

A Social Research Toolbox:

Hypertextual Lessons
For Students Exploring Public
Perceptions of the Environment

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Executive Summary

A growing number of students at the Brown University Center for Environmental Studies are using qualitative methods in their course work. For my senior thesis, I developed, tested, revised, and evaluated four (4) interactive, hypertextual lessons on “How to Design Survey and Interview Questions,” for Environmental Studies students working on qualitative social research projects. I worked under the assumption that qualitative research methods can be an effective vehicle for students who want to examine environmental issues and people’s environmental attitudes and behavior.

In my research, I first identified a number of questions that ES students grapple with when they try use qualitative research methods. I did this by observing and interviewing ES students doing social research projects through the Brown University ES department, as well as by reading key social research texts and talking with the department’s social research professor, Christina Zarcadoolas.

Once I had a sense of the questions students were asking, I designed a hypertextual educational tool. This tool -- The Social Research Toolbox -- would introduce students to social research skills that are frequently applied to environmental issues. Over the summer of 1995, I created one section of the Toolbox, the 4 lessons on “How to Design Survey and Interview Questions” (the SIQ Lessons). These Lessons focus on common issues and obstacles that students face while designing protocols about environmental issues.

To test and evaluate the SIQ Lessons, I used a number of qualitative methods, including observations, interviews and follow-up survey questions. In particular, I conducted a set of study tests. My participants were undergraduate students enrolled in an ES course on public perception research, ES 126. These study tests enabled me to the better understand how students used the lessons, what they thought was effective about the lessons, what they thought was missing, and how an interactive, hypertextual presentation might have

influenced their perceptions of the Lesson content. My study test findings, coupled with my secondary research on hypertextual writing, helped me revise the Lessons.

Chapter One

An Introduction to the Context & Objectives of the Thesis Research

Environmental Studies, an inherently interdisciplinary field, involves the study of how humans interact with both the natural and built environment and with projects that affect environmental quality. Many of these interactions are impacted by public perceptions, namely how people perceive the environment, environmental issues, and their own behaviors in relation to the environment. A premise of my approach is that environmental influencers (the people who impact environmental problems)¹ need to include an examination of these perceptions. Before environmental influencers can motivate people to act-- or not to act-- in certain ways, they must account for the ways that people currently perceive the issues at hand and how these perceptions motivate people's behavior.

Since Love Canal, in 1977, a growing number of environmental researchers have learned that they can not legislate public attitudinal change and that "expert" scientific or technical evidence is not enough to change how Americans think. Likewise, more and more environmental policy makers and planners, organizers and educators have realized that their programs and policies need to account for the diverse, and often surprising, ways that different people perceive environmental issues. They have looked to fields such as sociology, psychology, and market research to learn social research skills and methods for understanding public attitudes. (Szasz, 1994; Dunlap and Scare; Dunlap; Lensen, 1992).

In academic settings that explore environmental issues, such as internet discussion lists and university-based departments, there is a growing interest in the "human" component of environmental problems. The rapid growth in Environmental Studies departments is

just one indication of this interest. Although there currently exists no reliable way to count the exact number of ES departments,² the number of Environmental Studies departments has increased dramatically in the past fifteen years. Currently, of the 70 university-based departments and programs listed on the World Wide Web site, “Environmental Studies & Environmental Science Programs,” at least 30 programs include an explicit emphasis on Environmental Studies in their title.³

Internet discussion lists that are frequented by qualitative and health researchers often include discussions of the human-environment interaction.⁴ For example, the list brown.list.occ-env-med-l, which has at least 1380 subscribers both U.S. based and abroad, routinely has discussions about the interaction between environmental problems and human health. Between April 14- April 30, 1996, the list’s conversation was dominated by topics of worker poisoning from lead battery acid, fitting respirators, pregnancy and factory workers, and safety concerns related to latex rubber gloves.

In these classroom and on-line settings, the topic of public attitudes and behavior arises occasionally, but far less than one might expect. On occasion, the subject of public perceptions arises-- either as a factor that drives research, in the case of a scientific study on the a disease related to rodents and the hantavirus, or in the form of psychosocial stressors associated with environment-related cardiovascular disease.

In standard Environmental Studies texts, such as Miller’s series on *Living in the Environment* and *Readings in Environmental Studies* (Miller, 1994 and 1990; Olszewski and Schiavo, 1992), the topic of public perceptions has become more common, but the

¹ The term “environmental influencers” includes, but is not limited to, educators, students policy makers, program coordinators, politicians, nonprofit organizations, businesses, and industry.

² As Harold Ward, Director of the Center for Environmental Studies at Brown University, explains, “The problem is one of definition - e.g. Brown doesn't have an ES department, it has a Center. Other places have ES degrees, but no Center or Department - they are sponsored by a committee or a traditional department - and then there are traditional departments that offer degrees with environment in the title - e.g. environmental engineering, ecological economics, etc. - so it's almost impossible to know where to stop counting. Every listing I've seen has been fatally flawed, either by being over- or under- inclusive.”

³ Web site: http://www.brown.edu/Departments/Environmental_Studies/espgm.html

⁴ see bit.listserv.qualrs-l and brown.lists.occ-env-med-l

discussion remains limited. These texts often make declarations in favor of a change in society's perceptions of the environment. For example, Lester Brown, in the 1992 Worldwatch Institute Report *State of the World*, makes an argument that is popular in many environmentalist circles, "the Environmental Revolution is the product of seeing ourselves again as a part of nature rather than apart from nature." (Brown; 1992) Sometimes, it involves philosophical discussions of "world views" and practical recommendations for ways to take action, such as Miller's advice, "Don't use guilt and fear to motivate other people..." (Miller, 1994)

The boundaries of the dialogue on environmental public perceptions have been pushed by some environmental influencers in their examinations of nuclear energy and solid waste. These are issues in which environmental public opinions, like distrust of corporations and government nuclear agencies, have had a clear, notable impact on national policy development (Lensen, 1992).

Yet, public opinion is more encompassing than a political issue that drives research. The arduous task of understanding and transforming public perceptions requires more than a generic list of do's and don'ts. Environmental perceptions play a role in the day-to-day functioning of environmental programs and in the ecological health of our own neighborhoods. Environmental Studies curricula are in need of a more sophisticated, nuanced approach to examining, understanding, and ultimately affecting public attitudes about environmental issues.

STATEMENT OF THE PROBLEM

At the Brown University Center of Environmental Studies (CES), one of the oldest and preeminent environmental studies departments in the country, a growing number of students have been trying to investigate public attitudes about the environment. For example, almost half (12) of the 26 seniors graduating '95.5 and '96 had a component of their thesis research that involved public perceptions.

But, often, students who want to examine environmental attitudes and behavior do not have adequate social research skills, such as understanding the goals or limitations of public perception research. Without such schooling, students often miss out on a valuable educational experience. Rather than learning how to skillfully examine environmental perceptions, many such students spend their time trying to figure out just “what to do.” One common outcome is that students design and ask biased questions that, for instance, assume that respondents share their concerns about the issues at hand. This situation is exacerbated by a dearth of discipline-specific resources available to university students who want to study environmental perceptions (see above discussion of Miller, 1992 and 1994; Olszewski and Schiavo, 1992; and Brown, 1992).

CENTRAL QUESTIONS & OBJECTIVES OF THE THESIS

This thesis project examined two central questions. First, I wanted to better understand: What are the needs of college students who are using social research methodologies to study environmental perceptions and attitudes? To answer this question, I informally observed and conversed with students working on qualitative research projects at the Brown University Center for Environmental Studies.

The second question examined in this thesis was: Can an interactive, hypertextual program serve as a practical and effective means for teaching students certain qualitative research skills? Do my 4 lessons on “How to Design Survey and Interview Questions,” in particular, meet the needs of students working on qualitative research projects through Brown University’s Center for Environmental Studies (CES)? In my research, I concept and product tested the SIQ Lessons with students, evaluated the utility of these lessons, revised parts of the SIQ Lessons, and identified areas of the Social Research Toolbox in need of revisions, development or further research. The methods I used to collect this data included qualitative techniques-- observations, interviews, and a small scale survey-- as well as secondary research (primarily via the World Wide Web and the Internet) about Web page design, hypertext, and qualitative evaluation of computer programs.

Chapter Two

Public Perceptions & Environmental Studies

Over the past 25 years, environmental influencers-- from policy makers to civil engineers-- have become increasingly interested in the public's environmental behavior and perceptions. Moreover, many environmental influencers have realized that public attitudes can have a tremendous influence on environmental issues. As a result of this interest, environmental researchers draw upon social research methods to better understand public perceptions and how they can shape environmental activism, policy and planning (Logan and Molotch, 1987; Szasz, 1994, Collver, 1990).

The Torrent of Love Canal

The events surrounding the Love Canal flood played an important role in this shift. In 1977, when the Niagara River flooded and poured contaminated groundwater into the basements of Love Canal residents, Americans across the nation were shocked and outraged. Many people felt that that industry had betrayed their children and the government had failed to protect them. The communication that ensued between citizens and business and regulatory bodies was a paramount failure. The technical assessment from specialists, or "experts", did little to address the perceptions of risk among citizens-- particularly the belief that industry was unreasonably burdening their local communities with health problems (Mazimian and Morell, 1992; Szasz, 1994).⁵

⁵ Many of these specialists deemed the perceptions of local citizens as irrational and parochial, claiming that the activities of citizens groups were evident of a NIMBY-- "not in my backyard"-- mentality. These dismissals did nothing to alleviate, and perhaps further fueled, the public's perceptions of the risks. that hazardous waste posed severe health risks and that industry could not be trusted (Mazimian and Morell, 1992; Sandman, 1993).

Ultimately, public perceptions of risk and public response had a tremendous impact on America's toxic policy. In response to Love Canal, a number of organizations formed to take on the issue of toxic waste and challenge the hazardous waste industry. These organizations started developing skills to influence the policy process. Prior to Love Canal, the Carter Administration and Congress had paid little attention to hazardous waste; yet they responded to this swell of public outrage-- intensifying congressional oversight and proposing "strict" and "joint and several" liability with the Comprehensive Environmental Response, Compensation, and Liability Act.

Although the calamity of Love Canal was by no means the first, the last, or the most severe environmental disaster, it fundamentally changed the debate on environmental issues by bringing public opinion to the forefront. The Love Canal episode revealed the significance of the public's risk perception, particularly the way public perceptions can encourage social activism and shape environmental policy. Regardless if technical experts and policy makers in the field agreed with citizen groups, they learned an important lesson from Love Canal: they would have to account for the public's perception of risk in their environmental policy considerations (Mazimanian and Morell, 1992; Szasz, 1994).

ENVIRONMENTAL PUBLIC PERCEPTIONS

Since Love Canal, the academic, scientific, and political communities have become more attentive to various factors related to environmental risk perception, including:

- the values and rationales that underlie the public's reactions;
- strategies for communicating risk; and
- the role of the media in reporting environmental risks and shaping the public's risk perception. (see Fischhoff, 1989; Breyer, 1993; Sandman, 1993; Sandman, Sachsman, Greenberg, Gochfeld, 1987; Roberts, 1990).

Research on risk perception and risk communication has proven to be critical to government and industry who must respond to situations that the public perceives to be environmental disasters.

But the public's perceptions of the environment encompass far more than their ideas about environmental risks. The public environmental perceptions include the ways that people:

- think about the environment,
- understand environmental issues, and
- place responsibility for environmental problems.

Environmental perceptions play a role in both environmental catastrophes, like oil spills and earthquakes, and in the day-to-day functioning of society. Perceptions influence whether people drive to work or take a bus, use a styrofoam cup or bring their own mug, shun any political activity or participate in activist organizations.

The influence of public perception on the environment and environmental programs also extends far beyond environmental policy and the character of America's toxic tort law. Moreover, *human behavior and perceptions largely determine the success or failure of policies and programs designed to ameliorate environmental problems.* For example, if people in a town do not perceive solid waste disposal as a serious problem, they may have the attitude that they "can't be bothered" with recycling. Or, if they perceive that their town's recycling program infringes on their personal freedom, they may backlash and refuse to participate in the program.

To resolve environmental problems, environmental influencers need to account for the public's environmental attitudes and behavior. Whether the impending issue involves developing a casino on a Native American reservation or protecting caribou on land threatened by oil developers, environmental influencers must have a grasp of how the various parties perceive and act upon the issues at hand.

METHODS FOR UNDERSTANDING PUBLIC PERCEPTIONS OF THE ENVIRONMENT

As environmental policy makers and program developers have become more aware of the public's attitudes, they have sought out methodologies for understanding public opinion. Environmental researchers interested understanding public opinion have incorporated research methods from social sciences, like psychology, applied sociology, and from consumer and advertising research (Freeman, Dynes, Rossi, and Whyte, 1983).

These methods-- collectively referred to as social research-- involve a set of diverse, formalized research techniques and skills. Social research generally involves:

- Quantitative methods, with large scale surveys and data sets like the U.S. Census;
- Qualitative methods, such as ethnographic observations and interviews; or
- Comparative methods, a combination of both quantitative and qualitative methods

Quantitative methods are typically applied to study relationships between variables, as they can condense large sets of data to elucidate a defined set of variables. Qualitative methods are most appropriate for in-depth exploration of a few cases. Comparative methods can clarify subtle patterns among cases (McNeil, 1985; Reichardt and Rallis, 1994; Ragin, 1994).

The explicit application of social research methods to environmental issues has become more common in a number of different areas, particularly environmental planning (Collver, 1983). These applications include:

- Public opinion surveys, such as the Roper Poll;
- Regional data collection and analysis, to better understand the relationship between development and demographic trends;
- Community impact analysis, to explore the human history and cultural context of a community that will be affected-- or that already is affected-- by environmental issues;
- Public education/ Communications planning, such as what messages will people respond to in a public education campaign about recycling; and
- Program evaluation, such as the impact of a beach restoration project on local residents and businesses catering towards tourists.

Understanding Public Opinion With Polling

Up until the past few years, quantitative opinion polls have been the standard method for assessing environmental attitudes (see Fontana and Fry for parallel trends in the field of sociology).⁶ In the early 1970s, a few firms such as the Roper Organization and Media General/ Associated Press (MG/AP) began conducting large scale, quantitative surveys

⁶ This polling technique has been applied not only to public opinion on environmental topics, but also to issues ranging from presidential elections to O.J. Simpson's credibility.

about Americans' attitudes towards environmental issues. In the subsequent 10 years, particularly after the Love Canal media blitz, popularity of these polls among policy makers, media analysts, and the public at-large grew exponentially. Environmental polling became a popular barometer for measuring the national mood on environmental issues (Szasz, 1994; Dunlap and Scare). As Yankelovich explains: "Opinion polling techniques have proven a cost-effective way to elicit the views of cross sections of the American public..." (1991)

A small industry has developed, in which organizations and research centers conduct quantitative surveys to document and understand environmental public perceptions for both their own research and for other organizations. These organizations are not the only ones calibrating the opinions of the nation, as newspaper, magazines, broadcast news, and even MTV has begun to conduct polls of their respective audiences (Rossi and Whyte, 1983).

What We've Learned From Environmental Polling

Environmental polls typically ask respondents questions about the seriousness of environmental problems, the degree of threat posed by environmental problems, and the role of government action in addressing environmental problems. Overall, the polls show that the U.S. public is more aware about environmental issues and more concerned. For example, the Cambridge Reports found that, in the 1980s, a growing number of Americans felt the green house effect was a "very serious" problem. According to their research, only 12% of the population in 1982 considered the green house effect to be "very serious," whereas in 1989, 41% considered it "very serious." (Dunlap and Scare; Cambridge Reports, 1989). In the past ten years, the breadth of these quantitative surveys has expanded, as well, to include issues such as the environment's impact on people's health and the relationship between the economy and the environment (Dunlap and Scare; Dunlap; Roper Organization, 1990)

Limitations of Polling for Understanding Environmental Perceptions

There are a many limitations inherent to the use of polls to understand environmental attitudes. With the burgeoning of polling, little can be done to ensure that the methods applied are consistent and scientifically credible. Moreover, polls generally capture a brief glimpse of “mass opinion” on a particular subject-matter, but they do not necessary reveal informed judgments. Such polls say very little about the quality of the opinions they record, thus giving no indication of the degree to which respondents understand or deliberate over the issues at hand.

Yankelovich states that opinion polls have “proven fallible, easy to misinterpret, and subject to abuse” (1991). For example, polls may show that people *say* they support environmental issues, but they do not explain the mismatch between such claims and the public environmental behavior, such as public’s general unwillingness to buy environmentally sound products, use public transportation or support candidates who favor environmental protection.

But, more important than these limitations is the fact that quantitative surveys alone can not paint a complete picture of public perceptions about the environment. Their strength lies in their ability to “explain relationships, often of a causal nature, without particular emphasis on the participants’ perspectives” (Reichardt and Rallis, 1994). Thus, environmental influencers who rely on public opinions polls as their sole source of information on public attitudes will develop policies and programs that, in all likelihood, fail to address many deeper factors of the issues at hand. Most notably, they may not account for the way in which the public perceives the issues at hand.

Qualitative Methods and Environmental Research

Qualitative methods, on the other hand, are well-suited to explore these relationships and possibilities. Qualitative social research has the advantage of explicating social reality *as participants perceive it* (Reichardt and Rallis, 1994). Unlike polling, qualitative methods often can gauge the deeper underpinnings of people’s beliefs, such as:

- the intensity or volatility of individuals’ opinions,

- the way in which people develop or adopt certain beliefs,
- how people maintain (or change) their convictions, or
- the complex relationship between what people say and what they do (Crossen; Yankleovich, 1991).

For environmental organizers, policy makers, and planners alike, this later point is perhaps most important. In recent years, environmental specialists have been forced to confront the critical and perplexing fact that Americans often hold complex and contradictory beliefs about the environment. The very citizens who claim they support environmental issues in the polls may also refuse to ride buses or may continue to plant non-native species in their yards. As previously stated, large scale quantitative surveys alone can not explain the mismatch between what people say and what they do.

Because of the strengths of qualitative research and the inherent limitations of large scale surveys, *qualitative social research has become a standard cluster of methods to explore many social issues, including environmental problems.* By incorporating these research methods into their current projects, specialists in government, nonprofits, business, and education can do a better job at examining, understanding, and ultimately addressing environmental perceptions and behavior.

