Conducting online research and evaluation

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Abstract: Web-based evaluation/surveys and research about the Internet are becoming increasingly widespread. The apparent ease of conducting these activities may be blinding researchers to potential methodological flaws that threaten the validity of the data and any interpretations that may be drawn from them. Additionally, some online research and survey methods threaten the central tenets of human research: privacy, confidentiality and informed consent. This paper outlines three case studies at Griffith University as a point of departure for discussing these emerging issues.

Introduction

The use of web-based surveys and internet-based research is increasing (Medlin et al, 1999; Kaye & Johnson, 1999). University academics have been using online surveys to evaluate or research their teaching practices for some time (Kelly & Marsh, 1999) and the widespread use of learning management systems will probably see an increase in such practices. The Internet has been the focus of many changes and much research in computer-mediated teaching and learning, as seen in the publication of journals such as Journal of Computer Mediated Communication, Medical Education Online, Journal of Asynchronous Learning Networks and Journal of Interactive Media in Education. Internet mediated and Internet based research is not confined to higher education: the American Psychological Association is currently associated with the conduct of more than 120 online research studies (Krantz, 2002). One major appeal of online surveys is the significant decrease in the time and unit cost of conducting the survey (Hmielecki, 2000). However, the popularity of Internet-based research and evaluation also stems in part from ready access to millions of individuals each with their own experiences and opinions, and millions of documents and archived records of discussions between special interest groups.

A variety of techniques, tools and sources is available to conduct online research. Some newer tools include e-mail surveys (Smith, 1997) and pop-up web surveys (Comley, 2000). The Graduates of the Millennium project researched the experiences of undergraduate students, and used a combination of online interviews, electronic diaries and e-mail contact to maintain contact with informants (Mann & Stewart, 2000). Whilst not always using new communication tools to conduct research, academics have explored many different elements of their online teaching practice: the development of learning communities (Hill & Hall, 2001), the role of online discussions in collaborative learning (Baskin, 2001) and evaluation of online portfolios for assessment (Bowie et al, 2002). The range of possible topics and methods for
Internet research depends largely on an understanding of the ways in which people use the medium.

The availability of a new communications medium, new tools and different types of information sources also confronts researchers with new questions and the need to find solutions for methodological problems that had previously been resolved with established tools. Staff at GIHE (the Griffith Institute for Higher Education) have initiated or been associated with a range of online research and evaluation activities. These three brief case studies serve as a departure point for considering some of the ethical and methodological issues associated with conducting online research and evaluation.

Online educational research and evaluation activities at Griffith

The Generic Skills Snapshot (GSS) is part of a multi-phase project, entitled the Griffith Graduate Project, which has been running at Griffith University since 1999. Initially, it concentrated on embedding generic skills/graduate capabilities in undergraduate programs. Later phases addressed integration of work-based learning in the curriculum and the implications for generic skills development in the context of the workplace and the university. The GSS was the first initiative that used a Web-based survey to identify how the generic skills from the University’s Characteristics of a Griffith Graduate statement are taught, practised and assessed in all undergraduate courses (Figure 1). The intention was to take a snapshot of current practices and to identify examples of innovative approaches to embedding generic skills (Crebert, 2000). This was an exercise in collecting baseline data, against which future improvements could be monitored.

Figure 1. The Griffith Graduate survey screen had an unconventional format; support for completion of the survey was available by telephone, e-mail and detailed instructions
Individual Heads of Schools were asked to complete the survey, in conjunction with course convenors. There was little need for confidentiality, as the project team had decided not to make the data publicly accessible and to aggregate reported data, to avoid “competition”. The primary motivation for using the Web-based approach was to collect and process data quickly and efficiently, making use of existing University systems, so that the findings could be aggregated and disseminated across the institution. The survey was divided into discrete sections, through which staff could proceed sequentially, using easily understood prompts and instructions. Question formats required radio-button, select one of many and free text responses. The University community was able to read the final report on the project and view the graphs showing implementation of the various generic skills in those Schools that had participated. The project was supported strongly by the Deputy Vice-Chancellor, who personally encouraged Heads of Schools to respond to the questionnaire and sent two follow-up e-mails to Heads to increase the response rate. After three months, convenors of 119 of 135 courses across 35 Schools had completed the evaluation, an 84% response rate.

