this] reason, it is not compatible with the
complexities and dynamic possibilities of the modern world," (Papert 1998). Papert
invented the term constructionism to define an educational method rather than the
cognitive theory. For decades, he has purported that self-determined learning is the best

method in ensuring an educated world community, and that computer interactivity is indispensable to ensuring self-determined learning (Papert 1992).

Traditionally, computers have been used in educational settings in two ways: for people to create "worlds in [their] computer" and "computers in [their] world" (Sargent et. al. 1996: 161). Children have been taught simple computer programming languages (e.g. LOGO) that can be used to create within the computer by manipulating geometric skills as well as creating artistic representations of these skills (Sargent 1996, Papert 1992). There are also projects in which children have created computerized objects that become a part of their world by interacting (through simple feedback mechanisms) with their physical environment (Sargent 1996, Papert 1992). Both are examples of interactive learning, and in both cases the children are learning to be an active component of their own cognitive processes through problem solving, designing and inventing with computers. The payoff for this interactivity is that the children were increasingly excited and innovative not only in their work with the computers, but also in their approach to other forms of learning (Sargent 1992).

3.3   Flexibility of the Web

The following is not meant as a comprehensive analysis of the need for educational reform in the United States, but rather as a context in which to place Web-based learning. There are myriad books dedicated to the reform of our contemporary educational system. These books espouse that sometime during the last half a century, the true meaning of education was lost. Today's children and the influences on them are *not* the same as those that existed fifty (or even twenty) years ago, and the education system needs to be

flexible in order to encompass diverse socioculturalism and cognitive processes (Johnson 1993).

There has been, particularly in the past decade with the explosive growth of the Internet, a decentralization of how people want to receive information. With this decentralization also comes a need for more personalized retrieval of and interaction with information and learning resources (Luskin 1997). Interactive learning and computers allow learners the flexibility to construct knowledge based on personal/individual needs for various kinds of knowledge in various learning styles (Papert 1998, Johnson 1993).

The world's population is growing, and so is the number of people who need to be educated. The question then becomes one of space and resources for learning. The Web has the potential to increase class size exponentially while still retaining the ability to provide individualized learning; at the same time, interactive education offers a more efficient means of education by offering learning at a lower cost per student (Bork 1997). By producing educational materials on the Web, both learners and educational producers can access that information at any time to learn or revise.

Distance learning provides ultimate flexibility in that it has the potential to aid people who may be educationally marginalized because of geography, disabilities, economic, time and relationship constraints (Schrum 1998). Educational institutions are recognizing the potential of the Internet to provide a venue for augmenting or replacing traditional classroom experiences. Syllabi, coursework, and links to relevant resources are posted on many institutional Web sites for various courses[5]. In slightly more advanced scenarios, discussion groups are posted to the Web for course members to

---

[5] University of Texas' World Lecture Hall is a Web site that offers over 2000 on-line courses in 80 disciplines. This is one example of the enormous potential for placing educational materials on the WWW.

access and add to, and video or audio links are available to augment the educational experience even further. The ability to experience most of a course's components through the Web is beneficial to student cohorts who would otherwise not be able to physically attend a class.

In summation, the World Wide Web has become a vast, necessary and empowering resource during an age in which information is an undeniable asset (Schofield 1997). It has been said that this is an age in which "…people prosper less according to what they have in their hands or bank accounts, and more according to what they can do with their minds," (Dyson 1997: 82).

Given the importance of interactivity to learning, the inherent flexibility of the Web, and the burgeoning number of people who are using the Web for educational purposes, the creation of Web-based educational materials appears not only timely, but logical. My search for Web-based educational tools yielded copious sites; the empirical testing of those sites, however, was not implicit in their language. This furthered my interest in the design, testing, and release of a Web-based Toolbox to empower community organizations with the tools that they would need to conduct participatory action research within their communities.

Chapter 4   Methodology

For my thesis, I conducted research to determine a need for the Toolbox, redesigned the original Web site, pilot tested and redesigned the site again, and conducted ethnographic observations on and interviews with site users in order to revise the site again. This was

done in order to customize the site for community organizations as well as students

attempting environmental social research.

4.1   Assessment of Need – Content and Necessary Technology

In order to continue with the re-creation of the Toolbox, I needed to determine a need for

such a tool in the community and the receptivity to the Toolbox in community

organizations. I also needed to determine if organizations had the technology and

manpower to work with a tool such as the Great Green Toolbox (GGT99).

During the summer of 1998 I conducted telephone interviews with twelve Rhode

Island-based community organizations[6] to assess the need for an interactive tool on

environmental social research (Appendix A). The organizations were asked to respond to

questions on basic organizational profile, organizational needs, and technological

capabilities. Among other questions, the organizations were asked if they had ever done

any public perception research; if they would be interested in a tool that would help them

learn to gauge community knowledge and opinion; what they would expect from such a

tool and their perceived limitations to conducting opinion research; and their

technological capabilities and comfort levels for using a Web- or CDROM-based tool.