A number of sociologists have already used qualitative social research methods to examine how communities respond to environmental and environmental health issues-- a form of community impact analysis. These projects have included participant observations and interviews about the 1972 Buffalo Creek flood in Appalachia, a proposed nuclear energy plant in central California, and toxic waste exposure in Woburn, MA (see Erickson, 1976; Epstein, 1991; Brown and Mikkelsen, 1990). This environmental sociological work continues in a variety of spheres, as represented by the papers to be presented at the second Environments for Tourism Conference in June, 1996; conference topics range from critical analysis of ecotourism and sustainable tourism, to the design of tourist sites in a postmodern world, to "green" operations and marketing of tourist facilities.⁷

⁷ see 4/21/96 posting on bit.listserv.qualrs-l

Ideally, these qualitative methods are combined with quantitative research. For example, in 1994, the National Environmental Education and Training Foundation used focus groups, small scale surveys, and large scale surveys to study understand the perceptions of the natural environment among disadvantaged youth (NEETF, 1994). The Center for Agriculture in the Environment routinely uses this approach, as well, to understand factors such as farmers and rural landowners' opinions on open space policy in Rappahannock County, VA (CAE, 1994). By coupling qualitative and quantitative techniques, these projects are able to both account for subtleties in perception and to make generalizations across a large number of cases.

Looking in our own backyard, we can see that organizations here in Rhode Island are using qualitative methods to examine public perceptions. For example, Save the Bay is currently interested in heightening public awareness about estuaries as a natural habitat. In order to design a relevant, effective public education campaign, the organization is conducting focus groups and interviews with Rhode Islanders to find out what residents currently know about estuaries (Ronning Interview). The Rhode Island Department of Environmental Management has used interviews and focus groups to understand how small and medium-sized businesses in the state dispose of recyclable solid waste.

Public perceptions have become an increasingly important factor in policy and program design. Methods for examining public perceptions can be quantitative, qualitative, or a combination of both. In the next chapter, I explore how qualitative research can be used in an environmental studies curriculum in a university setting. In particular, I examine the challenges that university students face when applying qualitative research methods without prior training in social research. I also propose a solution to the lack of resources for these students.

Chapter Three

Qualitative Research at the Brown University Center for Environmental Studies

Over the past five years, more and more students at Brown University's Center for Environmental Studies (CES) have use qualitative research methods in environmental studies projects. The ES department offers a qualitative research methods course, ES 126, and employs an associate professor-- Christina Zarcadoolas-- who teaches this course and advises students who want to apply social research methods. Research projects at the Brown University Center for Environmental Studies reflect students' growing interest in public perceptions of the environment. At least four other departmental course include public perception research. There is also a course in Environmental Sociology, SO 187E.

Social research projects in the department have included:

- Small scale surveys with Brown students about their use of water and electricity in their dorms;
- Focus groups with local residents who have lawns, to better understand their perceptions of their lawns and their willingness to switch to ecologically sound ground covering; and
- Ethnography of an environmental education program.

As previously stated, almost half of the seniors (1995.5 and 1996) addressed public attitudes as a component of their thesis research (see Goodman, '96; Maslansky '95.5; Burtaine, '95; and Renaud '95 for examples). Many of these projects have examined the constituent components of public perception and public involvement, in addition to making recommendations for programs going forward. These projects can serve a dual purpose: they provide rich learning opportunities for students, and they can augment partnerships with community-based organizations.

Methods Used to Understand ES Students' Qualitative Research Needs

In the last three years, I have had numerous opportunities to participate in, assist, or observe social research projects at CES. I have personally worked on a number of projects, including:

- A joint ES 126-192 student project about elderly residents' perceptions of the Woonasquatucket River;
- A household survey on lead poisoning and quality of life in a low-income Providence neighborhood;

I have also provided support to other students working on ES social research projects:

- Assisting students in the ES 192 social research group, as a Research Assistant (Spring, 1995) and more informally (Spring, 1996); and
- As a teacher assistant for ES 126.

The 1995-1996 school year, while I was working on my thesis, brought me many opportunities to work with and observe students who were learning to use social research methods. As a teacher assistant for ES 126 (the ES social research methods course) in the fall, 1995, I participated in class meetings twice a week, and I worked intensively with three ES 126 students outside of class. Throughout the school year, I met independently with many undergraduate seniors- both in the Environmental Studies department or in other departments-- who were designing social research projects and wanted my assistance. In March and April, I also informally assisted students in the ES 192 social research group (Spring, 1996).

These meetings with all different types of ES students provided me an opportunity to hear some of the issues these students were struggling with. I got a sense of what questions they had and to which answers they were most responsive. Sometimes I set up these meetings because I wanted students to try my lessons, so I offered some time and advice in exchange (see more in chapter on "Interpretation of Research Methods").

Most Frequently Observed Questions about Qualitative Research

Through my observations, I have identified a number of needs that ES students have, in regards to social research methods. In this section, I pose these needs as questions. Most, but not all, of these questions stem from students' lack of experience with or schooling in basic qualitative research techniques. The nine (9) primary questions I have observed and my analysis of the needs represented by these questions are as follows:

1. What kinds of research questions can be explored with qualitative methods?

Many students do not realize that the questions they are posing about an environmental issue lend themselves well to qualitative inquiry.

There is often confusion about what questions can be explored with quantitative research, and which can be explored qualitatively. One ES student was trying to develop an evaluation for a Brown course. After developing the survey, asking students to fill it out, and tallying the results, this student found herself with many graphs and numbers, but learned little about how she could improve the course. Another student in the department did 20 interviews about a local revitalization project and generalized from these 20 people to the broader community, erroneously using quantitative methods to analyze qualitative data.

2. What are the goals and limitations of public perception research?

Often, students are not clear on the do not understand the goals or limitations of public perception research. For example, an ES 11 project, a student group surveyed other Brown students about solid waste reduction. Their survey included the following questions:

“Do you recycle the mixed paper & newspaper you receive in your P.O. box?”

“If magazine recycling bins were placed in the P.O., would you use it to recycle your magazines?”

These questions reflect a misunderstanding about the goals and limitations of qualitative research (in addition to being poorly worded). Although it is reasonable that this group was interested in people's recycling behavior, survey questions are *not* the most effective way to acquire this information. Survey questions such as these can only teach the researchers what people *say* they do, or would do, under given circumstances.

This group would have learned far more had they spent a set number of hours in the P.O. actually observing what students do with their recyclable waste. This observational project could have even included placing a bin labeled “Magazines” and observing what students do.

3. What are the methods we can use? When can we apply which method? What are the benefits and drawbacks of each method?

Students lack training in specific qualitative research methods, the benefits and drawbacks of each method, and when to apply what method. As a result, students often do not recognize there is a set of skills and methods that they should know about and apply to their qualitative research.

During a recent meeting, students in the ES 192 social research group (1996) went in circles trying to figure out whether they should use interviews or focus groups. Throughout the discussion, none of the students demonstrated a clear understanding of either method. By the end of the meeting, all of the students seemed frustrated that they did not know what they could do. A few were still confused about what research questions they could even examine with qualitative research methods.

4. How much research can we do in the time available?

Students have difficulty assessing the amount of research they can realistically do in the allotted time. This, too, is a problem for the current ES 192 group. Before going out into the field, group members estimated that they will conduct 40 interviews between in the month of April. This is not a realistic assessment of the amount of work they can do.

5. How do we obtain access to participants?

Students frequently underestimate the importance of access to participants. When they can not find participants from their “planned for” population, they usually end up accessing participants via people that they know of work with, independent of Brown, such as through a community organization.

The experience of the ES 192 social research group in 1995 cogently illustrates this issue. These students, interested in local perceptions of lead poisoning, wanted to interview pregnant, Latina women in a low income Providence neighborhood. After developing a number of protocols, they spent weeks trying to access this population to no avail. Eventually, they had to revisit their initial goals and find an accessible participant population. They ended up interviewing teenagers through an organization where one student worked.

6. How should we act towards participants?

Because they have not done formal qualitative research before, students are often uneasy about their role as qualitative researchers vis a vi their participants. This uneasiness may surface as a perspective on participants as “subjects.” Many students express sincere concern for how they present themselves to, and interact with, participants.

One student I worked with talked about how she orally asked a respondent for her age. The respondent, a middle-aged Latina woman, was quite offended by this question, chastised the interviewer, and refused to answer. The way student researchers act and the questions they ask can influence how respondents perceive

Brown and CES-- for example, whether or not they are culturally sensitive institutions.

Because many students do their research outside of Brown and because students often have a limited, high stress period of time to do their research projects, students often rush in a flurry to find respondents. This context makes it more likely that student researchers may not “tread lightly.” I did not directly observe this issue as often as some of the others, but these certainly are serious factors to consider.

7. How do we design good questions? (This is the question I focused on in the SIT Lessons).

Many students do not have adequate training to prepare good research protocols. As a result, their questions often:

- Use language and wording that is inappropriate or confusing,
- Lead respondents to particular answers, and
- Test their respondents.

For example, one protocol I read had an introduction that sounded like, “I am interested in how young mothers perceive their children’s health.” The particular respondent population the student was interviewing would not relate to this kind of language. At best, this introductory language might confuse respondents and, at worst, it could intimidate them and turn them off to the researcher (Language issues, such as this one, are addressed in both the Language Lesson and the Question Bias Lesson).

Additionally, students researchers often make a number of faulty assumptions about their respondents, based on their own researcher biases. These biases emerge in questions that:

- Assume respondents understand & have opinions about the issues at hand,
- Assume respondents have a shared or universal understanding of particular terms, like “community” or “environment”, and
- Assume that respondents share the researchers’ concerns about environmental issues.

(These assumptions are addressed in Pitfall #1 of the Question Bias Lesson.)

There a few common questions that ES students like to ask that involve general perceptions of environmental issues. These questions often sound like this:

“What are the 3 most important environmental issues?”

Or, student researchers may provide respondents with a long list of many different environmental issues and ask respondents:

“Rank the following environmental issues in their order of importance:”

Questions such as these assume that respondents care about environmental issues, and know the issues presented in the list. These questions also replicate some of the weaknesses of large scale opinion polling, such as failing to assess if respondents answers are “flash judgments” or “informed opinions.” Chances are, a researcher could ask the same question to a respondent four times over the course of a month,

and they could get different answers each time, depending on news coverage and that respondents' personal experiences.

8. How do we analyze our research?

As previously stated, students who do not have schooling in qualitative methods often become confused or overwhelmed with analyzing their data once they collect it.

9. What do we do with our results?

Lastly, there does not seem to be a clear policy or system within the department for cataloging qualitative research projects. A policy could help maintain an ethical way of making research accessible to appropriate parties. Currently, there is no uniform system. For example, I have overheard people wander into the department and ask about interviews that were done in Olneyville, and the response depended largely on who was asked the question! A cataloguing system would keep students from reinventing the wheel each time they try to construct a research project, and it would help the department keep track of who is being asked to participate in projects (to avoid, for example, "participant burn-out".)

How Do These Questions Relate to Environmental Studies Qualitative Research?

While these questions are certainly not unique to student researchers in the environmental field, they are certainly common. There are three factors, in particular, that make ES students prone to these problems. First, ES students often do not have experience in social research, which is more commonly used the social sciences like sociology and anthropology, and in market research. As a result, they often do not realize that they are doing social research or that there are specific research techniques they need to apply.

This factor is exacerbated by a dearth of materials that explicitly pertain to environmental social research. While there are many print resources about qualitative methods, few texts speak to the unique needs of ES students using qualitative methods. Environmental Studies is not the only discipline facing such a shortage-- apart from sociology and anthropology, nursing is one of the few disciplines that has qualitative research texts and publications specific to its field of study, including *Qualitative Health Research*, *The Western Journal of Nursing Research*, *Medical Anthropology*, *Social Science and Medicine*, (Daly and McDonald; Drummond, Wiebe, and Elliot; also see Sapsford and Abbott). Discipline-specific texts for qualitative health care researchers can explore the nuances of the field, such as balancing clinical and research goals or working in research

context traditionally dominated by an positivistic, objective paradigm (Gibson; Miller and Crabtree).

The second factor making ES students susceptible to these problems is an ironic double sword: these students tend to feel very passionately about the issues they study. As the ES Guide for Concentrators states, “Most students select an environmental concentration out of a general concern for the environment and an interest in improving its quality...” (CES, 1995). One example of this enthusiasm was in a survey protocol that started with the statement: “Could you take a 3 minutes to help save the environment?!” While such passion may be excellent motivation for an environmental lawyer or political organizer, a qualitative researcher’s primary goal of is to find out how other people perceive environmental issues. The education campaign or debate comes *after*, not during, the survey!

Lastly, the contentious and political nature of environmental issues makes it that much more likely that unprepared researchers will use faulty, unreliable questions in their qualitative research. When combined together, these three factors make ES students inclined to writing biased and leading questions. They also can prevent researchers from stepping away from their own feelings about the issues at hand.

Reflecting on These Nine Qualitative Research Questions

As I developed and refined this list of students needs over the course of the year, I grappled with a number of questions. The most pressing issues I struggled with were:

- What skills would be most useful in introducing students to qualitative research?
- What activities can help students learn these skills?
- Which skills do we want students to learn on their own, through trial and error, and which skills should educators teach formally?
- Which skills are high priorities and why?
- How can educators effectively address these problems? Can hypertextual technology teach students basic qualitative research skills?

The ES department encourages students to develop critical thinking skills, skills that include formulating research questions, designing research projects, and assessing which approaches were effective to solving the problem at hand. The way I prioritize and

address each of these questions keeps in mind the ES department's educational philosophy and practice.

Prioritizing Each Question

Based on my observations and conversations with students and my understanding of qualitative research design, questions #1, 2, 3, 5, and 7 are the most important ones.

These questions get at the core of what most qualitative research texts address.

Furthermore, these questions are most important in student-driven environmental social research, and they really shape the quality of the student's learning experience.

Questions #4, 6, 8, and 9 are of secondary importance, as I believe students can learn these skills in other disciplines, as a result of addressing questions #1, 2, 3, 5, and 7, and as a result of experience in the field. For example, question #4-- assessing the amount of time a project will take-- is what I consider a skill that students learn by *doing* rather than hearing or reading. Although the Lessons should counsel students should to aim to do a very small number of interviews, surveys, observations, or focus groups, this lesson often comes with time and experience. It is also a skill that students can learn from projects in other disciplines.

Furthermore, I planned to further address questions #4, 6, 8, and 9 in other Toolbox Lessons, sections that would be developed after my thesis was completed. For example, the question of relating with participants-- Question #6-- can be addressed in the ethics section of the Toolbox.

Proposed Solution to Students' Social Research Needs

ES students would greatly benefit from concise, readily available, introductory information about qualitative research methods. In the next chapter, I describe the “The Social Research Toolbox,” a hypertextual program I designed to address many of these questions. The goal of this toolbox is to introduce ES students to qualitative research skills and methods and to prepare them for some questions they may struggle with while designing their protocols. For the purposes of this thesis, I focused on question 7-- designing good questions-- and I created a set of four (4) lessons on “How to Design Survey and Interview Questions.”

Chapter Four

Developing the SIQ Lessons

In light of the problems that ES students grapple with while applying social research methods, Prof. Christina Zarcadoolas and I came up with the idea to design a hypertextual “Social Research Toolbox”. Over the summer of 1995, I developed one section of this Toolbox, “How to Design Survey and Interview Questions,”(the SIQ Lessons), which consists of 4 distinct lessons on designing qualitative research protocols and questions for small scale surveys and interviews.⁸

THE SOCIAL RESEARCH TOOLBOX

I designed the content of the Toolbox in light of the questions that ES students typically confront while doing qualitative research projects, particularly in drafting questions (see chapter on “Qualitative Research in Higher Education”). To better understand the needs of ES students doing social research, I reviewed numerous protocols designed by ES students. I read many key social research texts, such as Ragin (1994), Lofland & Lofland (1995), and Ely (1991), to inform the content of the Toolbox lessons and to prepare myself for the process of creating the Toolbox. I also held many extensive input sessions with Prof. Zarcadoolas, to refine the structure and content of the Toolbox. Examples within the lessons were drawn from the many drafts of questions and surveys designed by Prof. Zarcadoolas, other environmental studies students and myself over the course of the past five years.⁹

⁸ What is not included in the toolbox as of this point in time are sections on:

- Orienting oneself to environmental social research, with lessons on topics such as the strengths and limitations in qualitative research, how to use qualitative research to examine environmental perceptions, and various qualitative methodologies, like focus groups;
- Ethical responsibilities of qualitative researchers; Preparing to go out in the field; Available resources (on line and in print); and An annotated bibliography

⁹ Throughout the year, I frequently drew upon these protocols as models for my examples in the lessons.

I envision that the Toolbox will ultimately include five central components:

1. An orientation section on The Basics of Qualitative Research,

This section would orient students to the fundamentals of social research. It would outline the most common qualitative research methods, when to use which methods, and the benefits and limitations of each method. This orientation also would explain the difference between qualitative and quantitative research. It could include sections such as:

- *What's the Difference Between Quantitative and Qualitative Social Research?*
- *The Benefits and Limitations of In-depth Interviews,*
- *Ancient Proverbs of Survey Design,*
- *Gaining and Maintaining Access to the Field/Community, and*
- *Frequently Asked Questions in Qualitative Research.*

2. Lessons on How to Design Survey and Interview Questions;¹⁰

These lessons teach students some practical techniques for designing and asking social research questions. They give students the opportunity to practice redrafting example questions.

3. A Researcher's Tool Kit

The tool kit would help students prepare themselves to go out in the field. It would stress ethical problems that students need to be aware of and give advice for using equipment, such as audio tapes. This tool kit could have items such as:

- *A Researcher's Code of Ethics*
- *A Disclosure Form*
- *Tips on Using Audio and Video Equipment*

4. Bibliography

The bibliography would include references to prominent texts on social research, including Clifford Geertz, John and Lyn Lofland, and Margot Ely.

5. Web Resources¹¹

Here, students could find links to other social research resources on the World Wide Web. These resources could include:

- Environmental Studies thesis abstracts;
- Catalogue of CES social research projects;
- Related Web sites, such as Cornell University's PARNet and Center for Agriculture and Environment, which has used social research methods to understand issues facing American farmers; and

¹⁰ To date, I have completed two drafts of section #2, "How to Design Survey and Interview Questions." This is the section of the Toolbox that I tested and evaluated in my thesis.