**Logan Student Audit of Flexible Learning (LSA)** The Logan campus of Griffith University opened in 1998 with the intention that all academic programs would be offered in flexible mode, with a substantial online component. In 2000, a pilot project sought views and opinions from graduating students regarding their experiences of flexible teaching and learning practices in third-year courses offered on Logan Campus (Zimitat, 2002). It was appropriate to initiate an online survey with students on this campus because of ready access to the university intranet and a high degree of computer literacy. A consent page with details of the nature of the survey and the ways in which we would use and report data also required students to click an "I agree" button to access the login page of the survey. The survey drew upon a database of eligible student names, numbers and date of birth for access to the survey. In case the database of potential respondents was incomplete, students were able to register online with their student number and date of birth as authentication measures. The self-administered web survey consisted of questions requiring free text and Likert scale responses. The survey screen-format was designed so that a block of questions and navigation were presented on one screen at a time (Figure 2) without the need for scrolling. Advertising was achieved through targeted e-mail with an embedded link to the site, postings on the Logan community bulletin board and course notice boards, and an e-mail/phone call to course convenors to encourage students to complete the survey. A 43% response rate was achieved from 150 students and these students completed the whole survey. Data was written to a delimited file for import into Excel spreadsheets. Students could provide an e-mail address stored in a different file to receive a debriefing report of the project.

**Internet Finance Forums (IFF)** The use of online discussion forums in the area of finance have caused concern for government regulators because of their potential to facilitate market manipulation or other fraudulent conduct. The site www.hotcopper.com.au is a provider of information on the Australian sharemarket, providing links to the Australian Stock Exchange and a forum for investors to discuss and exchange information on shares. This postgraduate study (Greenfield, 2001) explored factors such as social norms, (n)etiquette, group values and learning and personal development involved in the development and maintenance of "community" in this virtual community. The public, moderated forum required only registration for participation. A transcript of discussions between 67 individuals conducted on the forum over a 29 day period was analysed without participation in the online discussion. Elements of the transcript were coded using a communicative model of collaborative
communication to establish an understanding of meanings and motivations behind specific words, phrases and terminology used by community members in their discussions. Verbatim quotations from the forum were included in the dissertation. Ethical clearance was obtained for this study.

![Figure 2](image)

**Figure 2.** The Logan Student Audit used structured headings within shaded tables to help separate lines and decrease measurement error. Download times were not critical because the survey was conducted on a high speed intranet.

**Discussion**

In universities the rethinking of scholarship prompted by Boyer (1990) has seen a blurring of boundaries between research and teaching. In this paper we consider the term "research" to have a broad meaning that also encompasses the evaluation of teaching and teaching practices. Regardless of the context or nature of the research, the basic principles and standards for the conduct of research should be the same. The issues discussed in this paper are part of that process of applying the same standards for discipline-based research to the online environment and the scholarship of teaching.

As research into teaching practice and student learning becomes mainstreamed, students are increasingly being asked to provide feedback on their university experiences and the conduct of teaching. In some cases students may be over-burdened by requests to provide evaluative feedback on all courses that they are studying. Furthermore, program evaluations and the need for more longitudinal studies of the effectiveness of educational technology (Alexander et al, 1998) may require extended involvement of students. If students are participating in regular teaching evaluations and longitudinal studies, when do students stop becoming students and start to become subjects of human research? What ethical implications are there for students (and the university) when they agree to take part in longitudinal evaluations of teaching and learning practices? These questions have no definitive answer here, but we suggest that
academics model professional behaviour to inform students about studies, protect confidentiality and privacy and disclose how collected data will be used and reported.

**Emerging ethical issues: confidentiality, privacy and informed consent**
Confidentiality, privacy and informed consent are the cornerstones of ethical human research (Jones, 1994; Frankel & Siang, 1999). Understanding and identifying the potential violation of any of these principles when using the Internet for research and evaluation are becoming more difficult as a result of increasing computer security measures, advances in the functionality of web tools and blurring boundaries between private and public communication spaces.