---

[6]The twelve organizations included in this survey were: Childhood Lead Action Project, Grow Smart,
Health and Education Leadership for Providence, Joslin Community Development Corporation, Keep
Providence Beautiful, Mount Hope Land Trust, Olneyville Housing Corporation, Progresso Latino, Project
BASIC (Bringing Advocacy and Strategy Into the Community), Stop Wasting Abandoned Property, Urban
League of Rhode Island, and West Broadway Neighborhood Association. Organization and contact names
were given to me by Michael Simon of The Providence Plan; all organizations had participated in a
technology grant program with The Providence Plan. Because these organizations were recipients of
technology grants, it could be said that there was some bias to my selection process – however, these grants
did not stipulate Internet connectivity and I found that all of the organizations were interested in being on-
line. This was also an efficient and effective introduction to many community groups.

Key findings from these in-depth interviews, lasting between one and two hours each, were:

- The audience was overwhelmingly receptive to the idea of GGT99 – "It would be really useful, really helpful…most times we just have to guess what's happening or what's important or rely on one or two people to get an idea of what the community wants…and none of us has experience in asking the right questions," and "If we had an ongoing and more accurate way to gauge [public opinion], we would probably be more effective and efficient at service delivery and class design."

- All of the organizations were, or planned to be, outfitted with the necessary technology (computers/modems);

- All responded that there was someone within the organization who could be trained with a tool such as this;

- A similar tool did not currently exist for this group;

- Several organizations admittedly were not certain how to even begin to think about conducting community opinion research – "We're really wrestling with the idea of how to do [public opinion research]"; and

- Other organizations felt that, although they thought that they had a good grasp on public opinion, "there is always room for improvement."

From the results of this initial survey and my exploration of Web-based learning material, I concluded that there was definitely a need and a venue for an interactive tool such as the GGT99.

4.2 Re-Designing the Great Green Toolbox

I began to look closely at the original Web site (GGT96) during the summer of 1998
(Appendix B). The core of GGT96 contained solid content on social research, and there
were parts that remained virtually untouched through the re-creation process. I decided to
create the new Toolbox as a Web site because of the ease and low cost with which it
could be distributed and updated, but always with the idea that it could be written to a
disc and used via CDROM.

For GGT99, I edited many of the original sections, created sections on the ethics
of doing social research, data analysis, and report writing, and completely overhauled the
layout and graphic design of the original site. I included the important innovation of
using case studies as a teaching tool. I developed two practical case examples of social
research at work on environmental issues in the real world. These practical examples on
(1) lead poisoning and (2) water quality were used throughout the site to enhance the skill
development in the Toolbox. I also included an on-line evaluation form, as well as
specific page response forms designed to receive on-line feedback.

4.3 Posting/Response/Release of the Pilot Toolbox

The pilot site was ready to be released for review in early February 1999 after almost five
months of re-design (Appendix B). On February 2nd and 3rd, 1999, A request for
reviewers was posted to the NEES-L (New England Environmental Educators) and
COCE-L (Conference on Communication and Environment) listserves and to various
people who we felt might offer helpful evaluations of the site. The site address was not

released to these lists because I wanted to gauge interest levels by way of direct email response to me, and to have a more concrete idea of who would be visiting the site.

After one week on the listserves I had received thirty-four (34) requests to review the site. I responded to each of these requests with a personalized form letter informing the requester where the site was located and that the site would be open for review for three weeks. One week prior to the end of the review time, I released an email to all who had requested to review the site and who had not yet done so, reminding them that reviews were needed within the week.

By February 28, 1999, the closing date for review, I had 15 reviews. Respondents included professors of environmental studies, sociology, and geology, professional sociologists, biologists, a technical writer, grassroots organizations and several Ph.D. students. Seven of these reviews came from one requester's undergraduate students at Denison University who were taking part in a course working with qualitative research on urban environmental issues. I received three additional reviews after the closing date, all of which I have included in the initial findings, bringing the overall review total to 18.

4.4   Review/Evaluation of the Pilot Toolbox

Each of the reviewers completed a twenty (20) question on-line evaluation of the site and answered several additional questions through email after they had submitted an evaluation (Appendix C). I was given access to a discussion site on Denison University's Web in which the students who had reviewed the site participated in a more qualitative review of GGT99 and its applicability to their semester projects. Many of the reviewers chose to submit comments on specific pages through review forms located on each page.

I included hit counters on most pages to gauge which pages received the most or least user visits.

4.5   Revision of the Pilot Toolbox

I used the trends seen in the pilot evaluations and qualitative comments (see Findings) to revise the site so that it could be evaluated again. The most significant trends seen in the pilot evaluations were that (1) downloading required too much time and (2) that the navigability of the site was convoluted. The bulk of my revisions was based on these two trends.

In order to improve the downloading time, I removed the Java applets that provided the links within the site. Java applets are essentially short programs that require execution by the browser. They are aesthetically pleasing, yet downloading time-intensive. I replaced these applets with simple, efficient text links. I also removed several extraneous graphics that required additional downloading time.

To approach the issue of navigation, I began by including banner and contents frames. Both frames included simple text links, few graphics, and needed only to be downloaded once. Once the frame has downloaded, it remains visible throughout the site. From the links within these frames, users are able to access main pages or the site map at any time.