¹¹ It has yet to be determined if the Toolbox will be available via the World Wide Web, or if it will stand alone, on a disk or a hard drive. The format will determine whether this section has direct links to the Web or just textual references.

- Related discussion lists, such as [brown.lists.occ-env-med-l](#) and [brown.lists.envbeh-l](#).

Why an On-Line, Hypertextual Medium?

Prof. Zarcadoolas and I wanted the Toolbox to be interactive and easy to design and distribute. We had not yet decided if we wanted the Toolbox to stand alone, on a disk or one's hard drive, or be accessible on a Web site. As a result, we choose to used HTML (Hypertext Mark-up Language)-- a language commonly used on the World Wide Web-- as the medium for creating the lessons.

This hypertextual presentation enhanced the lesson content in a number of different ways, including:

1. Hypertextual writing is nonsequential and nonlinear, so that users reading the text are not confined to one single order. This feature made sense for the Toolbox and for each lesson, as the user can pick what they want to read and what they to skip, depending on their skill level and their interest.

One could argue that the SIQ Lessons are not “true” hypertext, as each lesson has an intended order. According to Jakob Nielsen, true hypertext is determined not by the system's data structures or commands, but rather by “its user interface ‘look and feel.’” (Nielsen, 1995) This statement cogently describes the lessons, which appear to be user-driven despite the fact that users probably will do each lesson in its intended order.

2. HTML allows for an interactive, and participatory (or pro-active) format-- meaning that users must “click” on words and icons to retrieve information. I took advantage of this capability to encourage users to practice redrafting example questions. For example, the Answer Options Lesson includes examples of questions with poorly drafted answer choices. The users initially view the first draft, and they are supposed to figure out what is wrong with the answer options and draft new ones. To see our commentary and better answer options, they must click to the next screen. There is a guaranteed lag time between the “early draft” and the “better draft.” This process of analyzing and redrafting

questions works far less effectively in a textbook, where a reader can look at the answer right away

3. Links are another interactive feature of hypertextual writing. Links enabled me to go beyond the linear structure of a text book by cross-referencing various terms and concepts. In the Toolbox, I used links as a forum to make the information that users want more easily accessible. For example, the explanation of how to design demographic questions is cross-linked in both the Structure Lesson and the Answer Options Lesson.

4. HTML and the WWW offer unusually accessible authoring opportunities, including simple graphics. Novice programmers can easily learn and manage the HTML language. This project would be far more difficult to launch or sustain if it required textbook publishing resources (Nielsen, 1995).

5. Lastly, another important advantage of HTML is that it can be distributed through a site on the World Wide Web, or it can stand alone on a disk or a hard drive and instead be accessed through a Web browser. (I am currently using this second approach)

On one hand, the WWW provides a venue that users can access all over Brown campus and, conceivably, anywhere that has networked computers. The Web itself is growing every day. Furthermore, it is quite easy for people-- particularly students who are usually comfortable with computers-- to learn how to use and navigate the Web. On the other hand, the stand-alone quality of HTML keeps open the option of distributing the Toolbox through other means, such as a publisher.

For all of these reasons, HTML seemed to be an appropriate medium for the Toolbox. Our vision was that users could open up the Toolbox on a Web browser, (whether the actual lessons were available on disk or on the Web), and in one or more sessions they could explore ways to delve into environmental attitudes, perceptions and behaviors.

Computer Technology and Philosophies of Teaching & Learning

At times, developing the technological components of the Toolbox and the SIQ Lessons seemed far removed from environmental problem solving. This is a quandary facing most scholars using computer technology, whether for historical research or literary analysis. I dealt with this dilemma by paying close attention to the educational goals, concepts, and strategies I wanted to students to learn. As Allen Renear explains,

It is best to think of technology not as physical objects, but as technique: a collection of practices, knowledge, tools, objectives and strategies.... Questions about how to use academic technology are always inextricably embedded in the larger context of decisions about how to approach teaching and learning... To ask how technology should be used is to ask how it fits in to this system of goals, objectives, and strategies (1996).

This explanation spoke closely to my interest, as a scholar, in choosing precise educational goals and concepts for the Toolbox. The Web technology offered unique and seemingly endless ways to convey these goals and concepts and to enhance the learning process.

In his essay, Renear goes on to explain that there are unique analytical tasks involved in converting say, historical, texts or concepts into a digital format. These analytical tasks are, in fact, a new set of skills *necessary* for teaching and learning in a particular discipline.

While creating the Toolbox and the SIQ Lessons, I have analyzed concepts used in environmental studies social research, adapted these concepts to a technical format, and found ways that HTML can clarify and teach these concepts. I consider these steps to be a set of skills that will become increasingly necessary for environmental studies scholars and educators.

Creating the Toolbox also involved a product development component. Stone explains that, when developing a product (in this case, an educational product), the end users' educational needs and wants are as important-- if not more important-- than the capacity for what can be created (Stone, 1984). For example, while developing the SIQ Lessons, I used themes and strategies, such as relevant examples and humor. ES students often view social research texts as dry and unnecessarily verbose (see Critical Review and Course

Evaluation Responses). These characteristics are intended to make the lessons more accessible to ES student audience. Understanding not just the problem ES students face when doing social research, but also their demographics, psychological mind set, and values, enabled me to relate these SIQ Lessons to these users and, thus, to create a more effective educational program.

THE 4 LESSONS ON “HOW TO DESIGN SURVEY & INTERVIEW QUESTIONS”

To build the actual Toolbox, I started with the second section-- lessons on “How to Design Survey and Interview Questions”(SIQ lessons). I began with this section for three reasons. First, and most importantly, I felt this was the most difficult section to design, requiring the most time and creativity. Secondly, I had the available “raw data”-- I could analyze protocols from past ES courses, along with other sources, to understand the types of problems that students have when writing questions. To develop the other sections of the Toolbox, I knew I first needed to do more research about students’ needs. Finally, there is a conspicuous gap in resources for students who want hands-on practice (and feedback) with designing survey and interview questions. Whereas, there are a number of books on various qualitative research methodologies if students want to take initiative and access this information.

Addressing Question #7: The Goals and the Content of the SIQ Lessons

Over the course of approximately ten weeks (June - mid August 1995), I created the first version of the SIQ Lessons.¹² To determine the content of these lessons, I defined and narrowed down some of the key needs that arise in Environmental Studies students’ qualitative research protocols. At this time, I elaborated on and flushed out question #7:

7. How do we design good questions?

Many students do not have adequate training to prepare good research protocols. As a result, their questions often:

- Use language and wording that is inappropriate or confusing,

¹² It is important to note that I initially envisioned a separate set of protocol design lessons for each major methodology: surveys, interviews, focus groups, and observations. Over the course of the summer, I realized that this approach was too ambitious and would take too long. While I had already designed 2 lessons-- the Structure Lesson and the Answer Options Lesson with surveys and formal interviews in mind, I decided that the other 2 lesson should be applicable to all types of protocols.

- Lead respondents to particular answers, and
- Test their respondents.

Additionally, students researchers often make a number of faulty assumptions about their respondents, based on their own researcher biases. These biases emerge in questions that:

- Assume respondents understand & have opinions about the issues at hand,
- Assume respondents have a shared or universal understanding of particular terms, like “community” or “environment”, and
- Assume that respondents share the researchers’ concerns about environmental issues.

To understand ways of addressing this need, I read a number of contemporary, eminent books on qualitative research methodology. I also reviewed texts that Prof. Zarcadoolas had written on qualitative research, as well as student and professional research protocols that she had collected over the years. Lastly, Prof. Zarcadoolas and I had a number of brainstorming sessions on what information I would include in these lessons and how I would organize it into distinct lessons.

By mid-summer, I determined three overarching goals for the SIQ Lessons. The following are specific goals for the hypertext lessons designed:

Goal #1: The SIQ Lessons should stress the importance of designing a good protocol with unbiased questions.

I decided upon four distinct lessons and the distinct messages each lesson would convey. Each lesson would appeal to the typical questions that arise when students try to write interview, survey, or focus group questions:

THE STRUCTURE LESSON:

The structure of one’s research protocol needs to be created carefully, with an introduction, transitions, well ordered questions, and a conclusion. For example, some researchers put demographic questions in the beginning, while other place them in the end, so the placement of these question should be considered. Furthermore, demographic questions probably should include answer options in the form of ranges.

THE LANGUAGE LESSON

Each question should be written at a language level appropriate for the respondents. The language should be and mindful of cultural sensitivities, interpretations and other factors that would effect respondents' reception and comprehension of a question and their construction of an answer.

THE QUESTION BIAS LESSON

Question wording should not be as neutral as possible, to allow for a variety of different answers from respondents, and to encourage respondents to be honest. There are many different ways to draft a question, depending on one's methodology (survey, interview, focus group) and the formality of the methodology. (With in-depth interviews however, neutrality does not mean coldness or lack of sensitivity)

THE ANSWER OPTIONS LESSON

Questions should include answer options that are appropriate to one's methodology and clear to respondents. If the respondent does not know how to use/ choose the answers, then very little accurate information will be gathered. . With surveys and formal interviews, the researcher should provide forced answer choices that are not leading and that account for the answers respondents might provide.

In the process of exploring protocol design, the SIQ Lessons would introduce students to basic social research concepts. For example, the Lessons would communicate that the goal of social research is to learn what respondents think about the issues at hand, not for researchers to persuade respondents or tell them what they *should* think about these issues.

Goal #2: The Lessons should provide students with numerous examples to redraft.

The lessons contain a myriad of realistic examples from environmental studies and environmental health. These examples are one of the unique features of the lessons.

They:

- familiarize students with the process of redrafting,
- give students experience drafting, and
- show students how to-- and how *not* to draft certain questions.

These examples encourage users to learn by doing (in this case, redrafting) rather than by passively reading. This strategy is intended to maintain students' attention and to keep their interest level high.

The examples contain a variety of topics that pertain to ES students' course work -- from second hand tobacco smoke to landscaping to community development. These topics also provide a bridge between environmental concepts, with which students are more familiar, and social research concepts, like piloting a survey, which are probably new to users. To keep the lessons a reasonable length, I condensed the lesson content and created many options for users to either skip various topics or to explore further.

Goal #3: Each SIQ Lesson should take a different approach to conveying information.

In the middle of the summer, after I had refined the SIQ Lessons' goals and content, I decided that the lessons should use a few different strategies for teaching information. First, the lessons should have varied opportunities for users to redraft examples. For example, in the Structure Lesson, users do not focus on redrafting questions. In the Language Lesson, users can see progressive redrafting of one question. At the other end of the spectrum is the Answer Options Lesson, which consists of nine examples that users can redraft. Secondly, each lesson varies in length. The Language Lesson is the shortest--no more than two or three pages, while the Question Bias Lesson is the longest.

Third, the difficulty of the content should vary between lessons and within each lesson. Some lessons--such as the Structure Lesson-- remain at the same difficulty level, while others-- such as the Answer Options Lesson-- posed more and more difficult questions as the lesson progresses. Lastly, the lessons have varied opportunities for users to direct the lesson. The main body of the Structure Lesson is quite linear and requires very little clicking, but this lesson provides many opportunity for users to "stray" from the main body of the lesson and view research concepts in separate nodes. On the other hand, the main body of the Question Bias Lesson requires a great deal of clicking. In many instances, this lesson provides users with the choice to either try to redraft another question with a similar problem or to go onto the next concept. Yet, the Question Bias Lesson provides few opportunities for users to leave the main body of the lesson.

Setting the Tone of the SIQ Lessons

In order to further customize the SIQ Lessons for ES students, I tried to make the lessons funny, when appropriate. Much of the lesson content has a humorous, almost light-hearted tone, and there are silly examples and goofy clipart throughout the lessons. I also strived to include as many “common ground” situations as possible-- scenarios and problems to which student users could relate. For example, the Piloting Definition talks about a student who was behind schedule on his thesis project, skipped pilot testing his interview questions, and faced unfortunate consequences as a result. I felt that design themes like humor and common scenarios would facilitate the learning experience and make the lesson content appealing and applicable to student users.

I created the lessons on “How to Design Survey and Interview Questions,” to familiarize ES students with social research skills. In the following chapter, I describe my first phase of testing the lessons with students from Environmental Public Perceptions, ES 126, an environmental studies course.

Chapter Five

Methods for Testing the SIQ Lessons

This section describes the qualitative methods used for tests with both the pilot population and the study population. In the fall of 1995, I used qualitative research methods of observing, interviewing, and small scale survey questions to test the SIQ Lessons. In my pilot tests, I gained valuable insights in how to conduct my study tests. My study tests helped me gather data that I subsequently analyzed and used to revise the SIQ Lessons. The process of concept and product testing helped to ensure that the Lessons were appropriate for the intended users-- primarily college students developing qualitative research skills. Many of my findings, and my analysis of these findings, informed the revisions I subsequently made to the SIQ Lessons.

RESEARCH GOALS FOR THE PILOT AND STUDY TESTS

Both the pilot tests and the study tests had specific research goals. In pilot testing the SIQ Lessons, I had to determine such things as where I should conduct my study tests and what interview questions I should ask. In the pilot tests, my two central research questions were:

1. **What is the best way to conduct my study tests?**
2. **How can I develop and refine my observational and interview protocols for the study tests?**

In the actual study tests, I wanted to answer five overarching research questions:

1. **How do ES students respond to the *content* of the SIQ Lessons?** Namely, what did students pay most attention to, what elements of the Lessons did they find useful, and what did they think was missing.
2. **How do ES students use the Lessons, as an educational tool?** Meaning, what do participants read and what do they skip. Do participants try to redraft the examples within the lessons on a separate piece of paper, or do they quickly click to the next screen, for the better redraft?
3. **Do they apply lesson skills to their own protocols?**
4. **How can I edit and/or expand the Lessons to better meet users' needs?**
5. **How do ES students respond to the Lessons' electronic, hypertextual presentation?** For example, how does hypertext influence the way they use the Lessons? What do they say about the hypertext format?

METHODOLOGY: AN OVERVIEW

To obtain student feedback on the SIQ Lessons, I conducted a total of 18 one-on-one activities. Each activity consisted of a computer session, in which the participant explored the SIQ Lessons on the computer while I observed them. When each participant had finished the lesson session, I orally interviewed him/her. I first conducted three pilot tests, then revised my protocols, and then I conducted 15 study tests.¹³ For the sake of the following discussion, I will refer to these 15 subsequent tests as “the study tests.”

The 18 participants, whom I refer collectively to as the “test participants,” were all Brown University students. The 15 participants in the study tests (the “study test participants”) were all enrolled in Environmental Studies 126 (ES 126), a social research methods course in the Environmental Studies department.

Both the pilot tests and the study tests took place in the student office of the Urban Environmental Lab of Brown University (hereafter referred to as the UEL). The pilot tests took place over the course of two days, from Oct. 23 - 24, 1995, and the study tests took place over the course 21 days, from Oct. 25- Nov. 14. In mid December, 1995, I asked the 15 study participants to respond to a few follow-up survey questions about the SIQ Lessons. I used a reiterative process of ongoing analysis, between December and March, to analyze my data.

METHODOLOGY: A COMPREHENSIVE EXPLANATION

Epistemological Framework for Applying Social Research Methods

My epistemological framework for testing the SIQ Lessons drew upon elements of qualitative market testing strategies and User Interface evaluation, both of which involve basic qualitative research methods. The study tests provided the means to concept test the SRT lessons. A concept test, as applied in market testing, provides an opportunity for the customer (or user) to respond to the proposed product. One advantage of this approach is

¹³ I was not able to observe or interview one study test participant, so he completed the test on his own. One of the 15 participants elected to return for a “mini-session,” in which he did the Question Lesson.

that enables the researcher to evaluate whether or not consumers want the product, and thus whether it is worth the time and money to develop the product. This concept-testing approach is particularly beneficial in the case of the SIQ Lessons, considering the popularity of the WWW and the limited amount of research about hypertext as an effective medium for learning environmental social research skills (see Pitkow and Recker, 1995; Merit NIC, 1994).

I used various market research techniques to gather information about the SIQ Lessons. It has been helpful for me to think about the SIQ Lessons as a product I am testing, and to understand that this product entails both the Lesson content and technology. According to Stone, market research involves assessing users’:

- **Needs**- What social research skills are most important to users?
- **Awareness**- How familiar are users with the product (in this case, both the content and the technology of the SIQ Lessons)
- **Behavior**- How do users use the Lessons?
- **Attitudes**- What attributes of the SIQ Lessons are most important to users? What are users’ perceptions of the Lessons, relative to other available resources?
- **Intentions**- Would users consider using this tool on their own? (Stone, 445)

I used market testing techniques to examine at these five different areas. For example, in my interviews I encouraged participants to play the role of consumer, rather than act as experts-- in this case, as experts on educational program design (Stone, 1984). I did not want participants to spend too much time talking about how they would design this program if they were me or how they think other users would react. Rather, I wanted participants to focus on how **they**, as users, learn best. This approach was exceptionally important in light of the fact that all of my participants were Brown students, who are notorious (and often quite skilled!) at giving opinions on almost any given topic.

Epistemological Framework: User Interface Evaluation

The qualitative research I used to test the SIQ Lessons closely resembles the rapidly growing field of user interface (UI) evaluation and design. In fact, my research often

Overall, I observed 14 entire study test sessions and 1 mini-session, and I have the results of 15 interviews

resembled this field more closely than traditional forms of ethnography . Whereas ethnographers typically participate, on some level, in people's day-to-day lives for a long period of time, UI designers have a slightly different agenda and time frame. UI designers-- like ethnographers-- want to understand how users interact with computer systems, but they do so with the intention of using the information to improve or change the computer program (Rose, et al.). The time frame differs, as well. “While traditional ethnographers tend to immerse themselves in cultures for weeks or months, UI designers need to limit this process to a period of days or even hours, and still obtain the relevant data needed to influence a redesign.” (Rose, 1995).

It is important to note, though, that I was testing one, relatively small set of HTML pages, whereas UI design generally involves more complex programs. These programs range the redesign of user interfaces like ACCESS (an on-line catalog for the Library of Congress development), to the Maryland Department of Juvenile Justice's information system (see Bentley, Hughes, Randall & Sawyer, 1992; Hughes, Randall & Shapiro, 1992; Rose, Shneiderman, Plaisant, 1995; Schniderman, 1993)

Justification for Applied Methodology

To answer my research questions, I used a methodological process of triangulation.