Conducting online teaching evaluations/research is usually done through university intranet services and learning management systems that are accessible only to staff and enrolled students with password-controlled access (authentication). In the LSA survey, we chose to model ethical research practice providing explicit assurances that the researchers would not attempt to correlate survey responses with individual students. We also explained in simple terms: the purpose of the survey, its voluntary nature, how data would be used and how it would be reported to respect confidentiality and privacy. Clicking an "I agree" button on this page indicated consent and enabled students to access the login page of the survey. On the basis of our own work, we recommend that if an e-mail address is requested, such as in the LSA survey to provide follow-up results, it should be on a separate page, stored in a separate data file and accompanied by a comment that explains this and assures the student. Course discussion forums also enable the identification of individuals and correlation with their respective comments, so it would be prudent to advise students of any research-related activities that are conducted on the forum, particularly if they extend beyond statistical reports to include verbatim quotations.

**Researching Internet communities**
The Internet, by contrast to university intranets, plays host to a myriad of computers, web sites, documents and communications that are largely accessible to everyone. Internet communities enable groups of peers to communicate with each other via newsgroups, discussion forums, mailing lists, chat rooms and personal web sites. The whole gamut of experiences and opinions of a vast range of individuals, including patients, consumers and learners, etc is recorded online in the archives of these communities. Three methods are commonly used to access these discussions and archives (Eysenbach & Wyatt, 2002): passive analysis of the discussion without intrusion into group processes; active analysis where researchers participate in the discussions without identifying themselves; and active participation where researchers identify themselves and gather information from participants.

The ethical issues that arise from researching these communities depend on the nature of the community under consideration. Public records, such as newspapers, are normally considered fodder for research because their purpose is to provide the public with information. The archives of online communities are usually publicly available, but are they serving the same purpose as newspapers? Whilst www.hotcopper.com.au serves an information delivery and sharing role, individuals participating in other online communities may not be seeking public exposure or to educate the public. Members of these latter communities may view their discussions as private conversations in cyberspace and hence no different to any other private conversation. If the particular Internet community requires registration for access and participation; some characteristic as the basis for its foundation; and has "rules" that govern membership and behaviour, and outlines these on the site (e.g. in Frequently Asked
Questions), then it could be reasonably assumed that the archived records are private and not available for research purposes.

Access to the archives of online communities (newsgroups, mailing lists etc) that are reasonably believed to be public allows the researcher to examine transcripts of the groups' discussions. There are similarities between passive analysis of these records (Eysenbach & Wyatt, 2002) with retrospective clinical case studies in medicine which do not require the explicit consent of the subjects (National Statement on Ethical Conduct of Research involving Humans, 1999). The National Statement of Ethical Conduct of Research involving Humans includes research on collectivities that could arguably include Internet communities. In this case conditions that need to be addressed include: negotiation with the group or group leaders, issues of privacy, confidentiality, non-intrusiveness and minimal risk and anonymity of subjects. Ownership of data and approval by an ethics committee should still apply. Whilst data from passive studies may be de-identified, researchers must be vigilant with the reporting of results so as not to inadvertently breach privacy of individuals. Verbatim quotation from postings or text from the archive could infringe personal copyright under the Australian Digital Agenda Amendments to the Copyright Act 1968. More importantly, it could enable the identification of the individual by use of Internet search engines. A query to search for the quoted text string on www.Google.com could uncover the original message, e-mail address and name of the sender.

Conducting research on Internet communities using active analysis and active participation (Dillman, Eysenbach & Wyatt, 2002) is more complex. In the first instance, intrusion into the community for the purposes of research may alienate group members or affect their usual participation in the community, thereby jeopardising the validity of results. Certainly some members of online support groups may be vulnerable and distressed and such intrusion may adversely affect them. Contacting the list owner about the research might be a useful start to establishing contact and negotiating ways of conducting the research and in so doing establishing professional integrity. Alternatively, researchers could obtain consent prospectively by sending an e-mail to the list describing the research and asking for permission, or retrospectively by contacting community/list members. The latter approach would have less impact upon the natural operation of the community, but non-response and invalid e-mail addresses can complicate the process.

Methodological issues
Generally speaking, four basic sources of error must be adequately addressed and minimised in the design of survey-based evaluation and research in order to be confident of the sample results and make valid inferences about the population that they represent (Groves, 1989). The introduction of an online dimension to surveys does not alter the need to address these issues, but raises a number of different types of problems for the researcher.

