Using the Web for Student Research

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Since the middle 90's the web has grown into a powerful research tool for psychologists. The reasons to do web research are varied but some of the major reasons include sample diversity, access to limited populations, and even cost (Musch & Reips, 2000). While the use of the web as a research tool presents many challenges such as loss of control of the environment, it has repeatedly been demonstrated that for many research questions the web is a valid means to collect data (Krantz, Ballard, & Scher, 1997; Krantz & Dalal, 2000). This chapter aims to describe the nature of web research and its uses as a tool for student research, and to give some guidelines both to the practical and ethical issues regarding web research.

Nature of Web Research

Most psychological research conducted online makes use of web forms, which are familiar as the means of consumer purchasing over the web. It did not take long for psychologists to see forms as a means for collecting data from participants over the web (Keiley, 1996). A simple web study involves a minimum of three web-pages and a program to receive the data. The minimal web-pages are an informed consent page with a link to the study page, the study page containing the web form with a submit button, and a debriefing page. The program to receive the data resides on a web server and communicates through what is called a Common Gateway Interface (CGI). Pressing the submit button on the study page transmits the form data to the CGI program, which records the data in a file and then redirects the participant's browser to the debriefing page. It certainly is possible to approach web research using more sophisticated tools, but with these few tools it is possible to do web research.

Online Research Case Study: Hanover College's List of Online Psychological Studies

Since the development of web forms, online research has increased dramatically. Since 1995, a list of web-based psychological studies has been maintained at Hanover College's web site (http://psych.hanover.edu/research/exponnet.html) (Krantz, 1995/2007). This site has grown from less than 2 dozen studies when it appeared to over 250 studies currently online. The activity of the site has also grown. In 1995, the site had only 1300 hits. In 2006, the site had over 380,000 unique visitors. In 1995, only 7 new studies were posted after the original list. In February 2007, a record 42 new studies were posted. Many of these studies are student research or have students as co-investigators.

Online Student Research

Perhaps the greatest advantage of web-based research is that students can obtain a sample that is larger and more diverse than they would be able to obtain otherwise (Krantz & Dalal, 2000). By posting a link to their study on popular websites of online research (such as Hanover College's list), researchers can obtain responses from around the world. In addition, online research typically has lower participation costs than traditional research. Participants who might feel anxious traveling to a laboratory can participate from the comfort of their own computer. They can participate when it is convenient and save the time of traveling to a laboratory. Because of the low costs and the anonymity of participation, student researchers often feel comfortable soliciting participation from their friends and acquaintances, again boosting their sample size. Online research can also lower the costs for researchers. Materials that can be reproduced electronically, such as text and images, can be mass-produced for free in electronic form (assuming copyright permission has been obtained). The time required to enter data is nearly eliminated for online research because it is easy to store data in a comma-delimited format that can be imported into most statistical analysis programs.

An example of an online student research project is given at http://vault.hanover.edu/~altermattw/research/beatrix/index.html. In this study, the students hypothesized that a person's parents' marital status influenced ratings of their attractiveness as a

date or long-term relationship partner. On the informed consent page, participants select whether they will rate male or female faces. The link they click is generated by a JavaScript command embedded in the webpage that randomly assigns participants to one of two versions of those faces (You can see this and all JavaScript code by using the view source command). The faces that have divorced parents in one version have married parents in the other version. The photos were used with permission from Minear and Park (2004). The questionnaire submits not only the data that participants enter but also "hidden" data fields that indicate the version of the questionnaire and whether the faces are of males or females. The webpages for this study reside in the instructor's institutional web directory, permitting easy access, and the CGI program and data file are stored on the department's secure web server.

Although there are considerable advantages to student research on the web, there are costs as well. Foremost among these is the time and expertise required by instructors to assist in the development and testing of online studies. Even if students use the simple web study described above (three pages and a CGI program), the web form must be thoroughly tested to make sure the data are recorded correctly. This can be done by entering a sequence such as increasing and decreasing responses and then observing the logged data to see if the sequence was recorded correctly. Once that is complete, students should pilot test the survey on a few participants and the instructor may need to modify the questionnaire based on the feedback from those participants. Instructors considering online student research should, at a minimum, be familiar with the basics of html. Fraley (2004) provides a lucid and step-by-step guide to html for online research. The html code for a straightforward survey can be generated by students with little oversight using Birbaum's (2000) SurveyWiz webpage (http://psych.fullerton.edu/mbirnbaum/programs/surveyWiz.htm), but instructors must still modify the code produced by SurveyWiz so that data is transmitted to their home server. Other useful guidelines for developing online research are discussed by Reips (e.g., Reips, 2000). In general, expect to spend at least an hour developing and testing each online study. This time could be reduced by implementing tutorials for students focusing on 1) webpage formatting and layout and 2) how to upload new versions of pages and download the data file. These tutorials would speed up both the development and testing phases.