4.6   Observations and Interviews with Users of the Revised Toolbox

Upon completion of the revisions on the pilot site (Appendix B), I conducted six observations of and informal interviews with graduate and undergraduate environmental

studies students using the site. These observations and interviews, each lasting between 1.5 and 2.5 hours, were conducted on April 13, 14, and 15, 1999. Four of the students planned to be doing some social research techniques during the coming summer for various Center for Environmental Studies projects. The other two participants had taken Environmental Studies class 126: *Public Perception and the Environment*.

The observations began with an introduction to what I was trying to accomplish. I explained that I would be watching and making notes on how they used the site, that the review would be followed by an informal interview and that I would also verbally conduct the 20 question on-line site evaluation with each participant. I used an observation protocol (Appendix D) to record how the students used the site as well as any verbal comments and any interpretable body language that they exhibited during their reviews. I wrote "quick notes" to myself after each interaction to remind myself of certain characteristics of the participants and major points that were brought to my attention during the interactions. The observation protocols and interviews were coded and examined for apparent themes and variations. The trends seen here will be used to revise GGT99 even further.

Chapter 5   Findings

5.1   Pilot Toolbox: Field Test Findings

The on-line evaluation and several questions that were sent via follow-up email were geared to indicate:

- whether the Web is a good venue for the Great Green Toolbox;
- whether there is currently a tool such as the GGT available to general audiences;

- whether the GGT shows a meaningful relationship between social research and environmental issues;
- whether the GGT is successful in increasing respondents' knowledge of or ability to conduct social research on environmental issues;
- whether a respondent's experience with social research affected their evaluation; and
- trends in criticisms surrounding the GGT.

The Web is an Excellent Venue for the Great Green Toolbox: All eighteen (18) respondents felt that the World Wide Web is an excellent or good venue for the Great Green Toolbox. Those (6) who felt it was "good, with limitations" indicated concern over students' ability to critically evaluate information on the Web, simplification and the need to indicate that the GGT is not a finite example of how things should be done, and the need for a printed manual to accompany the tutorial, "…to have when I'm off-line and in the field."

No Pre-Existing Social Research Tool Available to General Audiences: None of the eighteen respondents had ever used or seen an environmental social research tool on the Web prior to using the Great Green Toolbox. As one respondent wrote, "I had no guidelines to help me not mislead my research…I could never find [material] like the GGT: all the information required is there, but in a pleasant and non-frightening way."

The Toolbox Clarifies the Meaningful Relationship between Social Research and

Environmental Issues: Fourteen of the eighteen respondents felt that the GGT

emphasized a meaningful relationship between social research and environmental issues.

Of the four who felt that the relationship "needs improvement", two felt that more

examples needed to be included in the text, one felt that cultural and racial differences

were not fully taken into consideration regarding environmental issues, and one person

did not explain why he felt the connection needed improvement.

The Toolbox Increases Respondents' Knowledge of or Ability to Conduct

Environmental Social Research: Seven of fourteen respondents said that the Toolbox

increased their knowledge of social research; five responded that the Toolbox did not

increase their knowledge of social research (these five people gave high ratings to their

pre-Toolbox knowledge of social research). Two respondents were not sure whether

their knowledge had changed. On the question of whether the Toolbox had positively

influenced their ability to conduct social research, six felt that it had, six felt that it had

not, and two were not sure. The six who felt that it had not positively influenced their

ability to conduct social research had also given high ratings to their pre-Toolbox

knowledge of social research. This indicates to me that the Toolbox is effective at

influencing the knowledge and ability of social research novices[7].

Respondents' Experiences with Social Research Affected their Evaluations: It seems

that respondents' pre-Toolbox experiences with social research did affect their

---

[7] An outcome study to gauge whether users' skills changed after using the Toolbox was not accomplished for this thesis, but will be conducted when there are a number of users to re-contact and follow-up.

evaluations of the Toolbox. Of the ten respondents who rated themselves as "very knowledgeable" or "knowledgeable" on social research, only four felt that the Toolbox had increased their knowledge of social research, and only two felt that the Toolbox had positively influenced their ability to conduct social research. However, the four people who rated themselves as "somewhat knowledgeable" or "not knowledgeable" on social research felt that the Toolbox had increased their knowledge of social research, and three (one was not sure) also felt that the Toolbox had positively influenced their ability to conduct social research.

Referencing the Toolbox: Twelve of eighteen respondents felt that they would reference and re-visit the Toolbox in the future. Only one respondent said that she would not reference the site in the future, and five were not sure. "All of it!", *Question Creation*, and *Ethics* were the top rated sections that respondents felt they would reference.

Navigability and Downloading Time: Five respondents made reference to difficulty they had in navigating through the Toolbox and the extensive amount of time it took for them to download pages. Although this number accounted for less than one-third of the respondent pool, the high level of intensity and the explicit nature of these responses made it clear to me that navigability and downloading time needed to be modified in future versions of the toolbox. Respondents made reference to the Toolbox being, "too klugey to handle today's capacity…again, you must pick up the clip of the site for it to capture folks' hearts!", "comments took too long to submit," and "Too slow! Too little on each page compared to the time necessary to get to a new page!"