Triangulation typically involves “the convergence of data gathered by different methods, such as observation and interview...” (Ely, 1991) The study tests involved three specific methods: participatory observations, semi-formal interviews, and follow-up survey questions. In this section, I briefly outline the function of these three methodologies in my research. Later, in my discussions of the pilot tests and the study tests, I elucidate how I applied these methodologies during the tests.

1. Participatory Observations

I did participatory observations during both the pilot test and study test sessions. These observations proved to be particularly useful in gathering data on how participants used and interacted with the SIQ Lessons. Specifically, my observations enabled me to record:

(one of which I did not conduct) and one mini-interview.

- which lessons and which lesson components participants focused on;
- participants' nonverbal reactions, such as laughing or grimacing;
- the time participants spent on each lesson; and
- (my interpretation of) when participants actually tried to rewrite sample questions and when they directly clicked to the next screen to see the revised questions.

Participant observation is a critical method in product testing research such as this. Methods for observing software users are becoming increasingly important, particularly because more people are using computers and because designers are evaluating and upgrading these systems. (Rose, et al.) To successfully evaluate and redesign the program, the researcher needs to know how participants interact with the product at hand, and the relationship between how they act and what they say.

The distinction between participatory and non-participatory observation is ambiguous, to say the least. I consider these observations “participatory” because I sat directly next to the participants as they went through the lessons, and I occasionally answered questions or injected comments. As Goetz and LeCompte explain, “Nonparticipant observation exists only where interaction is viewed from hidden cameras and recorders or through one-way mirrors.” (1984) Interaction was impossible to avoid during the pilot and test sessions; participants viewed me as the involved “creator” and could turn to me with questions. Thus, I believe my presence had an impact-- however minimal-- on each session.

2. Interviews

I used interviews in both my pilot tests and my study tests. I informally interviewed each pilot participant, revised my interview questions, and then conducted nonscheduled, standardized interviews with each study test participant. By “nonscheduled, standardized,” I mean that each of these interviews contained the same questions and probes, but the order in which I asked them changed according to the individual respondent's reactions (Goetz & LeCompte, 1984). This distinct interview methodology was particularly useful in learning about students' opinions about the Lessons' contents and concept.

Fetterman explains that most ethnographers have a set of questions they hope to ask, and they ask them at the most appropriate times in the interviews (Fetterman, 1989). My interviews followed this pattern. Although I directed the interview and asked most of the questions, the informality and open-ended nature of my questions encouraged a conversation-like exchange. This exchange benefited my research in three ways:

- I elicited and recorded a wide range of responses from participants.
- Participants were able to clarify their responses and opinions by scrolling through the SIQ Lessons on the computer and pointing out particular parts of the lessons.
- Participants could specify how they planned to apply these lessons to their own protocols.

According to Lazarsfeld, these features are all basic advantages of open-ended interviewing (Lazarsfeld).

3. Follow-up Survey Questions

I asked study test participants to respond to two follow-up, written survey questions. These follow-up questions served as “recall” questions, enabling me to gauge what participants did and did not recall from the lessons. Participants anonymously answered these surveys and returned them to a third party, who then passed them on to me. I used an anonymous, written format to obtain participants’ opinions, in order to avoid any problems with truthful disclosure (Ragin, 1994; Sieber, 1982). The written format also proved to be a quick means of distributing and retrieving participants’ survey responses.

METHODOLOGY USED IN THE PILOT TESTS

As previously stated, I conducted three (3) one-on-one pilot tests between Oct. 23- 25, 1995. During each session, the pilot participant explored the SIQ Lessons, while I observed him/her and recorded notes, and then I interviewed him/her. As soon I completed the three pilot tests, I concisely analyzed my pilot notes, looking primarily for problems that I had to address prior to conducting my study tests.¹⁴ I conducted all three pilot tests on the IBM computer in the UEL student office, at times that were appropriate to participants’ schedules.

The three pilot test participants each represented a different student population-- other than ES 126-- that may eventually use the SIQ Lessons. These populations include:

- ES students who have never taken a qualitative research course, but are interested in qualitative methods; and
- Past ES 126 students; and
- Non-ES students using (or interested in) qualitative research methods.¹⁵

All three participants were concurrently designing qualitative research protocols. Pilot sessions were loosely transcribed and field notes were clarified in order to be more useful on later analysis.

Pilot Test Findings

My pilot tests were a critical component of my research process, and they served three primary of functions. First and foremost, the pilot tests helped me determine how I would set up my study tests. The data gathered in my pilots enabled me to answer a number of key methodological questions:

- Where should I conduct the study tests?
- Where should I sit to observe the computer sessions?
- How long should I expect the study tests to last?
- How should I revise my observational and interview protocols?

Based on my observations during the pilots, I decided that the UEL would be an appropriate and convenient location for the study tests. Also through my observations, I found that the pilot participants did not seem to mind that I sat right next to them.¹⁶ All three participants seemed quite engrossed in the lessons and rarely, if ever, spoke to me

¹⁴ In the next chapter, I discuss the second stage of analyzing my pilot tests, which involved examining pilot participants' comments and actions about the lesson content.

¹⁵ There are a many other populations who may find the SRT lessons useful tools, but who were not represented in these pilots or study tests. The most notable population missing from these pilots was students from an introductory Environmental Studies course at Brown University, ES 11. This course was held during fall semester, 1995, but I did not identify this group until late in the fall semester, when the SRT lessons were no longer applicable to ES 11 students' work, according to three ES 11 t.a.'s.

¹⁶ I did have some difficulty keeping myself from laughing during two of the pilots- I found some of the lesson content to be pretty funny, and I was probably nervous. Since the students were laughing, too, this did not seem to interfere with the sessions too much. On the other hand, my behavior may have reinforced the idea that I really like these lessons, and thus kept the students from criticizing them. This is only speculation.

or looked in my direction. And in my pilots, I found that users the amount of time users spent on the lessons varied dramatically.

Secondly, the pilot tests personally prepared me for the study tests. The pilots opened my eyes up to some of the different ways that participants used and reacted to the lessons. Thus, the pilots left me with a better sense of what to expect from participants in my study tests.

Lastly, my pilot observations and pilot interviews informed my observational and interview protocol revisions. Before conducting the pilot tests, I had drafted two versions of my observational protocol. I followed the second protocol draft during the pilot tests.

While observing the pilots, I primarily looked for data on:

- which lessons and lesson components participants paid most attention to,
- the order in which participants did the lessons,
- whether or not participants followed the icon and word links,
- which links they followed, and
- if they actually redrafted sample questions when advised to do so.

During the pilots, I recorded my observations in a separate journal (See Draft 2).

As I read over my pilot observational notes, though, I found two problems. One problem was that I had not consistently recorded the same data for every participant. For example, I had noted how long the first pilot participant spent on each lesson, but I did not record how long the second participant spent on the Answer Lesson or the Question Lesson. The second problem was that I did not uniformly document how each participant used each individual lesson. To illustrate: from my pilot observational notes, I could not tell which links each participant had followed and which they had skipped. I also did not have a standardized way of registering, or deducing, when and how often participants tried to redraft a sample question.

To resolve these problems, I dramatically redesigned my observational protocol (see Draft 5). The revised observational protocol began with a “General” section, in which I could note Session Attributes, such as the date and the participant’s name. I also created a

separate page with specific questions for each lesson. I also adopted what Fetterman describes as a checklist, to “help organize and discipline data collection and analysis.” (Fetterman, 1989) The following visual example shows how I chose to layout and use my observational “questions” (notes in *Script* indicate my observational recordings):

<p>Facial Expressions:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Laughing <input checked="" type="checkbox"/> Smiling <input type="checkbox"/> Indifferent <input type="checkbox"/> Puzzled <input type="checkbox"/> Very Confused <input type="checkbox"/> Other: 	<p>Body Language:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Upright <input type="checkbox"/> Leaning Back <input checked="" type="checkbox"/> Leaning Forward <input type="checkbox"/> Hands <input checked="" type="checkbox"/> Feet --<i>Taps foot in last few minutes of lesson</i> <input type="checkbox"/> Other:
--	---

This checklist format later proved to be vital to my success in recording legible, consistent, comparable observational data.

My interview protocol, on the other hand, required fewer revisions before I could do the study tests. The interview involved informal, open-ended questions about seven or eight key aspects of the lessons. Examples of my interview questions included:

“Do you have any general reactions to the lessons?”
 “If you had to rate the lessons on their usefulness, which was most useful and which was least useful?”
 “What do you think about the level of difficulty? Were any of the lessons too simplistic or too difficult?”

My interview questions were based on topics I had previously identified as areas of my particular interest, when I was developing the SIQ Lessons. Prior to the pilot tests, I reviewed my questions with my thesis advisor, a pilot participant in a pre-pilot session meeting, and members of my affinity group, all of who took ES 126 in the spring of 1995.

The results of my pilot indicated the following revisions needed to be made to the interview protocol used for the study test participants:

1. Encourage participants to bring their protocols with them to the Lesson session.

My second pilot participant talked about how he might apply these lessons to his own protocol, and he stressed the importance of this application.

2. Ask participants a question about subsequent changes they would make to their protocols, based on their experience doing the SIQ Lessons.

Upon the urging of my thesis advisor, I added the following question:

“After doing these lessons, is there anything in your protocol you want to revise?”
Probe: *“Which questions?” “How will you change them?” “What (in the lessons) inspired you to make those changes?”*

3. Add a question about “anything else within the Lessons that might reinforce what you’re learning?”

One pilot participant stressed the need for “review” components of the lessons that students could print out, or a worksheet they could take notes on during their lesson sessions. This question would help me understand if students want a companion worksheet or summary pages within the Lessons.

4. Add a question about how this computer tool compared with traditional social research texts.

In particular, did the Lessons' format helped students learn social research skills? I added a new question to my interview:

“Were these lessons different than activities you have done in ES 126- in class or as homework? How so/Why not?”
Prompt: *“More useful, less useful, complementary?”*

5. Add a short section with some general questions about computer use.

These questions would also help me better understand how hypertext may influence students' perceptions of the Lesson content. For example:

“How comfortable are you with computers?”
 Very Comf. Somewhat Comf. Not Comf. at all

“Think about how much time you spend using a computer when you are in school. Do you feel like you spend too much time on a computer, not enough time, or the right amount of time?”
 Too much time Right amount Not enough

I also was already observing and determining how I thought participants' “used” the computer. I intended these computer use questions to serve as another means of gauging participants' interest and experience in using computers.

6. Adapt my introduction

Both my pilot observations and interviews revealed that my introduction needed to account for two factors: dead links and the need for a more thorough introduction to the lessons. During the pilots, I observed that participants sometimes clicked on a dead link-- a word or icon link that led them to a computer error message because the links were not technically complete. These dead links left participants slightly confused, and they interrupted the flow of the lessons. When participants came across these dead links, I often ended up interrupting the pilot sessions and accounting for the missing links. Although the dead links sometimes confused participants, I made a conscious decision *not* to remove these dead links.

I kept the dead links because I wanted to know if these topics interested participants, as indicated by participants' choice to follow the links or pass over them. Yet, as a result of my observations and interviews, I decided to clarify that the lessons were “a work in progress” in my introduction to the study tests, and I warned participants that some word links did not actually lead anywhere (see Introduction on first page of Draft 5).

The second factor I needed to address in my oral introduction involved the lack of a textual introduction to the lessons. During the interviews, a few of the pilot participants mentioned that they were confused by the lack of an introduction or conclusion page *within* the lessons. One participant suggested that I provide a more thorough oral introduction to the lessons.

In the interest of time, I decided not to add a textual introduction to the lessons before I did my study tests. Instead, I orally explained that these SIQ Lessons were originally supposed to be the main body of a “Social Research Toolbox.” I told participants that I did not include the Toolbox Orientation in the study tests because I had not completed this orientation. Once I finished revising my introduction, I went ahead to conduct my 15 study tests.

METHODOLOGY USED IN THE STUDY TESTS

My goals for the study tests differed from my goals for the pilot tests. When I did the pilot tests, I was primarily interested in answering methodological questions that would help me prepare for the study tests. In the study tests, my research questions were more concerned with getting feedback about the SIQ Lessons. Specifically, I wanted to know:

- 1. How do ES students respond to the *content* of the SIQ Lessons?**
- 2. How do ES students use the Lessons, as an educational tool?**
- 3. How should I edit and/or expand the SIQ Lessons, in order to meet users' needs?**

About half way through the study tests, I added a fourth question:

- 4. How do ES students respond to the *concept* of an electronic, hypertext-based medium for the Lessons?**

Because of my piloting experience, I went into these study tests with a better sense of what to expect from participants, such as how long participants may spend on the lessons. I also had a refined understanding of what data I wanted to gather, as reflected in my protocol changes.

Study Test Sessions & Interviews

The methodology for study testing the SIQ Lessons was virtually identical to the methodology for pilot testing these lessons. I conducted the 15 one-on-one study tests from Oct. 26- Nov. 11, 1995. at the UEL. During study test sessions, I observed the study participants as they looked through the SIQ Lessons, and I recorded my observational notes onto a protocol. As soon as the participant had completed the lessons, I interviewed him/her and took notes onto my interview protocol. I made minor changes to both my observational protocol and my interview protocol after three or four tests were completed.

I was unable to observe or interview one of the 15 study test participants. After I introduced him to the lessons, this participant explored the lessons and recorded his answers to the interview questions on his own. Also, one of the 15 participants elected to meet at a later date for a “mini-session,” in which he repeated the Question Lesson. After observing this mini-session, I asked him interview questions relevant to his mini-session.

The 14 observed test sessions varied in length from 18 to 54 minutes, with an average of 19.3 minutes. The 14 in-person interviews lasted anywhere between 7 and 45 minutes, with an average of 29.5 minutes (Test timings). The mini-session lasted 25 minutes.

Study Test Participants: ES 126 Students

For my first study test population, I chose students from ES 126, a social research methods course offered through the Brown University Environmental Studies department. This population group consisted of 15 students-- 14 sophomore, junior, and senior undergraduates and 1 graduate student. All participants had enrolled and stayed attended in this course for at least 6 weeks; Apparently, most participants had a fairly high level of interest in the topic of social research protocol design. The content of the lessons was extremely relevant to these participants' academic work, as they were concurrently studying qualitative research methodologies and designing either interview, survey or focus group protocols.

Access to participants is one the most important factors in ES student-driven social research projects. It is easy to underestimate the difficulty of finding research participants. These students were incredibly accessible participants due in part to the fact that it was part of course requirements for ES 126. This requirement enabled me to avoid issues of volunteer bias within this small study population (Kimmel) (see more in chapter on "Interpretations of Research Methods").

The Researcher's Relationship to Study Test Participants

Another key factor facilitated participant recruitment: I was the teaching assistant (the T.A.) for ES 126. Thus, I already saw study test participants at least twice a week in class and had a working relationship with many of them. Some of these students had even called me at home or met with me outside of class to talk about their course work. I would describe my relationship with all of these participants as friendly and equitable. With this incredible ease of access, I could set up appointments with students during or after our class met, and I could easily pursue students who did not initially sign up for a test session (also, see chapter on "Interpretation of Research Methods").

Interruptions

Because of the study test location and time of day, there were frequent interruptions. I considered an *interruption* to be any activity at or above the typical noise level of a human voice in a public setting, such as ringing phones, people having conversations within approximately 10 feet of the participant, and people talking directly to the participant or to me. Over the course of each testing session, there was average of 2.9 interruptions per session, with as few as none and as many as 7+ (Test timings).¹⁷ Based on my observations, these interruptions did not seem to seriously detract from the participants' use of -- or their interest in-- the SIQ Lessons, as participants typically ignored the sounds.

Revising the Observational Protocol

As mentioned earlier, I changed the observational protocol after the first few study tests. Over the course of my first day of testing, Oct. 26, I discovered a number of problems with my observational protocol. It was subsequently revised, thus I used Draft 5 of my observational protocol for my first three study tests, and Draft 6 of this protocol for my last 12 tests.

To elaborate: I began my study test sessions with Draft 5. But, during my first test on Oct. 26, I found myself writing all over the paper, and I frequently ignored the questions I had intended to answer. For example, while observing my second study participant doing the Structure Lesson, I took unsystematic notes that looked like this:

Rewriting: <input type="checkbox"/> Stop & Think <input type="checkbox"/> Pause & Think <input type="checkbox"/> Click Immediately Changes over the lesson: <input type="checkbox"/> Yes <input type="checkbox"/> No	Student's ease with clicking and electronic format: <input type="checkbox"/> No Difficulty <input type="checkbox"/> Some Difficulty <input type="checkbox"/> Much Difficulty <input type="checkbox"/> Other
--	--

¹⁷ In addition, the other computer was almost always in use over the course of each test. During two separate testing sessions, ES T.A.'s were conducting classes on the computer we were not using, and there were as many as 15 other people crowded around the computer.

“Clicking” Patterns:

- Links:** Ethics Frog *"I know all about ethics"*
 Strc 1= Frog Intro. *"should I tell you or tell myself?"*
 Strc 2= Frog- Demog
 Strc 2a= Frog- Rewrite
 Strc 3= Frog Drafting *laughs, reads through*
 Word= Drafting Lesson
 Strc 4= Frog Conc. *didn't read all of the 3 paragraph discussion*

My written notes were crowded into a small area, making them difficult to read and often illegible. As indicated by the uneven nature of my observational notes, my protocol apparently did not include many observations that I was interested in during the tests.

I revised the observational protocol draft, to incorporate more specific information on how participants used individual components of the lessons, such as:

- Did users read, skim or skip the Structure lesson frog who talked about repeating important questions?
- When asked to redraft a question, did users actually stop and then click the icon? Or did they pause first? Or did they immediately click?