A pedagogical disadvantage of online research is that students are distanced from the process of data collection. The data appear as if by magic and students do not gain hands-on experience in administering a study. This distance increases if instructors shoulder most of the webpage design burden. Instructors should consider whether online studies should be students' only experience with research. Instructors should also consider whether they should permit a mix of traditional and online studies in the same class because of the potential imbalance in effort expended by the two types of data collection.

Resources Needed

There are several online services that will handle much of the research setup and data collection for the researcher, but most of these have fees. One notable exception is QuestionPro (www.questionpro.com), which students can access for free to develop surveys with a variety of response options. See links at the bottom of Krantz (1995/2007) for a current list of several of the most popular services. For many reasons, researchers might want to either set up their own server or develop their own web pages. Most free online survey hosting services provide little flexibility, typically restricting researchers to Likert-type questionnaire items. One reason to develop one's own server is to keep control of the data. It is possible to have the data stored directly on the researcher's hard drive, limiting access by others to the data. The Apache (http://www.apache.org) server is the most popular server and has versions for many different types of operating systems. The resources needed for writing one's own web forms depend upon the project but at the minimum include access to a web server and a CGI script to collect the data. Nearly every academic institution has web servers and it is often possible to have the institutions' technology department grant researchers permission to post studies. They may even set up the CGI script necessary to collect data.

Recruitment

There are many ways to recruit participants. If no special types of participants are needed, the best way to recruit is to post the study on a general list such as the ones listed in Table 1. If more specialized populations are desired, one of the best techniques is to contact discussion or email groups related to the population under interest. Many of these groups can be found via an internet search for the population of interest and seeing if a discussion group appears on the list. Yahoo also has an extensive set of discussion groups that can be searched. It is important to contact the list owner and ask permission to contact the list. If you do not get

permission from the list owner, your email will appear to be spam and at best ignored, at worst generating great negative feelings about psychological research which may prevent these people from participating in any research.

Participant Motivation

The lack of direct control over the research situation raises a lot of concerns about whether the web can be used for psychological research. First, data collected over the web compares very favorably to data collected from the laboratory; in fact, the two data sets can often be indistinguishable (Krantz, Ballard & Scher, 1997; Krantz & Dalal, 2000). While the lack of the presence of the researcher in the room with the participant can lead to participants, perhaps, being less serious about their responses, the absence of the researcher also reduces the chance for demand characteristics playing a role in the data (Reips, 2000). Still, data collected suggest that online participants are as serious about participation as are laboratory participants (Krantz & Dalal, 2000; Reips, 2000). One issue that may bedevil a data set is multiple submissions, often the result of a delay in the response from the server and not any overt attempt to manipulate data by the participant. There are several ways to handle this issue, but perhaps the easiest is to design the web form to record the time and date of submission and the Internet protocol (IP) address, which identifies a computer (or set of computers) on the Internet. If there are several identical or nearly-identical entries in a short period of time from the same IP address, the researcher should consider eliminating the repetitions. It is not a common problem (Reips, 2000). See Reips (2000) for a more extensive discussion of these and other issues related to data quality and how to handle them on web research.

Ethical Concerns

Ethical complications unique to online research are discussed elsewhere (see Birnbaum, 2001, pgs. 243-244; Fraley, 2004, pgs. 274-275; Reips, 2000), so only a few issues will be discussed here. Because it is generally not possible to verify that participants have received the debriefing, we recommend against online research involving deception. Another ethical concern with online studies is the ease with which copyrighted materials can be reproduced. Be sure to obtain permission from the copyright holder before displaying any copied media, including images. IP addresses collected to identify repeat responses cannot easily be associated with individuals, but this information should nevertheless be considered confidential, stored in a secure location, and destroyed when the study is complete. Finally, a commonly-overlooked obligation is the promise to share the results of a study with participants. An easy way to do this with online student research is to include a link in the debriefing page to a website where final copies of student papers will be posted. Online research also offers several ethical advantages over traditional research. Participants feel much freer to leave a study online than in the laboratory, suggesting that there is a lower risk of participants feeling pressured to continue. In addition, most online data collection is anonymous, reducing confidentiality concerns.

Conclusion and Recommendations

Online research provides many advantages to the student researcher: sample size and diversity, inexpensive duplication of materials, and more efficient data entry are some of the most obvious. However, online research can be very time-consuming to develop and, if this is the student's only research experience, it can separate the student researcher from the research process in significant ways. Although there are some online services that make it easy to collect simple questionnaire data online, these tend to be inflexible and the resources necessary for developing flexible and personalized web forms are freely available at most educational institutions. It is probably an important exercise for a department to consider what role online student research should play in their overall curriculum.

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Table 1

Web Sites Where Internet Studies Can be Advertised to Recruit Subjects

Site Name	Owner	Address
Psychological Research on the Net	John Krantz	http://psych.hanover.edu/research/exponnet.html
Social Psychology Network list of studies	Scott Plous	http://www.socialpsychology.org/expts.htm
The Web Experiment List	Ulf-Dietrich Reips	http://genpsylab-wexlist.unizh.ch/