This sentiment is supported by the hit counters that were assigned to each page to track the number of times individual pages were accessed. Hit data allows the Web designer to see which pages the users are actively or inadvertently bypassing[8]. Difficulty in navigation or user disinterest may result in one page receiving many hits and another page receiving relatively fewer hits. GGT99 consisted of about 130 pages in six tiers, most of which contained hit counters[9]. The following graph and table illustrate the number of hits by tier level:

Figure 1: Average Number of Hits/Tier

Average # of Hits

60
50
40
30
20
10
0

1   2   3   4   5   6
Tier
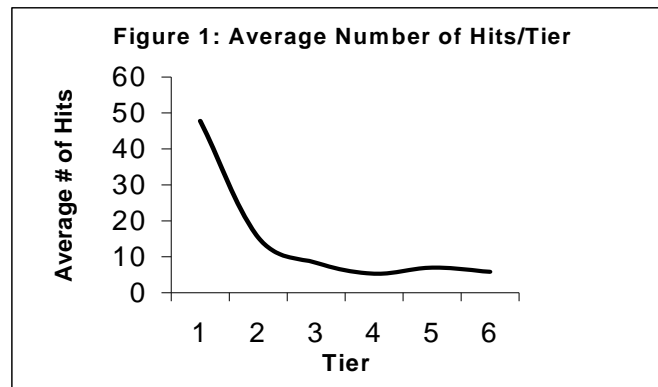
Tier	# of Pages in Tier	Total # of Hits	Average # of Hits
1	5	239	47.8
2	27	417	15.4
3	47	390	8.3
4	27	142	5.3
5	13	91	7
6	4	23	5.8

Table 1: Average Number of Hits/Tier

---

[8] Active and inadvertent bypassing cannot be delineated, but can be assumed by the trends in surrounding hit data.

[9] Pages such as the Home and Evaluation pages did not have hit counters because it was assumed that users would begin on the Home page and end with the evaluation. There were also several pages on which the hit counters did not work – these pages were not included in the tally or table.

These figures indicate that for the first four tiers, users tended to bypass deeper tiers. Hits were most numerous at the site's primary and secondary tiers, but less people ventured to pages in the third, fourth, fifth and sixth tiers. I began to wonder if this was indicative of a loss of interest or difficulty with navigation. Based on the qualitative comments indicating an enormous interest in the Toolbox, I conclude that the hit data indicates a difficulty with navigation. A possible explanation for why the average number of hits rises slightly in the fifth and sixth tiers is that the few users who ventured to the deeper levels were more likely to hit every page at that level.

Conclusion of Pilot Findings: The evaluations of Great Green Toolbox '99 revealed:

- the Web is a good venue for the Great Green Toolbox;

- there is currently no tool such as the GGT available to general audiences;

- a meaningful relationship between social research and environmental issues;

- the GGT is successful in increasing respondents' knowledge of or ability to conduct social research on environmental issues for novice audiences;

- respondents' experiences with social research affect their evaluations in that more experienced evaluators provided more insightful response to additions and removal of information in the site than did their inexperienced co-evaluators; and

- critical trends included convoluted navigability and excessive downloading time.

In general, responses showed that the Great Green Toolbox is a great concept, one that does not currently exist, and is a tool that would benefit many users. Among my test audience, the overall feeling about the Great Green Toolbox '99 is that it is a great site

and full of potential. The issues of navigability and downloading time became trends

with respondents and were re-evaluated and redesigned for the next version of the

Toolbox.

5.2   Revised Toolbox: Findings from Ethnographic Observations and Interviews

The findings from the ethnographic observations and interviews with students using the

revised version of GGT99 indicate that downloading time is no longer an issue; when

asked whether downloading time was an issue, one student replied, "Totally *not* an

issue…it's all very fast." These interactions with students also indicated that the issue of

navigability, although greatly mitigated, has not been completely solved.

        A finding from these observations with regard to navigability concerns the

contents frame to the left of the main page. Users felt that the contents section, although

helpful, needs to include links to every page within the site, not only main pages. As one

student replied when asked about the navigability of the site, "You really can't get lost

with the [contents frame] to the left, but you really need to include more detail there."

There was also a general feeling that the navigation was easy in the "middle" of the site,

but not as clear in the beginning and at the end. Students were looking for more structure

– a definite start and finish to the site. Several students, however, also praised the site for

being unstructured, and "liked the fact that you could go through in any order."

        These observations were also helpful to me for having fresh sets of eyes on the

site. With that freshness came some wonderful suggestions, including self-evaluations

(quizzes) for users so that they could gauge their learning throughout the site, and a "road

map" that could be printed out by an organization and used as a check list and to divide responsibilities during a project.

Chapter 6   Next Steps

The current Toolbox is finished and will be posted for general access by mid-summer 1999. Web-sites, however, need to be maintained in order to stay current. My recommendations for future revisions include:

- the creation of a section on data coding as well as examples of coding,

- improving the visibility and access to the *Ethics* section,

- further improving the navigability,

- possibly increasing the interactivity of the Toolbox by including self-evaluations after sections and after the entire toolbox to let users gauge what they have learned, and

- increasing the use of graphics without significantly increasing the downloading time.