I also wanted to ease the manual recording process (see Draft 6). For instance, I redesigned the layout of each page, to create writing space at the points during which I wanted to take notes. An excerpt from the Structure Lesson, below, illustrates this new layout:

Structure Lesson	Lesson #	Time:	Total min.:
Interactions with me: <input type="checkbox"/> Look for my reaction <input type="checkbox"/> Distracted by my presence <input type="checkbox"/> Comment: <input type="checkbox"/> Clarify where to click <input type="checkbox"/> Clarify instructions <input type="checkbox"/>	Interruptions: <input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 +	Speed: <input type="checkbox"/> Fast <input type="checkbox"/> Medium Paced <input type="checkbox"/> Slow Changes over the lesson: <input type="checkbox"/> No <input type="checkbox"/> Yes:	
Y. Frog: Introduce! <input type="checkbox"/> Read <input type="checkbox"/> Skim <input type="checkbox"/> Skip	<input type="checkbox"/> Stop & Think <input type="checkbox"/> Pause & Think <input type="checkbox"/> Click Immed.	<input type="checkbox"/> Word- Ethics <input type="checkbox"/> Strc1= Frog- Intro.	
Y. Frog: Craft! <input type="checkbox"/> Read <input type="checkbox"/> Skim <input type="checkbox"/> Skip	<input type="checkbox"/> Stop & Think <input type="checkbox"/> Pause & Think <input type="checkbox"/> Click Immed.	<input type="checkbox"/> Strc3= Frog- Drafting <input type="checkbox"/> Word= Drafting Lesson	

There were also a few questions that I only needed to answer once during each test. I moved these questions that it to the “Overall” section at the beginning of my protocol:

Overall	
Student’s ease with clicking and electronic format: <input type="checkbox"/> No Difficulty <input type="checkbox"/> Some Difficulty <input type="checkbox"/> Much Difficulty <input type="checkbox"/> Other	Overall Rewriting: <input type="checkbox"/> Stop & Think <input type="checkbox"/> Pause & Think <input type="checkbox"/> Click Immediately

As a result of these revisions, Draft 6 of the observational protocol provided me with enough room in the appropriate places to take essential notes. I used this revised 6th observational draft for my last 12 tests.

Revising the Interview Protocol

I also made minor, situational revisions to the interview protocol throughout the 15 study tests, as well. These revisions involved adding a phrase to two different questions, to make these questions more clear, and adding a few questions.¹⁸ Despite these lexical changes, though, my interview protocol stayed basically the same throughout the 15 interviews.

I changed the wording of one question that participants were responding to with abstract answers. These participants often answered my questions by talking about how different people might use the lessons or might answer a question, rather than discussing what would work best for **them**. The following example from a real interview illustrates this problem:

<p>Ellen: <i>“I am trying to figure out when is the best time for students to do these lessons. Was this the right time to do these lessons, or would you have rather done them earlier or later in the semester?”</i></p> <p>Participant: <i>“Well, for non-Environmental Studies concentrators, the concepts are applicable... The language is accessible to high school kids...”</i></p>

¹⁸ These changes in wording are **not** reflected in my interview protocols.

I decided to change my interview protocol by frequently emphasizing the phrase: “*For YOU, personally,....*” (Draft changes appear without italics, in bold):

Ellen: “*I am trying to figure out when is the best time for students to do these lessons. **For you, personally,** was this the right time to do these lessons, or would you have rather done them earlier or later in the semester?*”

This tactic proved to be quite successful in focusing participants on their personal needs and interests.

The second change I made involved another problem: participants continually misinterpreted a few particularly unclear questions and answered them based on their varied interpretations. In the Draft 5 version of one such question, I asked:

“*If you could use these lessons again this semester, is there anything you would do differently?*”

Many respondents did not understand what I was asking and asked me to repeat the question.

To revise this question, I followed Fowler and Maglione’s advice for dealing with question problems and set a more explicit, clear context for the question (Fowler & Maglione).

I kept the first sentence, but provided participants with an example of what I meant:

“*If you could use these lessons again this semester, is there anything you would do differently. Some students have said that they liked doing the lessons in one sitting, while other students have said they would have liked individual lessons spaced out over the semester, with one lesson every two weeks. For you, if you could do these lessons again, how would you do them?*”

These changes helped me elicit responses about timing that, hopefully, reflected participants’ own learning styles and preferences.

About half way through my study tests, I made a few more minor changes to my interview protocol. I started to ask study participants if they would return to do the lessons and which lessons they would want to do. At that point, I casually introduced the idea of a “follow-up session,” to ascertain how many participants would actually take the initiative to set up a “mini-session.” As previously mentioned, 1 student scheduled a mini-session, to repeat the Question Lesson. Also, in some of the later interviews, I occasionally added a question about how comfortable participants felt about using

“hypertext,” but I did not consistently ask all participants this question. I also asked a few participants directly if they redrafted the questions in the lessons, or if they found themselves clicking immediately to the new draft.

Follow-up: survey questions

Approximately one and a half months after conducting the last study test session with participant students, I asked all 15 test participants to respond to two follow-up survey questions. These questions were part of a written course evaluation for ES 126 (see Course Evaluation). One of these survey questions is a “rating” question on the usefulness of the Web lessons. I used a rating question to better understand how participants judged the utility of the Web Lessons and how they compared these lessons with other course components of the ES 126. The second follow-up survey question was open-ended:

Was there anything about the Web Lessons that stands out in your mind? Anything that was particularly helpful? Please explain.

I intended this survey question to gauge what participants recalled from the lessons and what, if anything, did they like or use in their own protocols.

METHODS FOR IN-DEPTH ANALYSIS OF THE STUDY TEST DATA

I used qualitative methods to analyze the data I gathered in my pilot and study tests. Earlier in this chapter, I briefly discussed how I analyzed my pilot test data. In this section, I describe my in-depth, final phase analysis of my data-- the analysis that involved detailed renderings of what happened during the tests, repeated readings of my data, and comparisons of the test data and my field notes. This reiterative process of analysis enabled me to identify my findings-- common themes, events and references in my observational and interview data.

My in-depth analysis began with my first pilot test, and continued long after I completed the study tests. Some of my analytic findings actually surfaced during the first few pilot tests. As Ely, et al., explain “qualitative research involves almost continuous and certainly progressive data analysis from the very beginning of data collection.” (1991)

Yet, most of my *substantial* data analysis took place after I finished all the tests. It was not until the final phase of analysis-- once I sat alone with the data and stared at it-- that I was able to pull out and engage important, telling ideas in my data.

Recording & Transcribing Data

The methods used to record and transcribe data are critical components of the research process. These methods are one of the means by which qualitative researchers transform social reality to analyzable data (Lofland, 1995). During the study test sessions, I took notes on almost everything that was stated and wrote verbatim those utterances most related to the task at hand.

I chose to write down participants' comments, rather than tape record them, for 3 reasons:

- I was looking for participants' precise responses to questions about very specific components of the lessons. I did not want to collect more nuanced data, such as the inflection in participants' voices or the language they used in a personal narrative;
- Participants' answers were rarely more than 2-3 sentences; and
- The interviews, overall, were fairly short in duration. Except for one 45 minute interview, the interviews lasted between 5 and 25 minutes.

While taking long-hand notes satisfied my data collection process, this method did have its shortcomings. I am certain that I missed a few comments while I was taking notes, because I could not write fast enough or because listening to the participant preoccupied my attention.

Throughout the tests, I also wrote down my own thoughts about how the participants were using the lessons and about the lesson content. For me, the first few lesson sessions often launched a personal, creative brainstorm of ideas. Looking at the lessons over participants' shoulders would open my eyes to many mistakes in the content, graphics, layout and structure. For example, during one participants' session, while he used the "piloting" section of the language lesson, I noted:

eb: <input type="checkbox"/> add airplane [icons] here <input type="checkbox"/> add "Back 2 times" to the end of the piloting lesson.
--

As suggested by Margot Ely, *et al.*, I differentiated these personal notes from the rest of my notes by the letters “ eb” before them or by a box (1991). During my circumstantial analysis and problem-solving, I checked off () the ideas that I incorporated into the lessons..

Transcribing the Data

I used an iterative process to transcribe the verbal data, repeatedly rereading and reviewing my protocol notes. First, I created a spreadsheet to record the amount of time individual participants spent on each lesson and on the interviews, data that I had noted on the protocols during the tests. I then went on to transcribe all data I consider to be “non-quantitative,” meaning any data that I could not immediately record in a quantifiable form. This included:

- any comments participants made during the lessons, both to me and to themselves;
- if or when they read selectively; and
- all comments and responses during the interviews.

I did **not** transcribe any data that I had recorded quantitatively by checking in a box. For example, I did not transcribe whether or not I thought Rudy “read, skimmed or skipped” a component of a lesson. In the process of transcribing, I probably lost a small amount of data because I could not decipher my handwriting, the comments were incomplete or cut-off, or because the comments did not make sense to me.

Redefining What Constitutes “Data”

When I started to transcribe my data, I did not initially identify my personal notes about lesson ideas as data. As mentioned above, I had recorded these ideas directly onto my protocol and marked them with a box (). After the first few sessions I made immediate changes to the lessons based on my notes, so I checked off () some of my ideas, directly on the protocols.

Yet, when I started to transcribe, there were still many ideas written on the protocols that I had not incorporated into the lessons. As a result of my (mis)identification, I did not transcribe any of my notes while I was transcribing the first eight or nine protocols. But

one day, I realized that these notes were, indeed, data, and if I did not transcribe them, they might get lost or overlooked when I was later revising the lessons. I decided to account for them, so I returned to all the protocols, found the information I had previously skipped, and transcribed it.

Analyzing the Data In-Depth: The Transformation from “Transcripts to “Findings”

I analyzed my transcripts by repeatedly reading my data both in protocol form and as it was organized into question categories, once I had transcribed it. As I read, I looked for recurring or unique references, themes, and events. I organized and re-organized the data into increasingly appropriate categories over the course of 2 1/2 months, all in a word-processing program on the computer. This process of rereading and reorganizing also helped me narrow down and condense my data into distinct findings.

Take, for example, participants’ comments and my observations that related to the technology of hypertext and computers. As I transcribed, I organized participants’ comments into categories that corresponded with the questions to which they were responding, or the specific action points I was observing (See Transcript 1). At first, the categories I used to organize my findings were broad and all-inclusive. For example, the technology category included:

Using the technology

Elaine: didn’t know where ‘back’ was.

Greta explained that she did not look at the final draft of the L (the elephant), but then later came back to see it because she was still curious.

Ilana describes herself as “trigger happy” with the mouse and clicking.

I then read over this transcript numerous times, and re-organized the comments, as not every response fit only with the appropriate question. With the responses about computer technology, I kept many of the question categories but differentiated between types of answers (i.e. positive/ negative; too easy, OK, too difficult). I also divided the technology category into a few separate sections, such as moving and links:

TECHNOLOGY

moving

Elli: didn’t know where ‘Back’ was.

Stuart wasn't sure how to maneuver in Web page at first-- how to scroll down. After he figured that out, he was fine.

links

Greta: *"I wasn't sure which icons were graphics and which were references."*

Reed: In regards to a link, *"That frog won't get me anywhere, but it's a cute one."*
(she thought one frog was not a link when it actually was.)

endings/beginnings/accidents

Maggie left the Question lesson in the middle.

Ricardo accidentally went to the end of the lesson during the AO.

I often shuffled around comments to other question categories, where they made more sense. Some comments could fit in more than one category.

Additionally, I created a few new categories. For example, when I came across any comment made about the Language lesson, I usually kept the comment in the original question category, but also included it in a new category of "Language lesson comments." Any comments made during the pertinent lessons went into that lesson categories. This process helped me distill my data into concise findings with clear, supporting evidence.

The Decision to Forego In-Depth Quantitative Analysis

As I reviewed my data, I gradually resolved that the quantitative data I had gathered was not consistent, reliable, or plentiful enough to be considered quantitative. This included observational data such as:

Y. Frog: Craft!	<input checked="" type="checkbox"/> Read	<input type="checkbox"/> Stop & Think	<input checked="" type="checkbox"/> Srte3= Frog- Drafting
	<input type="checkbox"/> Skim	<input checked="" type="checkbox"/> Pause & Think	
	<input type="checkbox"/> Skip	<input type="checkbox"/> Click Immed.	<input type="checkbox"/> Word= Drafting Lesson

Four major factors contributed to this decision:

1.) Sample Size

My sample population size of 15 study test participants was too small to yield valid quantitative results. Ragin explains that one of the fundamental provisions of quantitative analysis is to "understand basic patterns and relationships... [by] examining patterns across many cases. Focusing on any single case or on a small number of cases might give a very distorted picture." (Ragin, 1994)

2.) An Abundance of Variables

The study context was not structured to limit the number of variables as is required for quantitative analysis. Ragin explains that the quantitative approach emphasizes “parsimony-- as few variables as possible to explain as much as possible.” Yet my quantitative observational categories were difficult to verify, and thus inconsistent and undependable as variables. For example, before doing my observations, I did not develop exact definitions of what constituted “reading,” “skimming,” or “skipping.” These were largely circumstantial decisions, and thus largely open to distortion.

3.) Contradictions between Observations & Students’ Self-Reporting

I asked only a few students the follow-up question: “In your opinion, how often did you redraft examples in the lessons?” This question referred to how often they redrafted throughout the lessons. One test session, in particular, illustrated the contradictions between my observations and participants’ reporting of their activity: By the end of the test session I had decided that the participant was skimming most of the sections, and then she turned to me during her third lesson and stated, “I read very fast.” Clearly, my judgment of her reading rate contradicted her description of her reading rate, rendering this data unreliable.

These contradictions were exacerbated by language barriers. Two of the participants were international students and spoke English as a second language. The rate at which these participants read or skimmed might be dramatically different than the reading rate of a participant whose first language was English. Another compounding variable were the differential speeds of the IBM and the Mac computers. The Mac’s slower speed in progressing to a new page could have affected my ideas about participants’ rewriting patterns.

4.) Inconsistent Data Collection

I did not record my quantitative data consistently, because collecting this data required my close attention and because there were frequent interruptions during the lessons. I also became increasingly aware that I did not have the skills to accurately collect or assess data that I had set out to collect with my quantitative questions, data like the psychology of the human-computer interface. As Ely explains, applying any particular research method means understanding and applying the congruent procedures for analysis (Ely, p. 142). Lastly, I knew that I had collected a great deal of valuable qualitative data, on which I wanted to focus my attention.

This chapter describes, in depth, the methods used to test the SIQ Lessons. The following chapter outlines my findings from the study tests.

Chapter Six

Study Test Findings & Interpretation of Findings

In this chapter, I organized my 22 major findings from the study tests into three categories:

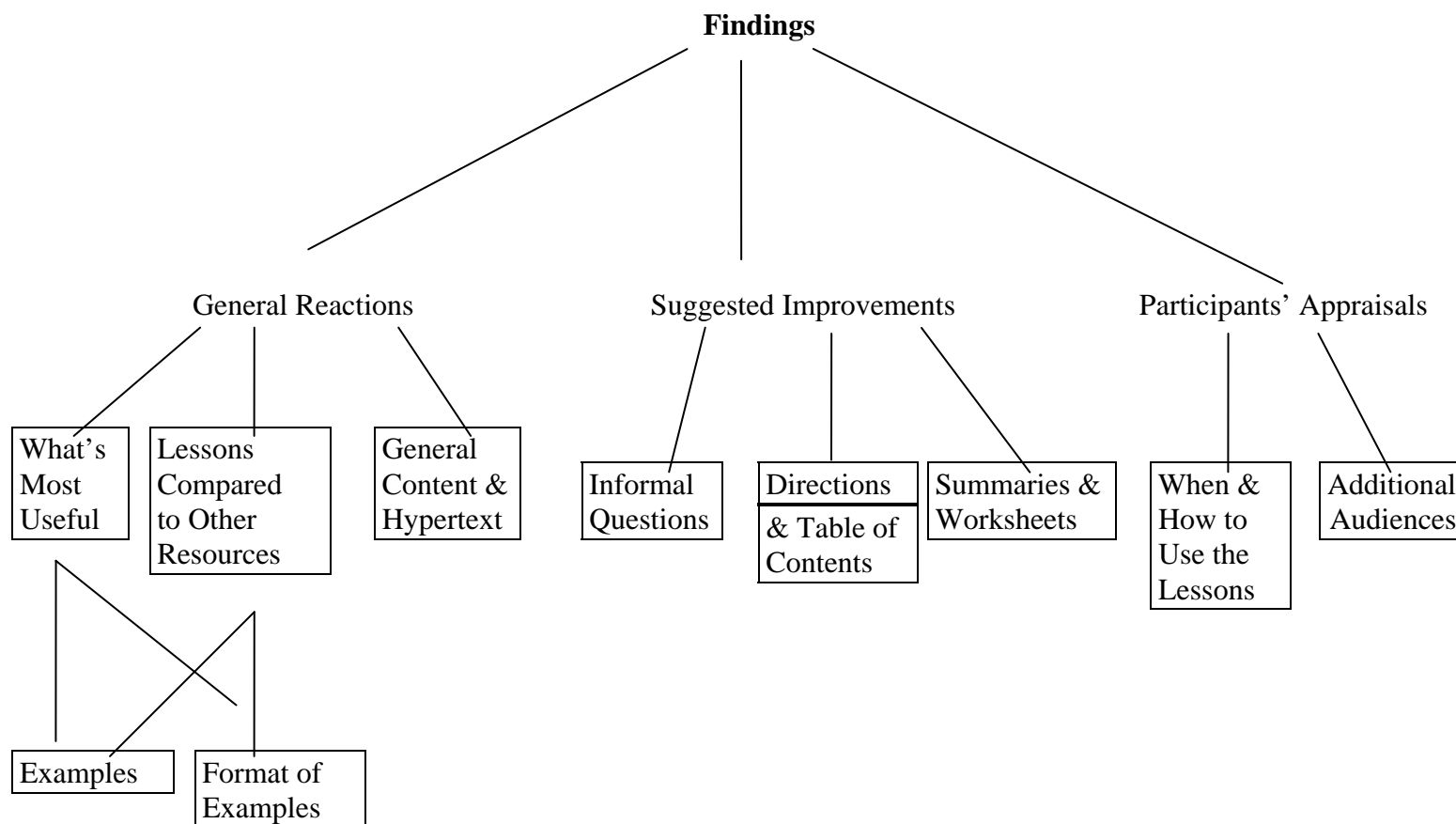
- General Reactions from Participants (Findings 1-11),
- Suggestions (Findings 12-15), and
- Participants' Appraisals of the Lessons (Findings 16-22).

At the beginning of each section, I explain the overarching purpose of each category.

These three categories are listed in order of importance, from most important to least important. I determined their importance according to their significance for my thesis, their implications for the SIQ Lessons, and for the ultimate completion of the hypertext Toolbox.

My interpretation of the findings appears in this chapter, as well. My interpretation of the findings is generally included after each category.