There are also issues of properly marketing, releasing, and maintaining the site so that information is both valid and current while insuring the equitable accessibility of the site. These are things I will be considering prior to the public release of the Toolbox.

Chapter 7   Conclusion

Given the importance of interactivity to learning, the inherent flexibility of the Web, and the burgeoning number of people who are using the Web for educational purposes, the creation of Web-based educational materials, including an environmental social research tool, appears not only timely, but logical. For my thesis, I conducted research to

determine a need for the Great Green Toolbox$^{©}$, redesigned the original Web site, piloted

and redesigned the site again, and conducted ethnographic observations on site users for

further site revision.

I re-designed The Great Green Toolbox to be used by community-based

organizations and agencies working with them, students of environmental studies, and

municipalities and agencies looking to conduct neighborhood-based explorations of

environmental issues. The Toolbox is not simply a question-creation tool, it is a set of

tools that can assist people in learning more about how their communities respond to

environmental issues, initiatives, and policies. The Toolbox was designed to address

environmental issues at the grassroots or community level, and therefore can aid

communities in creating understanding, gaining commitment, vesting stakeholders, and

promoting change from the ground level. The Toolbox was created to help address a

fundamental aspect of environmental problem solving, the social aspect.

In this thesis, I have presented background information indicating the need for

environmental social research at the community level, as well as the need to empower

community groups with the informational and methodological tools necessary to conduct

this research. The results of my thesis indicate that participants in both field tests felt that

the Great Green Toolbox$^{©}$ is a great concept, one that does not currently exist, and is a

Web site that could benefit many users. Users felt confident about applying both the

theoretical and practical aspects of the Toolbox to their work with communities and

students. It is my conclusion that the Toolbox can be used by organizations and

individuals on their own as well as in conjunction with science allies.

This thesis and the Great Green Toolbox© have focused on the intersection between a community need for environmental problem solving and their need for greater empowerment. The content and technology of the Great Green Toolbox© will continue to change as it grows to meet the needs of communities working on ever-evolving environmental issues.

APPENDIX A – Needs and Capabilities Interview Protocol

Needs/Capabilities Interview for Community-Based Organizations

I am conducting a needs and capabilities assessment of community-based organizations in order to determine the potential need for a social research tool that would assist you in targeting information and education within your community.

Organizational Questions

1. Name of organization:

2. Location:

3. Which community do you serve?

4. What types of services do you provide for your community?

5. What pressures does your organization experience? –

Pressure from the community

Funding pressures

6. How many years has your organization been in existence?

7. How has your organization changed over time?

8. Of the people who work for your organization, how many work:

full-time: ___

half-time: ___

on a volunteer basis: ___

Needs Assessment

9. Do you feel that your organization is able to accurately target the needs, attitudes and perceptions of the community that you serve?

10. Has anyone in your organization ever conducted any polling or surveying?

If YES:

11. What issues did the polling/surveying deal with?

 How did your organization feel about the results of the surveying?

If no:

12. Has your organization ever conducted social research to aid in determining the needs, attitudes and perceptions of the community that you serve?

13. If YES:

A. How many times have you used social research? (People don't generally know this term) Therefore the following is too abstract.

B. What form was this social research in?

C. How useful do you think this research was to your project?

14. If NO:

A. How useful do you think a social research tool could be to your organization?

15. If you were to use a social research tool to target your community:

A. What would you expect to gain through the use of social research?

B. Do you foresee any potential limitations to using social research in your community?

16. How many times per year(month?) do you distribute information directly to your community members?

17. What form does this information take?

18. Do you have any major projects (within the next 6 months) that you think would merit the use of social research?

Capabilities Assessment

19. Is your organization outfitted with a computer system?

20. If YES:

A. How many?

B. What kind? (PC, Mac)

21. If NO:

A. Do you expect to acquire a computer system in the future?

i.   If YES, when?

Obviously do not continue with questions at this point.

22. Can your computers read graphics?

23. Do your computers have CD-Rom capabilities?

24. Is your organization linked to the internet?

25. How comfortable are you with "surfing" the internet?

26. How do you feel about learning more about social research via the computer?

27. Would you/your organization be willing to field test a computer-based social research tool?

APPENDIX B – Great Green Toolbox URLs

Original Great Green Toolbox URL
http://www.brown.edu/Departments/Environmental_Studies/people/faculty/czcdl/GGT96

Pilot Great Green Toolbox URL
http://www.brown.edu/Departments/Environmental_Studies/people/faculty/czcdl/Holly/PilotToolbox99/Default.htm

Revised Great Green Toolbox URL
http://www.greatgreentoolbox.com/GGTHome.htm

APPENDIX C – Pilot Toolbox Evaluation Protocol/Additional Questions

First Name _____

Last Name _____

Title   _____

Organization _____

Street address _____

Address (cont.) _____

City _____

State/Province_____

Zip/Postal code_____

Country_____

Phone_____

E-mail_____

Age   20-30 31-40 41-50 51-60 61+

Sex   Male Female

1. Please rate your level of comfort with the World Wide Web:

Very Comfortable   Comfortable   Somewhat uncomfortable   Totally Uncomfortable

What do you generally use the web for? (check all that apply.)

work   research   fun   general surfing   other, please explain...

2. How much of the Toolbox were you able to review?

All   Most   Some   None

Roughly, how long did it take you to review this tutorial?

0-1 hours   2-4 hours   other, please indicate time...

3. Did you review the Toolbox...

all at once   In sections   other, please explain

4. Did you follow the suggested path throughout this site?

Always   Occasionally   Never   Don't Know/Not Sure

Why or Why not?

5. Was the Toolbox easy to navigate?   Yes   No   Don't Know/Not Sure

    If No, what problems did you encounter?

6. Do any lessons stick out in your mind as being the most useful during this tutorial?

    Yes   No   Don't Know/Not Sure

    If Yes, which ones?

7. Least useful?   Yes   No   Don't Know/Not Sure   If Yes, which ones?

8. Can you see yourself referencing this site in the future? If so, please list specific lessons to which you would return.

    Yes   No   Don't Know/Not Sure

    If yes, which lessons?

9. In your opinion, how well does the Toolbox demonstrate the usefulness of social research to environmental issues?

    Very Well   Well enough   Needs Improvement   Not well

    If you selected "Needs Improvement" or "Not well", please explain what you feel would help this connection.

10. Were there any parts of the tutorial that you consciously skipped over?

    Yes   No   Don't Know/Not Sure

    If yes, which ones?

11. Have you ever reviewed a social research methods tool like this tutorial on the Web before?

    Yes   No   Don't Know/Not Sure

    If so, what was it?

12. What do you think of using the Web as a teaching tool for environmental social research?

    An excellent idea
    A good idea, with limitations; explain,
    Not a good idea; explain,
    Other; explain

13. If this tutorial were to be used as a classroom teaching tool, what level do you see it helping:
High School
College (freshmen/sophomores)
College (juniors/seniors)
Graduate School

Other, Please Explain...

14. Would you add anything to this tutorial?   Yes   No   Don't Know/Not Sure

   If Yes, please explain what you would change...

   Would you remove anything from this tutorial?   Yes   No
   Don't Know/Not Sure

   If Yes, please explain what you would change...

15. Overall, how would you rate the usefulness of this tutorial to introduce someone to social research?
      Excellent   Good   Fair   Poor   Don't Know/Not Sure

16. Please rate the overall social research content of the Great Green Toolbox:
      Excellent   Good   Fair   Poor   Don't Know/Not Sure

17. Please rate the overall design (aesthetics) of the Great Green Toolbox:
      Excellent   Good   Fair   Poor   Don't Know/Not Sure

18. Please rate the overall structure (physical layout/navigability) of the Great Green Toolbox:
      Excellent   Good   Fair   Poor   Don't Know/Not Sure

19. Are there additional questions that you feel should be a part of this evaluation?
      Yes   No   Don't Know/Not Sure

   If Yes, please include them here:

20. Please feel free to make any additional comments that you feel were not covered above...

Additional questions sent via email after receipt of this evaluation:

1. How would you rate your knowledge of social research before using this tutorial?
   very knowledgeable, knowledgeable, somewhat knowledgeable, not knowledgeable, other (please explain).

2. Do you believe that this tutorial has increased your knowledge of social research?
   Yes, No, Don't Know/Not sure

3. Do you feel that this tutorial has positively influenced your ability to conduct social research? Yes, No, Don't Know/Not sure

APPENDIX D – User Observation/Interview Protocol
(*This is a partial representation of the entire observation protocol which had sections for every page in the Revised Toolbox*).

Hi, as you probably know, I've created a Web site on environmental social research for my master's degree. This site has already gone through academic review and has been revised taking into account the last review. Now I'm interested in watching how you use the site and how well it works in its current form for students. Remember, this is a test of the site, not of you! There is no right or wrong way to do this today. I'll be learning from your choices and your use. I'll just be watching you and making some notes. Please feel free to ask me any questions if you need to.   After you finish the site, I'm going to ask you some questions.

User: _____ Date: _____

Page		Time Start			Time Fin		
GGT Home	Read	Skim		Skip	Thinks		Just clicks
Student Starts with:		Banner			Contents		Orientation
My comments:		If student starts with banner or contents, they went to…					
		Verbal comments/Body Language:					
Nuts and Bolts		Time Start			Time Fin		
	Read	Skim		Skip	Thinks		Just Clicks
Student Starts with:		Never Web	What is SR?		Know?	Length	Begin a proj
My comments:		Verbal comments/Body Language:					

Interview Questions…
1. What are your general reactions to the Toolbox?
2. How would you rate your knowledge of social research before using the Toolbox? very knowledgeable, knowledgeable, somewhat knowledgeable, not knowledgeable, other (please explain).
3. Do you believe that the Toolbox has increased your knowledge of environmental social research? Yes, No, Don't Know/Not sure
4. Do you feel that the Toolbox has positively influenced your ability to conduct env. social research? Yes, No, DK/NS
5. Off the top of your head, is there anything you would change about the Toolbox?
6. What did you think of the lead and water units?
        How useful were they to emphasizing the practical nature of social research?
7. Did you experience any difficulty with the navigation of this site?
8. How about the downloading time?
9. Do you recall being frustrated or confused with the site at all?