Matrix of Findings



GENERAL REACTIONS, FINDINGS 1 - 10

The findings in the category of “General Reactions” relate directly to the existing content of the lessons, such as what participants like best about the lessons and what stood out in their minds. These findings were typically the findings that grabbed my attention. I feel they capture what participants saw in the Lessons.

General Reactions: What Participants Said Was Most Useful

FINDING 1: Overall, most participants (11) responded positively to the lessons. One third of the participants (5) used the word “good” to describe the lessons, and the same number of participants used the word “fun.”

- “I think it’s a really good tool.”
- “I enjoyed that! I like the Web.”
- “It’s kind of like a tutor for you right there.”
- “Fun, informational, neat, thought-provoking”
- “Swell. The graphics and the language are very user-friendly and fun.”

FINDING 2: Of the eight participants questioned about hypertext, many (5) referred to the interactive, nonlinear structure of hypertext.

- “Hypertext is like a choose your own adventure book.”
- One male liked the “adventure options.”
- “Hypertext made the connections more visible
- “Hypertext is a way to get through lots of information without realizing it. You can be active, click around.”
- “Hypertext can create fragmenting in my mind.... And I get tired out by computers, staring at the screen”

Interpretation of the above General Reactions, Findings 1 & 2

A number of participants used language such as “fun” and “adventure” to describe the Lessons. I wonder how much of these reactions are a product of the similarity between hypertext and video games-- with interesting graphics, “remote control” maneuvering with the mouse, and quick reaction times. Although participants never mentioned this connection, I could certainly observe that participants’ posture and concentration while doing the Lessons-- particularly after they had been on the computer for about half an hour-- seemed quite similar the glassy-eyed looked that people get after playing video games for a long time!

At this point in history, Web-based hypertext is relatively new to the market and to most of these users. Yet currently, the Web is growing incredibly quickly, doubling every four months or so (Nielsen, 1996; Pitkow and Recker, 1993). I would be curious to know how much of the users' enthusiasm stemmed from the novelty of hypertextual nodes of reading, or their perception that hypertext is the hip, new thing. Provided that the Web continues to grow at its current pace, will users in five years from now still consider these lessons fun and adventurous?

On this same point: will users find the content in the Lessons more difficult to absorb and remember, because users associate the lessons with the Web which already contains *so much* information? Right now, there is much discussion about the difficulty of sorting through all the trashy or self-promoting information on the Web, in order to find valuable information. Will this reputation affect how users perceive information presented in a Web-based format? Or will material that actually has content stand out?

General Reactions: What Participants Said Was Most Useful (con't)

FINDING 3: Participants referred to a range of characteristics that they liked about the lessons. The lessons' "examples" and the format of these examples were cited most frequently as the characteristics that participants liked about the lessons.

One third of the participants mentioned the examples when asked "Was there anything you especially liked about the lessons," or during other related interview questions.

- "I liked how you'd use examples throughout- this was one of the reasons why it was so clear. Right and wrong examples."
- "It's helpful to see different ways of fixing [questions], especially several different examples."
- "Examples are timely-- delivered in a timely way. They're good examples because they get right at the content."

Four (4) participants also mentioned the examples while talking about the lessons they found most useful.

- "The Answer Options Lesson had a lot of examples, different types of questions."
- One female really liked the Structure Lesson's "examples of demographics, we didn't talk about that in class."
- "The best one was the Wording Lesson because it... showed good and bad examples and it allowed time to think in between."

FINDING 4: Participants rarely talked about the examples without mentioning the way the examples were formatted; almost every example required users to click to the next screen to see a better redraft. Five (5) participants stated that they liked this format.

- "The set-up was helpful- having to click a question, then seeing the problem, then how to fix it."
- The set of lessons "makes it really immediate, and forces you to sit down and come up with better questions. It's daunting, but in a good way."
- "...With a book, I'd look right down. [Here] I had to do something before I saw what was wrong with the question."

FINDING 5: Although many participants liked how the lessons encouraged them to redraft questions, this did not guarantee that participants actually redrafted. When asked, only two (2) participants stated that they rarely or never redrafted questions.

- "I didn't usually redraft the questions."
- "I never rewrote- I'm a lazy person. I automatically would be critical when I read it. When I read it, I got a general idea [of what was wrong]. I have problems taking it in because of dyslexia... I might do it if I could type it out."

Four (4) participants explained that they only redrafted some of the time. When they did, they often formulated a vague redraft in their head, but did not focus on the exact wording of the question.

- “I was redrafting questions in my head, but not specific exact wording. I always stopped a little bit. I’d say, ‘I know that question is leading,’ or ‘my answer choice wouldn’t be yes or no.’”
- “Usually- 65% of the time- I thought about it. I didn’t rewrite the whole question, but I picked out parts that were wrong. Sometimes- 35%- I just clicked over.”

FINDING 6: Based on my observations and follow-up questions, only a few (2) of the participants actually tried to redraft the example questions on a separate piece of paper. These participants only used this strategy with 3 or 4 example questions.

FINDING 7: Five (5) participants commented that the lessons should include a place where they could (or would have to) type their redrafts of the example questions.

- “Needs some way to make me try to come up with better wording, and not let me cheat.”
- “I never rewrote... I might do it if I could type it out.”
- “Write it down? No way- it’s not happening... Do people really write things down? I would’ve typed into a little box [on the screen].”

Interpretation of Findings 3 - 7 (Redrafting example questions)

I was pleasantly surprised that participants were so interested in and enthusiastic about the lesson examples. After spending so much time “up close” designing the lessons, it was refreshing to hear what users noticed most about the lessons.

Few participants tried to redraft the example questions, and almost no one took out a piece of paper and tried to do so. Some users said they should be “forced” to redraft questions. The notion of forcing students to redraft could have interesting implications for future testing and development of the final Toolbox. I would like to insert a mechanism into the Lessons, so students have to type in a box and send the words into cyberspace before they can see the next redraft.

Yet, even with such a mechanism, there is no way to force students to write anything intelligible-- students could quickly figure out that they could type in random letters and hit the return key in order to get to the redrafted example. In this case, such a mechanism

would do nothing to counter student “laziness,” or the simple temptation to click to the next screen. In this sense, the interactive component is fairly misleading, or at least not a guarantee that students will engage themselves.

On the other hand, it makes sense to provide a mechanism that at least encourages students to redraft. Currently, there is no incentive for students to redraft questions, nor a physically graceful way for them to do so. The most motivated users would have to reposition their hands from the keyboard to a pen and piece of paper if they were actually going to redraft an example. Additionally, some people (myself included!) compose better when typing, rather than writing.

General Reactions: What Participants Said Was Most Useful

FINDING 8: Apart from the examples, participants said they liked a range of characteristics of the lessons.

Many participants (6) said they liked the icons.

- “The pictures are very funny.”
- “I love those frogs. I really did.”
- “I don’t know where you found these [graphics], but they’re corny!”

A few participants (3) mentioned that they liked elements of the lessons’ layout and structure (in addition to the format of the examples).

- “I liked the separation of the information part and the questions in italics. Also, the bold and big print.”
- “I think they’re really good- the way it’s structured [into lessons], and points are clear- not too much in there to get people frustrated or lost.”
- “I enjoyed it, thought it was well-written and organized...”

There were many other characteristics that participants liked about the lessons. These characteristics did not fit neatly into a single category. For example:

- One male really like the “real world wording,” such as “*That’s Preposterous!*” and “*Hold On!*” “That would catch me.”
- “I liked the chance to do it yourself and the humor.”
- “The topics” [lesson content] and “the environmental perspective.”
- “It’s very user friendly because.. it doesn’t throw out a lot of information and it relates to what we’re doing [in ES 126].”

General Reactions: The Tone of the Lessons

FINDING 9: There was only one aspect of the SIQ Lessons that a few participants explicitly said they disliked: the tone. 4 participants made explicit remarks about the tone of the lessons. 3 participants felt the tone of the Lessons was too informal or childish, while the remaining participant said the tone was appropriate.

- “In some ways, the style is really informal. Is it too informal? It could turn people off. Puts out a feeling that social research isn’t that important or difficult.”
- “What age level is this catered to? I’ve been wondering... The way it is presented is to a lower level than 126 because... I think that it’s a little bit too happy and... cartoony, little kid picture-like. Big print. It’s not condescending.”
- “[With the redrafts,] you don’t say this is the ‘absolute right way.’ That’s appropriate...There’s a strong tone that should be maintained.”

Interpretation of Finding 9 (Informal Tone of the Lessons)

The Lessons’ graphics, inter-activity, and quick examples may have important implications for students who are being exposed to social research skills for the first time. As one participant eloquently said, “The style is really informal. Is it too informal? It could turn people off. Puts out a feeling that social research isn’t that important or difficult.” In this statement, she raises a critical issue. Although only a few participants remarked about the tone, they all tended to be participants who were more up front and vocal in their opinions. I took these comments earnestly, as explained in the chapter on Implications for the SIQ Lessons.

General Reactions: The Lessons in Comparison to Other Available Resources

FINDING 10: Participants noted that these lessons differed from their ES 126 course work in two significant ways. Overall, most participants considered the lessons useful, complementary components of the course.

First, the lessons had many examples, making the lessons more “practical” than theoretical readings.

- “A lot of stuff we talked about in class, you gave examples. Like fine tuning, conclusion, keeping questions to an 8th grade reading level.... But specific examples, we hadn’t done that before.”
- “More practical. Readings are more theoretical.... Most of these concepts were clear...The readings are weird. Some are pretty darn thick...”
- “I’m more interested in this than a book, especially in terms of the examples.”

Secondly, participants said that the computer format encouraged them to redraft these example questions.

- The set of lessons “makes it really immediate, and forces you to sit down and come up with better questions. It’s daunting, but in a good way.”
- “I liked the way it forces you to think about different questions and fix problematic questions.”
- “This looks more interactive than the readings- they’re dry. This is more likely to keep my attention span. With a book, I’d look right down. [Here] I had to do something before I saw what was wrong with the question.”

Interpretation of Finding 10 (Comparison between the SIQ Lessons and ES 126)

I asked study test participants to compare the Lessons with the course content of ES 126. This comparison enabled me to explore whether this electronic medium is appropriate and helpful for users who want to learn social research methods for environmental studies work. These questions raised the concept of social research skills, in particular, as educators teach them through hypertext. Because these participants (and many students, in general) perceive social research texts as theoretical, dense, and dry, it makes sense that the participants focused on the examples. A number of students stressed that the lessons should not be any longer than they already are. It is conceivable students said this because of personal time limitations they have for computer use or assignments outside of standard course materials.(Stone, 1984).

SUGGESTIONS: FINDINGS 11 - 15

The findings in the category of “Suggestions” were almost all findings that I could, and wanted to, immediately address. They are fairly straightforward, as implied in the title of this category. In this category, my interpretation usually follows each finding.

Suggestions: Informal Interview Skills

FINDING 11: Many participants (7) stated that the lessons did not address open-ended, informal protocols, a methodology that many of these participants were concurrently using.

- “I’m doing interviews. This doesn’t really deal with interviews. How do I link interview questions together? How to keep interview options open.”
- “This was mostly a survey lesson, but mine is open, informal... I would’ve liked to learn more about open-ended, informal stuff.”
- “Most of it seemed partial to the formal side. [In my protocol,] I’m trying to incorporate a really informal, conversational method.”

Interpretation of Finding 11

When I started to design the lessons in the Summer of 1995, I originally set out to create lessons about survey question design. I developed the Answer Options Lesson and the Structure Lesson with surveys in mind. Towards the end of the summer, my thinking about the lessons changed, and I decided the SIQ Lessons should include the topic of interview question design, as well. As a result, the first version of the Answer Options and the Structure Lessons are geared towards surveys, whereas the Question Bias and the Language Lessons apply to both surveys and interviews.

In the study tests, though, I presented the lessons as a tool for *both* interview and survey question design, without clarifying which lessons I had written for which methodologies. In light of these facts, Finding 11 does not surprise me.

This finding also challenged me to imagine what I could include in a lesson about informal interviewing and designing informal questions. Much of informal interviewing involves becoming comfortable with oneself as a researcher, as well as being practice and skilled enough with one’s protocol to deviate from it and be conversationally appropriate (Ely, 1991). Given that participants liked examples, it is possible I could show different

ways an interview could go, depending on the researcher's questions and other, uncontrollable variables. For example, each section of the interview could include three different, possible outcomes, depending on the question the interviewer asks (or how loudly the baby is screaming in the background). Such a lesson could certainly sound like a Choose-Your-Own-Adventure book, if further testing found this appropriate!

Suggestions: Directions

FINDING 12: Some participants had trouble using the technology of the Web. A few of the participants (4) had difficulty maneuvering between and within the lessons, particularly when using the "Back" button.

- One male could not find 'Back' during his first lesson. "It was easy to follow, once I got the Web part down."
- One female, during the Language Lesson, was confused about how to return to the lesson with the 'Back' button.

A few participants (3) accidentally left the lessons. Also, a few participants (3) could not, or did not accurately, distinguish between regular icons and icon links.

- "I wasn't sure which icons were graphics and which were references."
- One female said, in reference to a link, "That frog won't get me anywhere"

FINDING 13: The lesson content needs more introductory information and directions. Within the first few minutes of beginning their session, five (5) participants requested directions.

- "When they say 'write a question' should I write it out or say it in my head?"
- During his first lesson (Language), one male asked "Where's the 1st redraft?"
- "So I can just go in any order?"

At least three (3) participants were confused about components of the lessons, potentially due to the lack of information provided in the directions or the table of contents. (Also see secondary findings on Hypertext)

- "In the Wording Lesson, I clicked out when I was somewhere in the middle of there, then I went to Language Lesson because that was what I wanted."
- During the Structure Lesson, one female asked, "Is this something you'd ask in a regular survey?"

Interpretation of Findings 12 - 13

I was surprised that participants did not know how to use Web-based hypertext, but this was largely my own researcher bias. Furthermore, it is likely that the Web technology confused more than four participants, but these participants did not say anything and just

faked their way. This seems quite likely, considering I was their ES 126 T.A., and they were supposed to have explored the Web for the course. They would probably not ask for directions. In response to Finding 12, I created Guidelines (see chapter on Implications).

Suggestions: The Table of Contents

FINDING 14: Many (10) of the comments about the order of the lessons implied that the order was not important, and that I did not need to suggest an order.

- “I went in order, cause I figured I was going to see them all anyway.”
- “It doesn’t really lend itself to an order.”
- “The way they seemed organized. It’s not like they suggest a natural starting point-- they all seem integral.”
- “Definitely do not [suggest an order] because people will do it their own way- especially because of my experience doing the Web.”

Although none of my questions directly addressed the table of contents, some of the participants (4) commented that it did not provide enough information. These comments typically arose when I asked participants about the order of the lessons.

- “Tell people at the start” which lessons are about what.
- “I didn’t know what was under each [lesson].”
- “More definitions. Maybe that should be said in the beginning of the lesson- like language sort of questions here are more guided and open-ended- or put it on the menu with the click option...”

Interpretation of Finding 14 (Responses to the Order and Table of Contents)

After doing four or five interviews, I felt that the question about the order of the lessons was not very helpful or invoking insightful responses. I decided to continue to ask participants this question, to keep my protocols as consistent as possible. But, as I analyzed the data, I realized that this question, in fact, provided very useful secondary information about the lessons. Participants’ responses revealed that they did not understand the table of contents and that they wanted to know more, at the very beginning, about what was in each lesson. Meetings with my secondary reader also established that my Table of Contents be more explicit about the content of each lesson listed. I further elaborate on this issue in the Implications chapter.

Suggestions: Summaries and Worksheets

FINDING 15: When asked if the lessons needed a summary or a worksheet, two thirds (10 out of 15) of the participants said that they thought that the lessons needed a summary of some type, yet they disagreed about the format and location of this summary.

Three (3) participants thought *each* lesson should have a summary:

- “Add a conclusion at the end of each lesson- especially the Wording Lesson.”
- “A summary of main points. Hypertext can create fragmenting in my mind. These are problems and solutions. At the end of each lesson, an overall summary.”

Four (4) participants thought users should have a paper worksheet to accompany the lessons. This worksheet would include a summary. Three (3) of the these four (4) participants specified that it should have places for users to write notes, while at least two (2) other participants commented that they wished they had taken notes.

- “A worksheet- if it’s a 1 pager with place to write, maybe a reminder... Nothing else within lessons because I have them in my notes.”
- “.... Something to take home.”
- “A worksheet is a really good idea. With a place to take notes, too.”

Two (2) participants thought there should be a final overview at the end of all the lessons, on the computer screen.

- “I would go back and review myself. You could say what was most essential.”
- “A final overview, with places to click, bullets”

The four (4) remaining participants either did not personally want a worksheet, or thought that a summary or worksheet would make users “lazy.”

- “For me it worked fine, but I can see people wanting that.”
- “[Users] should be taking notes on their own. A summary will tempt students to not go through all the lessons.”
- “This works as is... Bulleting major points makes students lazy...”

Interpretation of Finding 15 (Summaries and Worksheets)

This finding raises the importance of tailoring the Lessons to students who learn best from either print media, which they can refer back to at their own discretion, or from multiple media, such as computers, print and spoken word. One pilot participant said that he would not remember information he saw on computers if there was not “something to take home.” Another student said that she had dyslexia, which made getting through the Lessons more difficult and redrafting less likely. (See Implications chapter for the changes made to the Structure and Question Bias Lesson)

Conversely, it is important to examine this finding in context of the question that elicited participants' answers. The question I asked that generated Finding 15 was a leading question. I initially asked:

Is there anything else the lessons should include, to reinforce what you're learning?

When I orally asked participants this question, I usually added examples, "...like a worksheet or summaries?" I added these examples because participants did not initially understand what I was asking. These examples-- in addition to my question-- may have unintentionally steered the conversation in the direction of supplementary materials, and away from potentially addressing what participants wanted to change in lessons.

One participant, Abe, had to answer the interview questions on his own. After he looked through the lessons, he wrote his answers directly onto the protocol and then gave them to me the next day. His written responses and his impression of what I meant by some of the questions intrigues me. Sometimes he interpreted far more interesting, useful questions than I had written!

Abe gave more input on what he wanted out of the lessons than other participants did. For example, when asked: "*Is there anything else I could have done with the lessons, that might reinforce what you're learning?*", he replied: "Help me relate my questions to the examples of questions." I interpreted this answer as a request that the Lessons should encourage users to apply lesson concepts and examples to their protocols. This honest answer may have resulted from a combination of:

- the privacy Abe had while answering the interview questions;
- his own astute ideas; and
- the absence of my leading probes.