Bibliography

Ackermann, Edith. "Perspective-Taking and Object Construction: Two Keys to Learning." Constructionism in Practice: Designing, Thinking, and Learning in a Digital World. Eds. Yasmin Kafai and Mitchel Resnick. Mahwah, NJ: Lawrence Erlbaum Associates, Inc., 1996. 25-35.

"Before the Board: More Schools are Online." American School Board Journal. Volume 185 Number 5 (May 1998). http://www.asbj.com/199805/0598beforetheboard.html (10 Feb. 1999).

"Before the Board: Study Documents 'Digital Divide'." American School Board Journal. Volume 185 Number 6 (June 1998). http://www.asbj.com/199806/0698coverstory.html (10 Feb. 1999).

Benen, Steve. "Web Wars." Church and State. Volume 51 Number 2 (February 1998): 13-16.

Bork, Alfred. "The Future of Computers and Learning." Technological Horizons in Education Journal. (June 1997) http://www.thejournal.com/journal/magazine/97/jun/feature3.html (5 March 1999).

Bossi, Richard, Peter Spain. "Environment, Energy, and Behavior Change." Academy for Educational Development. http://www.aed.org/publications/news/fall98/environ.html#people (5 March 1999).

Brown, Phil, and Edwin Mikkelsen. No Safe Place: Toxic Waste, Leukemia, and Community Action. Berkeley, CA: University of California Press, 1997.

Burton, Daniel. "The Brave New Wired World." Foreign Policy. Number 106 (Spring 1997): 22-37.

Cahoon, Brad. "Adult Learning and the Internet: Themes and Things to Come." Adult Learning and the Internet. New Directions for Adult and Continuing Education No. 78. Ed. Brad Cahoon. San Francisco: Jossey-Bass Inc., 1998. 71-76.

Clemente, Peter C. The State of the Net: The New Frontier. New York: McGraw-Hill, 1997.

Crossen, Cynthia. Tainted Truth: The Manipulation of Fact in America. New York: Simon & Schuster, 1994.

Dewey, John. Experience and Education. New York: Collier Books, 1963.

Dunlap, Riley. "Public Opinion in the 1980s: Clear Consensus, Ambiguous Commitment." Environment. Volume 33, Number 8 (October 1991): 11-15, 32-37.

Dyson, Esther. Release 2.0: Design for Living in a Digital Age. New York: Broadway Books, 1997.

Eastmond, David. "Adult Learners and Internet-Based Education." Adult Learning and the Internet. New Directions for Adult and Continuing Education No. 78. Ed. Brad Cahoon. San Francisco: Jossey-Bass Inc., 1998. 33-41.

Emerging Technologies Group. "The 1997 American Internet User Survey." 1997. http://etrg.findsvp.com/internet/overview.html (10 February 1999).

Fetterman, David M. Ethnography: Step by Step. 2nd ed. Thousand Oaks, CA: Sage Publications, 1998.

Gaventa, John. "The Powerful, the Powerless, and the Experts: Knowledge Struggles in an Information Age." Voices of Change: Participatory Research in the United States and Canada. Eds. Peter Park et. al. Westport, CT: Bergin & Garvey, 1993. 20-40.

Georgia Institute of Technology. "Graphic, Visualization, & Usability Center's (GVU) 10th WWW User Survey." (1998) http://www.gvu.gatech.edu/user_surveys/survey-1998-10 (10 February 1999).

Hall, Budd. "Introduction." Voices of Change: Participatory Research in the United States and Canada. Eds. Peter Park et. al. Westport, CT: Bergin & Garvey, 1993. xiii-xxii.

Hallgren, Richard, and Sherman Gorbis. "Visualization Technology in Medical Education." Technological Horizons in Education Journal. (June 1997) http://www.thejournal.com/journal/magazine/99jan/feat03.html (5 March 1999).

Holt, Margaret. "Ethical Considerations in Internet-Based Adult Education." Adult Learning and the Internet. New Directions for Adult and Continuing Education No. 78. Ed. Brad Cahoon. San Francisco: Jossey-Bass Inc., 1998. 63-69.

Irwin, Alan. Citizen Science: A Study of People, Expertise and Sustainable Development. London: Routledge, 1995.

Johnson, Michael L. Education on the Wild Side: Learning for the Twenty-first Century. Norman, OK: University of Oklahoma Press, 1993.

Karaliotas, Yannis. "Learning On and Over the Internet: Dynamics and Limitations." August 1997. http://users.otenet.gr/~kar1125/education.htm (7 February 1999).

Keohane, Robert O., Joseph Nye. Power and Interdependence in the Information Age. Foreign Affairs. Volume 77 Number 5 (Sep-Oct 1998): 82-83.