Because of the poor quality of this question, I did not accept participants' responses at face value.

PARTICIPANTS' APPRAISALS OF THE LESSONS, FINDINGS 16 - 22

These findings largely reflect participants' perspective on how the lessons applied to them, as users, at that moment. The general tone of these findings is that the lessons were "positive reinforcement." A few participants said the lessons were too easy and poorly timed. Such findings were to be expected from ES 126 participants, as these participants had taken ES 126 and had already been exposed to most of the Lessons' ideas in their course work. Except for the first finding in this category, finding 16, I am less concerned with this third category. I believe these responses are out of context; they involve the timing of the lessons, which was late for most of the ES 126 students. Ideally, late timing will not be an issue when students actually use the lessons.

How Participants Appraised the Lessons

FINDING 16: Many participants (9) evaluated the lessons based on the relevance of the lessons to their own social research protocols.

- "I... found some parts helpful. I breezed through some stuff that is not related to my project."
- "They [the lessons] gave general ideas for my own questions."
- "I liked the Language Lesson... because that's what I'm struggling with now."

For example, five (5) of the eight (8) participants who cited the Answer Options Lesson as "the least useful lesson" explained that this lesson did not relate to their own research protocols.

- One male thought the Answer Options Lesson was least useful "because I'm not interested in drafting surveys with closed answers..."
- "I'm not doing surveys, I'm doing more open-ended questions."
- "The Answer Lesson didn't relate as much..."

FINDING 17: After the first five interviews, I began to ask participants which changes, if any, they would make to their own protocols after doing the lessons.

Although the questioned participants mentioned a range of changes they planned to make, six (6) of these participants mentioned the re-wording their questions and three (3) participants talked about adding or adapting their introductions.

- "I'll work on my intro and demographic questions."
- "They got me thinking about different drafts, especially participants' boredom and attention span. My questions are too test-like."
- "...I'm definitely going to repeat important questions..."

Interpretation of Findings 16 & 17 (Applying Lesson Concepts to their Protocols)

Going into the field, I wanted to assess how participants related the Lessons to their own protocols-- did they take out their own protocols and write out notes? Or did they look at the Lessons as a strictly academic tool? This finding implied that that users did, indeed, make a strong connection between the Lessons and their protocols. This critical finding provides evidence in my ongoing evaluation of participants' understanding and application of the lesson content-- evidence that participants took initial steps towards using the Lessons to inform their protocol development and revisions. If students are using the Lessons in light of their own, relevant research needs, it seems more likely that they will apply lesson concepts.

Also, the students who said they would make many changes to their protocols after doing these lessons were typically the same students who were struggling most with social research concepts and protocol development in ES 126. This finding implies that the Lessons provide a useful resource to students who are struggling with social research methodology. It might be appropriate, in the future, to tailor the Lessons to different levels of difficulty.

Participants' Appraisals of: The Difficulty of the Lessons

FINDING 18: When asked about the difficulty of the lesson content, thirteen (13) of the fifteen (15) participants thought the lessons were either "too obvious" (8) or "about right" (5).

Many participants (8) said that the lessons were below their level. 7 of these participants cited their experience in ES 126 while assessing the lessons' difficulty.

- "I think it'll be really useful to people without a background [in social research]... I find it somewhat useful, having taken the class."
- "A little below my speed-- But hell, I'm taking a class on the stuff."
- "Some problems were obvious because of class."

A third (5) of the participants felt the lessons served as "positive reinforcement" of the information they already knew. Four (4) of these participants also said that the lessons were below their level.

- "A lot of it is positive reinforcement.... I feel comfortable with stuff- yeah I knew that. It reinforced what I knew, but wasn't repetitious."

- “Good. Obviously I understand where things were going. Some was reinforcement and general concepts...”
- “All 3 [lesson topics], I’ve done recently so this is just re-affirming.”

A third of the participants (5) thought the lesson’s level of difficulty was “about right” or “not too simplistic.” Four (4) of these five (5) respondents adopted the language I had used in the question and/or used negative terms, such as “not too simplistic.” 1 of these respondents also contradicted herself, as well. She said that the lesson difficulty was “about right,” yet the lessons were “appropriate for high school students” and they “should not be part of the 126 curriculum.”

- “About right. A few things I’ve seen, but not to say they’re too simplistic.”
- “Easy to navigate, not too simplistic.”
- “It’s not difficult at all, but that’s OK.”

Interpretation of Finding 18 (Lesson Difficulty)

As stated in the introduction of this chapter, the fact that study test participants already had extensive exposure to the concepts explored in the SIQ Lessons largely tempered their responses. These lessons appear to be too simple for ES 126 students, at this stage in their course work. The humorous content, hypertext format, and tone could have affected these perceptions, as well. As mentioned earlier, I could tailor the Toolbox to a range of skill levels, customizing lessons for different skill levels in future development of the Toolbox.

Participants’ Appraisals of: When & How to Use the Lessons

FINDING 19: There was no consensus-- and in fact a wide variation-- among participants on the best time in a semester (or project) to use the lessons.

Six (6) participants remarked that “this was a good time”- approximately 6-8 weeks into the semester. Three (3) of these participants also said, or implied, that students could do the lessons a little bit earlier.

- “This was a pretty good time [in the semester]. Perhaps a week earlier, but not at the beginning of the semester.”
- “This was good. Right after pilot. I’m in my last major revision of protocol.”
- “It’s good now. I can look for things. [Now I’m] wise, so I knew something was wrong and didn’t know what.”

Three (3) participants said the fourth or fifth week of class, or after the first pilot test of the protocol.

- “Beginning of Oct.-- 2 weeks ago. Earlier, right after the 1st pilot of the protocol.”

- “A bit earlier... before Strauss & Corbin and Lofland, because of simpler terms.”
- “2-3 weeks ago-- right after I decided what I wanted to do, when you’re just thinking about designing questions.”

Four (4) participants suggested the around the second or third week of class, or after users’ first protocol draft.

- “Not at the very beginning. Anytime after the first week of class.”
- “Earlier. The 2nd or 3rd week. People wouldn’t go til later.”
- “Earlier in the semester, after 1-2 drafts.”
- “After 1 draft-- not before they start [drafting].”

FINDING 20: There was also no consensus among participants about how the lessons should be assigned (or used) -- in one session/sitting, over a number of different sessions, or at the discretion of each user.

Four (4) participants said that they preferred doing the lessons in one session.

- “It’s good to do them all at once. If I did it again, I would do it this way.”
- “Definitely all at once. I don’t know if I cruised through it compared to other people. I’d have no problem sitting here with my questions.”
- “All there [available to do at once]. I wanted to play with it. The first one didn’t seem too long, so I could do the rest.”

Four (4) participants suggested the lessons would be best if students could use them in two or more sessions.

- “Maybe they’d be good going along. I like how it all works together. It could reinforce reading or what we’re doing in class.”
- “I could read it all, but my absorption might be better if I did 1 or 2 at a time.”
“Not all at once... You have to deal with fatigue...As we deal with each issue.”

Three (3) participants thought users should have “free rein” over when and how they would use the lessons.

- “Free rein. I thought it was a lot. I got to a point where I decided on what to concentrate on or whiz by. It also might be better to look at 1 or 2 relevant lessons more than once.”
- “Make it available from the very start, open use, as they wish to discover, unless there’s something we want students to discover on their own.”

FINDING 21: Four (4) participants recommended additional audiences (or, in one case, a more appropriate audience) for the lessons. These recommendations were of participants’ own accord, and not in response to any of my questions.

- “When I was in ES 11 I had to write a survey. We over-analyzed one part. This would’ve been helpful.”
- “Non-ES students. The concepts are applicable... The language is accessible to high school kids in environmental groups.”

- “The appropriate audience would be high school students.”

Interpretation of Findings 19 - 21 (How to use the Lessons)

A number of factors may have influenced these, and all other, responses. For example, participants may have been less concerned with applications of the program, and instead thinking about an upcoming exam or a paper they had to write. Brown students, like most students, tend to be under academic stress and time pressures. Also, the lesson tone and clipart could have contributed to who participants perceived to be an appropriate audience of the Lessons. The participant who suggested “high school students” later on said that this suggestion was based on the presentation of the lesson. I, too, believe her perception was largely shaped by the informal, even playful presentation of the material, with icons and large fonts. I can suggest ways for professors and students to use the lessons, but the timing of this application is largely out of my control. Furthermore, I will need more research with students who have not taken a social research methods course to determine when is the best time for students to use these lessons.

Participants’ Appraisals of: the Effectiveness of the Lessons

FINDING 22: A total of eight (8) participants returned the ES 126 course evaluation containing follow-up survey questions about the SRT Lessons.¹⁹ In those returned evaluations:

- 5 participants rated the lessons as useful,
- 1 participant rated the lessons as somewhat useful, and
- 2 participants did not respond.

Three (3) participants also answered to the written response question about the SRT lessons.

- “A good intro to the process of qualitative research. Good tool to fall back on during protocol/interview time. Would be good part of ES 11. Nice job, Ellen.”
- “These really helped me in refining my questions.”
- “Yes, the part on ethics. Maybe you could be more specific about the unexpected ethical dilemmas we can encounter. Also how qualitative or quantitative is used and why. I would like to know also more about the purpose of quantitative/qualitative research. I really liked the questions, how

¹⁹ Ten course evaluations were turned in, but two of these evaluations did not include the rating question.

some can be leading- maybe try to give more complicated examples where the solution is not so evident.”

Interpretation of Findings 22

As discussed in my chapter on Interpretations of Research Methods, these findings did not help me evaluate if or how students applied lesson concepts.

This chapter delineates the findings of my study test research. In the following chapter, I discuss my interpretations of both the methods applied in the study tests and the methods used in the other forms of data collection, such as my informal observations and my secondary research on HTML design and evaluation.

Chapter Seven

Interpreting the Research Methods

This chapter includes my interpretation of the research methods I applied in the study tests and in other forms of data collection that I employed. Below, I reflect upon these methods and explore some of their limitations.

Background Research & Limited Time Frame

Research projects are rarely conducted without external pressures and time constraints; my pilot and study tests were no exceptions. It was not until early October '95 that I decided to use the SRT lessons as my thesis project. In late October, the opportunity to test the lessons with ES 126 students caught me fairly off guard.

As a result of this time pressure, I did not do thorough background research on product testing and on educational hypermedia evaluation before testing the lessons. There exists a rapidly growing body of knowledge about observational, survey and interview tools for testing electronic educational programs-- and to my disadvantage, I knew very little of this information when I began my tests (Nielsen). The Quis 7.0 survey, developed by the Human-Computer Interface Laboratory at University of Maryland (see Appendix) is one such protocol (Slaughter, Norman & Shneiderman, 1995). I discovered these sites long after my tests were conducting. They did provide some insights into various ways that researchers use qualitative methods to evaluate computer systems. An even equally rich body of information exists regarding basic product testing techniques, which I did not have a chance to access before the tests, either.

Over the course of the school year, I was able to meet with my second thesis reader, Elli Mylonas, a number of times. She primarily taught me that I needed to apply certain elements of Web page design, such as a narrower page width. She also referred me to a number of texts on hypertextual writing, Web page design, and user interface program evaluation. These texts, along with periodic Web-crawling (meaning, exploring different

pages on the World Wide Web), helped me gather ideas about lesson design and format. They also provided some assistance in learning document markup (i.e. Hypertext Markup Language, or HTML).

Had I been familiar with research on hypertext design, user interface (UI) evaluation, and product testing prior to conducting the tests, I could have avoided problems in two different areas:

1. Quantitative Data Collection

I spent a great deal of time developing and applying the quantitative component of my observational protocol. This component of my tests was discarded for purposes of this round of testing. Familiarity with observational protocols that had goals similar to mine-- particularly protocols from the field of educational hypertext program evaluation-- would have helped me develop a better, more functional observational protocol.

2. Feedback on Hypertext Design

When I did the study tests, a major goal was to determine how participants used the SRT lessons as an educational tool, for environmental studies application. As a result, some of the data I gathered in the study tests concerned basic design elements of hypertext. For example, I found that participants had difficulty using the "Back" button, and that they need better directions at the beginning of the lessons. Although many of these findings were useful and informed how I developed the product, I could have learned many of these answers by reading a few books and articles on hypertext program design, prior to conducting the tests.

Reflections on Informal Data Collection

As described in the chapter on Qualitative Research in Higher Education, I have had many opportunities to participate in, assist, or observe ES social research projects over the past three years. Up until late March (1996), I did not recognize that the things I was observing, hearing and learning could be "data" for my thesis project. It was not until I had met with at least eight students outside of my participant population, analyzed my study test findings, and was reflecting on what I had learned over the year that the thought dawned on me: I could use these meetings support and enhance my thesis work. Moreover, I realized that these meetings had played a critical role in shaping what I know about students' process of learning social research methods and shaping how I think about teaching social research methods.

As a result of this after-the-fact realization, I do not have extensive notes from each session. I can recollect one or two critical issues that each person or group had to contend with (see Attached Problems Observed). My observations helped me refine my list of problems that students encounter when doing social research projects, particularly without adequate research skills (see chapter on Qualitative Research in Higher Education). These observations also inspired me to develop a rough outline of an orientation lesson, “Guidelines for Designing A Social Research Project” (see Appendix). I intended these guidelines to guide students through some of the major steps and questions they probably will face while that working on ES social research projects.

Reflecting on the Role of Study Test Participants

The participants to whom student researchers have access influence the data the students can gather.²⁰ The experience and background of the study test participants largely shaped the kind of data I could gather in these study tests. The participants already had some knowledge of and experience with social research methodology. As a result, they were in an ideal position to make informed, reflective, and critical judgments about the Toolbox and their own research needs. Considering participants’ background and knowledge, concept and content testing were practical test strategies.

On the other hand, I could not evaluate the precise effects that the lessons had on participants’ protocols, as there were too many variables at work. If I had examined participants’ protocols before and after they used the lessons, it would have been impossible to determine which changes were a result of the lessons and which resulted from the skills participants have learned in ES 126.

Reflecting on the Researcher-Participant Relationship

As discussed in the chapter on Research Methods, I had access to study test participants because I was a T.A. for ES 126. The very relationship that provided access, however,

²⁰I plan to further address this issue in the orientation section of the Toolbox.

may have created an intrinsic power imbalance. It is highly unlikely that, during the testing sessions or the interviews, participants forgot that I could exercise control over their grades! The power dynamic inherent to our relationship may have prevented some students from criticizing the lessons during the interview, or from doing the lessons faster or slower than they imagined I would think acceptable. There were certainly times when I felt that the participants saw me as a conduit to the professor-- that they could safely air their misgivings about the course to me, and in turn I would communicate their suggestions and ideas to her.

To minimize this power difference, I used my introduction to stress that these sessions were *not* evaluative quizzes or examinations at all. I also tried to be especially careful during the tests, and avoided making any comments that participants could interpret as judgments and evaluations of their behavior or answers (Fowler & Maglione).

Presumably, many of the study test participants also viewed me as a peer. A number of the study test participants commented on how they were impressed with the work I had done on my thesis. Participants may have withheld criticism, in an effort to support my work and my self-confidence. On the other hand, some students may have felt intimidated by-- or jealous about-- the amount of work I had apparently done on my thesis project. Another possible unintended consequence of this peer relationship may have been participant loss or gain of self esteem, based on their comparison of my lessons and their own academic work. Only a few participants used the time before and after the test sessions to talk about their own work. Still, it is necessary to speculate about what was *not* said and how this may have affected the data I collected.

The Role of the Researcher As Product Developer and Designer

In my study tests, it was difficult to emotionally or intellectually remove myself from the role of product developer or designer. As Ely explains, "We are too familiar when we cannot make the familiar unfamiliar." (1991) I had spent a great deal of time over the

summer and early fall developing and designing the Lessons. In some ways, I felt like an artist opening my work up to public criticism.

When I introduced the Lessons, I could have done a better job at stressing that I wanted ideas and comments from participants that would make these lessons as useful as possible. My introduction may have contributed to participants' tendency not to criticize components of the lessons very much or to give many suggestions for things they wish the lessons would do. Of the three or four participants who were most vocally critical of the lessons, one is a friend of mine (and we are comfortable being critical with each others' work) and the other was a student I had worked closely with as a T.A. and who tended to generally complain a lot.

As I reflect on the tests now, I wonder if I this attachment may have affected my presentation of the Lessons. I fear that participants saw the lessons as a fixed product, rather than a tool that could be changed, revised, even overhauled to better meet their needs. This perception may have prevented participants from giving more critical advice.

Recording the Study Test Interviews & Coding the Interview Questions

In retrospect, I would have liked to record the terms that participants used to refer to each lesson. Because I was using shorthand, I used, for example, the letter "L" whenever a participant talked about the Language Lesson. Now, I wish I knew if participants actually used the term "the Language Lesson," or if they said something like the "Language/zoo part" or the "Zoo section." Knowing these terms would help me better understand their perceptions of each lesson, and it would inform the titles that I ultimately use for each lesson and the set of SIQ Lessons.

I also could have coded the answer options in some of the interview questions *prior* to the study tests and marked them during the test, but not read them aloud. Some of the interview questions-- such as "*Which lesson was least useful?*"-- referred to a particular content and a distinct set of interactions, and thus lent themselves to this type of coding. Participants rarely answered these questions with long, complex narratives-- nor did I

intend for participants to answer this way. By using a coding sheet, I could have achieved the same results from these interviews questions, and I could have made my analysis process less tedious.

Reflecting on the Transcription Process

As mentioned in the chapter on Research Methods, I did not initially identify my personal notes as data when I first started to transcribe my data. But, ultimately, I went back and added my personal notes to the transcripts. This transcription oversight arose because some of my test notes did not fit my initial conception of “data.” I had started out transcribing all of my qualitative data in my protocol, with the intention of subsequently using quantitative methods to analyze my observations. I realized that my own ideas about the lessons were one form of “data,” as well, although they did not fit so neatly into a category of “what participants said they liked about the lessons” or “verbal responses to the lessons.”

My particular transcription method increased the likelihood that I may have overlooked data in the process of transcribing. Therefore, once I had typed up all of data, I reread the observational and interview protocols and compared them with the transcripts, to ensure I had not missed any data. This review was particularly important as a secondary check on my data transcription, but fortunately, it proved to be unnecessary, as I had not missed any data while transcribing.

The Follow-Up Survey

Both the response rate and the results of the follow-up survey questions (administered as an add on to the ES 126 course evaluation) were disappointing. Only ten (10) participants turned in the course evaluations- with six (6) of the participants answering the rating question, and only three (3) answering the written question. I learned very little from these responses for two reasons.

First, I was not clear with myself about the limitations of follow-up surveys. I wanted the follow-up questions to help me assess if lesson concepts were applied or how participants

applied them. Yet, I do not think such a task was in the scope of a few, standardized follow-up questions, or appropriate for study test participants, who had taken a social research methods course. In the second question, in particular, I wanted to gauge what participants remembered or applied from the lessons. But with the answers I received (or did not receive!), there is no way to know why many participants left the second question blank. I can not tell if participants skipped this question because they did not remember anything about the lessons, they were tired of filling out the course evaluation, or other reasons.

The second reason for poor final evaluation is that I did not adequately prepare the surveys before passing them out. I made a mistake by failing to prepare typed versions of these questions for participants. Instead, I wrote my questions onto the typed ES 126 course evaluation at the last minute, then photocopied the evaluations, and passed them out. Certainly some participants did not understand the rating question because it was either cut off the page or off to the side of the other rating questions about the course (see Course Evaluation). Participants probably did not take these questions as seriously, either, because they were obviously written in and, thus, did not appear prepared. Furthermore, the course evaluations were handed out to participants at the end of a very long class, and I did not have time to explain the questions I had written in.

The issues discussed in this chapter had differing degrees of influence over the quality of the study test data. Yet, in spite of the tests' limitations, the study tests produced a great deal of useful data. In the next chapter, I discuss the implications of the thesis research, both for the SRT and the SIQ Lessons.

Chapter 8

Implications of Thesis Research

My primary and secondary research, as well as meetings with my secondary thesis reader, opened my eyes to many changes that I could make to the SIQ lesson content and layout. In doing secondary research, I learned that the lessons need to fit to certain standards for Web pages, such as a narrower width than I had originally used. These changes were easy to adapt. The study tests, on the other hand, revealed findings that were unique to the lessons, such as the need for a lesson on informal interviewing. In this chapter, I discuss six principal changes I made to the SIQ Lessons, and I conjecture about potential future changes, revisions, and testing for both the SIQ Lessons and the entire Toolbox.²¹

RESEARCHING WEB PAGE DESIGN, HYPERTEXT, AND COMPUTER TECHNOLOGY

Input sessions with my second thesis reader, Elli Mylonas, primarily taught me that I needed to apply certain elements of Web page design, such as a narrower page width. She also referred me to a number of texts on hypertext, Web page design, and user interface program evaluation. These texts, along with periodic Web-crawling (meaning, exploring different pages on the World Wide Web) both helped me gather ideas about lesson design and format. They also provided some assistance in learning document markup (i.e. Hypertext Markup Language, or HTML).

I came across some sites and articles about using qualitative methods to evaluate User Interface computer programs. These included:

- "An Applied Ethnographic Method for Redesigning User Interfaces."
<ftp://ftp.cs.umd.edu/pub/hcil/Reports-Abstracts-Bibliography/3454.txt>
- "Assessing Users' Subjective Satisfaction with the Information System for Youth Services (ISYS)." and an evaluation program, Quis 7.0.
<http://www.cs.umd/projects/hcil/Research/1994/quis.html>

²¹ I do not discuss most of the editorial changes I made to the content of the lessons, as these primarily involved cleaning up and further condensing the text.

I discovered these sites long after my tests were conducting. They did provide some insights into various ways that researchers use qualitative methods to evaluate computer systems (see chapters on Methods for Testing the SIQ Lessons and Interpretation of Methods).

The six changes that I made to the SIQ Lessons involved:

1. Reformatting all of the lessons to meet Web standards

My secondary research and my meetings with my second thesis reader informed me that the first version of my lessons did not meet Web standards. As a result, I reformatted all of the lessons. This involved:

- Adapting the lessons for standard Web screen, which is more narrow than the full screen I originally used.
- Condensing most nodes into 1 page or less so that the full node appeared on the screen and users would not need to scroll down in order to read the text.
- Making the font smaller.
- Eliminating almost all directions to “Click ‘Back’ to return to your lesson.” I replaced these directions with word or icon links that take the user back to where they were in their lesson. For example, in Tip #4 of the Structure Lesson, the new links in the say:

Go Back to Tip #3 or **Go on to Tip #5**

This change had the most important implications for the Answer Options Lesson, which largely depended on the Back button.

2. Making the tone less informal or “child-like”

As stated in the Findings chapter, a few of participants felt the tone tended to be too casual. Although these comments only came from a handful of participants, they came from respondents who tended to be more honest in their views about the lessons. I took these comments about the tone quite seriously. I had intended the lessons to stress the seriousness of social research methodology while using humor visually and verbally, rather than play on a misleading image that social research is whimsical or self-evident. The tone of the SIQ Lessons, Version 2, is still humorous but less capricious. I also took out a few specific lines, such as “Oh you’re learning so much!” (Question Lesson) which participants had interpreted as condescending.

3. Making the SIQ Lessons less biased towards survey protocols and more applicable to interviews, surveys or focus groups.

A number of participants remarked that the lessons were biased towards surveys or formal protocols. This observation was accurate in regards to the Answer Options Lesson and the Structure Lesson, as I had designed these lessons with surveys and formal interviews in mind. I initially envisioned a separate set of protocol design lessons for each major methodology: surveys, interviews, focus groups, and observations. Over the course of the summer, though, I realized that this approach was too ambitious and would take too long. I did not change the two lessons I had already designed -- the Structure Lesson and the Answer Options Lesson. But I did create the other two lessons so that they would be applicable to all types of protocols.

In light this finding, I revised the content of the Structure Lesson and the Answer Options Lesson. I reviewed the Structure Lesson, and realized that the lesson concepts could apply not only to surveys, but also to most interviews. In the first node of this lesson, I added a disclaimer:

If you are planning to do intercept interviews or a *very* informal interview, not all of these tips will apply to you, but there are concepts here you should definitely keep in mind.

I also added the term “interview” throughout the lesson, wherever it was relevant, and when appropriate, I used examples to differentiate between interviews and surveys. In the discussion of how long surveys and interviews should take, I stated:

Most people last about 20-25 minutes when they're being surveyed. Interviews can last a little longer- sometimes up to an hour. But unless you are collecting an oral history, it is generally not a good idea to go this long.

The fatigue factor usually starts to kick in after about 25 or 30 minutes, especially if respondents are not talking about topics they find very interesting to them. (Yes, this includes environmental issues!)

Adapting the Answer Options Lessons was less time intensive, considering the main topic of the lesson. I changed the introduction, so that it started off with a discussion of answer options in informal interviews or focus groups and answer options in more formal protocols:

While it's important to ask questions in the right way, you also need to pay attention to the answer options you provide.

In informal interviews or focus groups, researchers typically use **open-ended questions**, so their questions don't have specific answer options.

But questions in surveys and more formal interviews often involve some “forced choice” questions-- questions with specific answer options.

I also created a link about open-ended questions, explaining what they are and the importance of coding when one uses this approach. These changes emphasized that answer options are an issue, whether or not the researcher provides forced choice answers.

4. Providing lesson summaries in the Table of Contents (see Appendix)

Both participants and my secondary research taught me that the lessons need to provide more information up front about what to expect from each lesson. In Finding X, I explain how many of study tests participants said that they wanted more descriptive information about each lesson up front, in the table of contents. My secondary research confirmed this finding, as I discovered that Web sites which have tables of contents typically have 1-2 sentence summaries, within the table, about each node. As a result, I changed the Table of Contents to account for this information.

5. Creating a node with directions about how to navigate the lessons

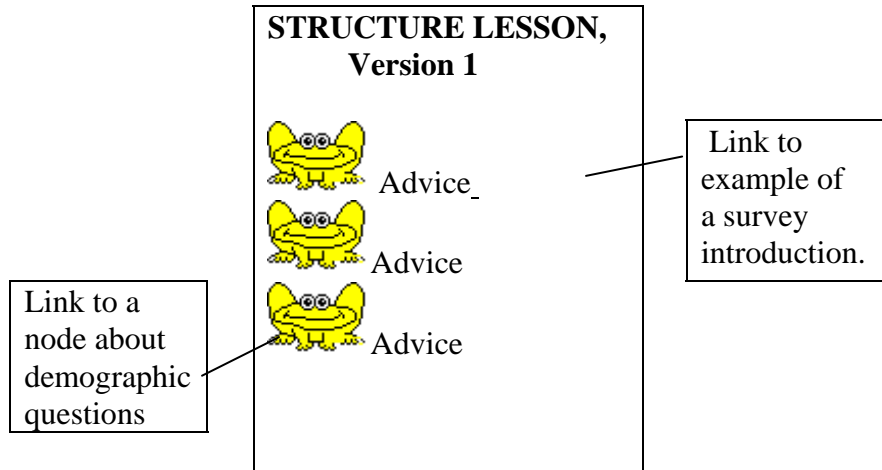
Participants who did not have experience with the Web had difficulty navigating the lessons at first. As a result, I created a short node to explain “Basic Guidelines for Using These Lessons” which users can access this node from the table of contents. This node provides basic directions about the HTML and browser features used in the lessons, like:

- Which icons and words are links
- How to use the “Back” and “Forward” buttons
- How to gauge how far you've gone/ got to go with the scroll bar
- How to make screen wide

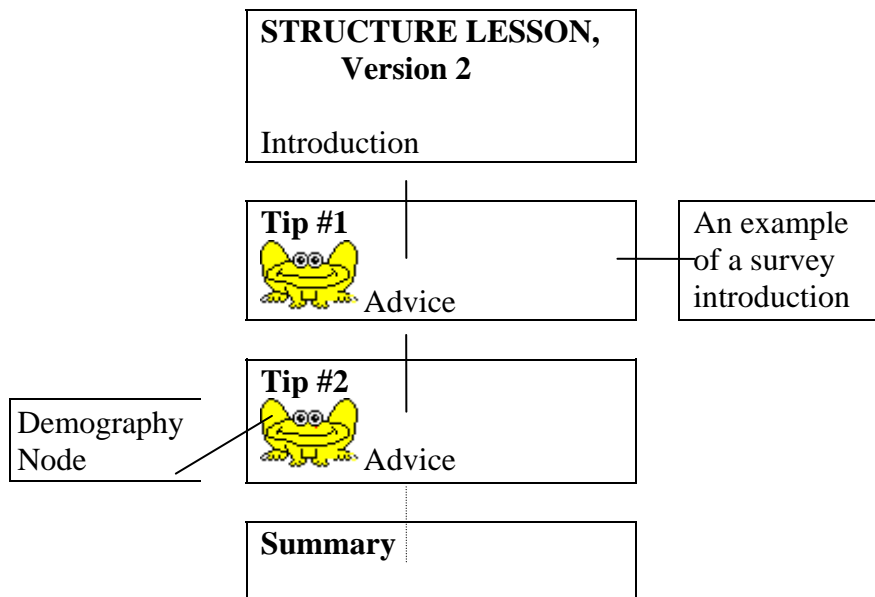
6. Re-organizing the Structure Lesson

Of all the lessons, I made the most changes to the Structure Lesson. I re-organized the entire lesson. The first version of the Structure Lesson had a main body of text, with a

few links that primarily contained examples of the concepts discussed in the main body. Because of this organization, the lesson required a great deal of scrolling. For example:



In the second version, I stressed that there were 6 tips about survey structure in the lesson, and I created a separate node for each tip. This change eliminated most scrolling, thus making the lesson much more easy to navigate. (Broken line indicates that there are additional nodes, but they are not represented in this diagram.)



One of the main reasons I redesigned the Structure Lesson was that I learned, from Nielsen, that hypertext is not determined by specific features or data structures, but rather how the user interface looks and feels (1995). This new format was no more interactive than the old one, but it certainly appears that way!

I also decided to create a summary of the six tips explored in the Structure Lesson, and I linked this summary to the very last page of the lesson. I created this summary for two reasons. First, I reasoned that the entire lesson was no longer on a single page, so it might be more difficult for users to go back and through the 6 tips and review them.

Secondly, I received mixed feedback from students when I asked if I should include summaries of each lesson. A few participants wanted summaries at the end of each lesson, while others protested such summaries because they make students “lazy.” I rationalized that I could test 1 lesson with a summary at the end. Also, students would be less “lazy” if the summary was only accessible at the very end of the lesson, and they had to click through the entire lesson to get to it.

Chapter Nine

Future Questions

After analyzing the data from the study tests, talking to ES students working on social research projects, and reflecting upon my own experience as a social researcher in the ES department, I had many more questions about the Toolbox. In this chapter, I discuss the research and development I would like to do, should the opportunity arise in the future.

FUTURE RESEARCH ABOUT THE SIQ LESSONS

After the study test, I had many more questions about both the SIQ Lessons.

- **Do the SIQ Lessons provide enough information for users who have never taken a social research methods course?**
- **Do the lessons need to encourage -- or even somehow require-- students to spend more time redrafting?**
If so, how can I get students to actually stop and rewrite the sample questions-- either in their head, on a piece of paper, or typewritten into the computer? Are there technological tools of which I am unaware, such as a box on the screen in which students could write, that would encourage students to redraft lesson questions?
- **Does the program need to encourage students to apply these concepts to their own protocols, or will students do this application on their own? How can the program encourage students to do this?**
- **Do the SIQ Lessons improve the quality of students' protocols?**
This analysis could involve examining users' protocols before and after they do the Lessons, to look for any changes in their research tool. This type of analysis was not feasible with the study test population, as these participants were simultaneously taking a social research methods course. It would be impossible for me to discern which protocol changes were a result of the lessons alone. After much deliberation, I decided that an evaluation of how the lessons impacted students' protocols would not be realistic, given time constraints and lack of access to participants. It would be interesting to do this evaluation in future research.

- **What tools could I product test, either within the program or supplementary, that would help students use and retain this information?**

For example, I could design a supplementary (paper) worksheet, a review page option at the end of each lesson, or a summary page at the end of all the lessons.

Product-Testing Techniques

Applying in-depth product testing techniques could be one way to answer some of these questions. In the study tests, I used standardized interview questions, which were quite general and broad. The fact that participants were using the SIQ Lessons, rather than examining the Lessons critically, largely shaped the study tests. With the opportunity to do additional tests, I would apply more product testing methods with questions that are more direct and flexible than the ones used in my study tests. This strategy would allow me more freedom to experiment with different approaches to showing the lessons and interviewing participants.

One product testing approach would involve asking participants more specific questions about particular lessons. I could ask five participants explicit questions about the Structure Lesson and shown prototype examples, such as:

*Let's take a look at this first screen. Do you like the title- "It's All About Style?" Should we keep this title like this, or should the title explain more about the lesson content?
For example, the title could be: (show prototype pages) "Developing the Structure of Your Survey."
Or the title could be: "An Inter-Frog Dialogue" (to stress that the yellow frog and the green frog are talking)*

This kind of feedback would be invaluable to my product development decisions.

Another approach could entail asking participants to tell me when, during a particular lesson, they were confused, lost, overwhelmed, or bored. This approach might reveal more about participants' decisions and emotions during the lessons. There were also times during the sessions when participants skipped part of a lesson or they left the lesson entirely, and I could not explore with them, why did this happen? For example, Marie left the Question Lesson in the middle of the lesson, and I did not know if she did this because she felt finished or was getting bored, or if this move was a mistake. I did not ask her in the middle of the lesson because I did not want to interrupt her, but a test atmosphere more geared towards product testing could encourage such questions.

A third product testing approach would involve a written evaluation immediately after the lessons, rather than (or in addition to) an oral interview. One participant, Abe, had to answer the interview questions on his own. After he looked through the lessons, he wrote his answers directly onto the protocol and then gave them to me the next day (see Interpretation of Study Test Finding 15 for more about his response) .

Abe gave more honest input on what he wanted out of the lessons than other participants did. His responses may have resulted from numerous factors, including the privacy he had while answering the interview questions (he did not have to look me in the eye and say it!). Abe's response hints at the type of data I could collect if I had more time to do more tests of the SIQ Lessons.

Future Changes to the SIQ Lessons

The study tests showed me a few new sections I could create, and they pushed my conceptual thinking about the Social Research Toolbox, in its entirety. The most critical new change I would make to the SIQ Lessons, granted I had the time to do so, would be adding a lesson and discussion about informal interviewing. I agree with participants who said that the SIQ Lessons do not address informal interviewing. A section on informal interviewing would be particularly relevant for ES students, as many of these students use informal interviewing in their social research projects. I also would like to develop a "user's hotsheet" for students and professors, to guide when, in the course of one's research, one should use particular lessons.

Future Research on the Toolbox

I also have many more questions about the Social Research Toolbox as an entire unit and the Orientation Section, in particular. These questions include:

- Is the Toolbox appropriate for the context in which students will use it -- namely projects in ES 11, 41, 192, and 195-6?
- How long will students actually spend using the Toolbox?
- How much information should the Toolbox present, and how much should be users be referenced to other texts?
- What should the orientation section include?
- How long should the orientation section be?

For example, if I had the time and wherewithal, I would do more formal observations of students working on social research projects. I would interview participants about what they wanted from the Toolbox as a whole. For example, before participants did the lessons, I would ask questions such as:

What are some of the biggest obstacles and frustrations you have faced while designing your (ES 126, ES 192, senior thesis) project?

This data could help me develop the orientation section of the Toolbox.

Future Vision of the Social Research Toolbox

In the summer of 1996, I want to develop unfinished components of the Social Research Toolbox. While the SIQ Lessons can stand alone, I believe they will be far more effective in the context of a completed Toolbox. I envision that students, professors, and community organizations who are interested in exploring environmental questions with social research methods can open up the Toolbox and explore aspects of qualitative research methodology. The Toolbox will specify when, in a research project, it is most appropriate to use various components of the Toolbox.

With this interactive, hypertextual Toolbox, ES students can become more skilled researchers of environmental issues. Students will be better prepared to delve into the complexities of environmental perceptions, attitudes, and behavior. Ultimately, the information contained in the Toolbox can help us create effective environmental programs and regulations. Intelligent, informed environmental programs bring us a step closer to improving the quality of the environment.

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