Luskin, Bernard. "The Best Time to Plant a Tree was Twenty-Five Years Ago." Technological Horizons in Education Journal. (June 1997) http://www.thejournal.com/journal/magazine/97/jun/feature3.html (5 March 1999).

McArthur, David and Matthew W. Lewis. Untangling the Web: Applications of the Internet and Other Information Technologies to Higher Learning. Santa Monica, CA: Rand Publishing, 1998.

McKenzie-Mohr, Douglas. "Promoting a Sustainable Future: An Introduction to Community-Based Social Marketing." Ottawa: National Round Table on the Environment and the Economy, 1995.

McTaggart, Robin. "Guiding Principles for Participatory Action Research." Participatory Action Research: International Contexts and Consequences. Ed. Robin McTaggart. Albany: State University of New York Press, 1997.

Merrifield, Juliet. "Putting Scientists in Their Place: Participatory Research in Environmental and Occupational Health." Voices of Change: Participatory Research in the United States and Canada. Eds. Peter Park et. al. Westport, CT: Bergin & Garvey, 1993. 65-84.

Miles, Matthew and A. Michael Huberman. Qualitative Data Analysis: An Expanded Sourcebook. Thousand Oaks, CA: Sage Publications, Inc., 1994.

Mondros, Jacqueline B. and Scott M. Wilson. Organizing for Power and Empowerment. New York: Columbia University Press, 1994.

Papert, Seymour. "Child Power: Keys to the New Learning of the Digital Century." 11th Annual Colin Cherry Memorial Lecture on Communication, Imperial College, London, June 2, 1998. http://www.connectedfamily.com (5 March 1999).

Papert, Seymour. "The Children's Machine: Rethinking School in the Age of Computer." New York: BasicBooks, 1992.

Park, Peter. "What Is Participatory Research? A Theoretical and Methodological Perspective." Voices of Change: Participatory Research in the United States and Canada. Eds. Peter Park et. al. Westport, CT: Bergin & Garvey, 1993. 1-19.

Piaget, Jean. The Origins of Intelligence in Children. Trans. Margaret Cook. New York: W.C. Norton and Company, Inc., 1963.

Roper Starch Worldwide. "Green Gauge." http://www.roper.com (1 February 1999).

Russell, Cheryl. "The Haves and Want-Nots." American Demographics. April 1998. http://www.demographics.com/publications/ad/98_ad/9804_ad/ad98044.htm (10 February 1999).

Sandman, Peter M. Responding to Community Outrage: Strategies for Effective Risk Communication. Fairfax, VA: American Industrial Hygiene Association, 1993.

Sargent, Randy, et. al. "Building and Learning with Programmable Bricks." Constructionism in Practice: Designing, Thinking, and Learning in a Digital World. Eds. Yasmin Kafai and Mitchel Resnick. Mahwah, NJ: Lawrence Erlbaum Associates, Inc., 1996. 161-173.

Schnaiberg, Allan, Kenneth Alan Gould. Environment and Society: The Enduring Conflict. New York: St. Martin's Press, 1994.

Schofield, Janet W., et. al. "The Internet in School: A Case Study of Educator Demands and Its Precursors." Culture of the Internet. Ed. Sara Kiesler. Mahwah, NJ: Lawrence Erlbaum Associates, Inc., 1997. 361-381.

Schrum, Lynne. "On-Line Education: A Study in Emerging Pedagogy." Adult Learning and the Internet. New Directions for Adult and Continuing Education No. 78. Ed. Brad Cahoon. San Francisco: Jossey-Bass Inc., 1998. 53-61.

Schwier, Richard, Earl Misanchuk. "Interactive Multimedia Instruction." Englewood Cliffs, NJ: Educational Technology Publications, 1993.

"Statestats: The Newest Way to Learn." State Legislatures. Volume 23 Number 6 (June 1997): 7.

Sterling, Bruce. "Short History of the Internet." 1992. http://w3.aces.uiuc.edu/AIM/scale/nethistory.html (10 February 1999).

United States Department of Education (DoED$_1$). "Educational Technology: Preparing America for the 21st Century. Preparing Tomorrow's Teachers to Use Technology." 1998. http://www.ed.gov/inits/FY99/1-tech.html (10 February 1999).

United States Department of Education (DoED$_2$). "Promoting High-Quality Distance Education: Distance Education Demonstration Programs and Learning Anytime Anywhere Partnerships." 1998. http://www.ed.gov/inits/FY99/1-learn.html (10 February 1999).

United States Department of Education (DoED$_3$). "Bridging the Technology Gap in Schools: Community Update." Number 59 (Jul-Aug 1998).

Waste, Robert J. "Community Power: Old Antagonisms and New Directions."
Community Power. Ed. Robert J. Waste. Beverly Hills, CA: Sage Publications,
Inc., 1986. 13-25.

Whyte, William F., et. al. "Participatory Action Research: Through Practice to Science in
Social Research." Participatory Action Research. Ed. William F. Whyte.
Newbury Park, CA: Sage Publications, Inc. 1991. 19-55.

Yankelovich, Daniel. Coming to Public Judgement: Making Democracy Work in a
Complex World. Syracuse: Syracuse University Press, 1991.