Coverage errors arise when the surveyed sample is not representative of the broader population because some members of the population are more likely (or less likely) to be sampled than others. Coverage errors associated with the GSS and LSA surveys are likely to be less of a problem than in online surveys of the general public, because all students and staff had ready on-campus Internet access. However, if all students in the LSA did not have ready access to the university intranet and computer laboratories, coverage errors may have been high since only 67% of Logan students had home access to the Internet in 2000 (GIHE, 2001). In cases where levels of access, web familiarity and computer literacy are unknown, mixed-
mode surveys with online elements and e-mail follow-up, coupled with mail and paper-based follow up should be used.

Steps should be taken to control against multiple submissions to protect the integrity of the data. In the GSS a final submission button was used to block re-submission or new submission of data from the same respondent. A simple notice asking participants not to participate more than once may be sufficient, but at least one further check should be employed. In surveys on the Internet, using a combination of e-mail address and the IP address of the participant's computer could be used, however this method is not foolproof since individuals may have more than one valid e-mail address or they may be assigned different IP addresses through dynamic addressing. The use of a login student number and authentication process requiring some personal data, such as date of birth in the LSA, is a useful method for identifying and deleting multiple responses to the survey. A variation of this approach involving the allocation of passwords (or PINS) may contribute to non-response and sampling errors.

Sampling errors arise from sampling only a portion of the population, instead of all of its members. In "traditional" mail and telephone surveys both large numbers of respondents and a well-sampled population typically decrease sampling error. However, online research and surveys of the general public that invite volunteers to respond are at greatest risk of sampling error because each member of the public (the loosely defined population) does not have an equal chance of responding to the survey. The sampled population may be the portion of the general population with Internet access or high computer literacy. Further complications arise in selecting a valid sample of the general public for online surveys because of the absence of directories of unique e-mail addresses and methods for randomly selecting respondents from lists of e-mail addresses.

In online surveys, measurement errors are most likely to arise from poor questionnaire/screen design or cross-browser problems resulting in distortion of the relationship between questions and answers. Ultimately the respondent is confused and any advantages of automated data entry and programming to facilitate valid responses (e.g radio buttons where an individual can not mark two responses) could be lost. The complexity and unconventional format of the GSS screen format (Figure 1) was a potential source of measurement error, but was decreased through an online guide, e-mail and telephone support for respondents. The LSA used tables with shaded areas to assist respondents in correlation of the question and its associated responses. Dillman et al (1998), however suggest that plain questionnaire/screen formats are preferred as they yield higher completion rates. Some of these issues associated with the screen formats of online surveys may be resolved through appropriate programming: for low level browsers; formatting for a standard screen size (640 x 480) or detection of screen resolution; rendering text in pixel sizes to prevent word-wrapping; and use of tables that occupy a set proportion of the screen.

There remains the unresolved issue of whether individuals give different responses on web and paper surveys. Kiesler & Sproull (1986) reported that there were no differences in the quality or quantity of responses to open ended questions, and these findings were consistent with our experience with the LSA and a similar paper-based survey (GIHE, 2001). Responses to open-ended questions on e-mail surveys were reportedly longer and more detailed than on paper questionnaires (Mehta & Sivadas, 1995; Schaeffer & Dillman, 1999). Baron et al (2000) compared expert responses to similar questions on web and paper questionnaires and found no significant differences between the two groups except on one variable. It was later discovered that the on-screen format for the question/s relating to this variable were
significantly different from the paper based format. It may be that individuals unintentionally gave the wrong response. When answering an online survey respondents must think about two things: the question and how to answer it using their computer. For example, respondents use more peripheral vision when completing on-screen surveys because their eyes, hands and the screen are all in different planes. There is potential for variation that may relate to screen format and computer literacy and this needs to be addressed in the study design, particularly if mixed-mode methods are used.

Non-response errors occur when respondents’ answers to the survey differ from those of non-respondents, causing an outcome different from that which could have occurred had the non-respondents participated. In the case of Internet surveys, it might be possible to use different entry pages to the main survey/research site to hook a broader range of respondents. In the case of teaching evaluations or institutional research where the sample group and population is usually known, attracting more respondents may be achieved by follow-up requests to complete the survey. The possibility of a high non-response error on the LSA could have been addressed by opening the survey earlier in the semester so that students in courses with end-of-semester examinations and assignments would have been inclined to participate in the survey. If students are inundated with surveys they are probably unlikely to complete any of them, hence schools should ideally have a coordinated approach to teaching evaluation and course surveys of their students to prevent this occurring.

It should be noted that non-response errors are not equivalent to response rate, but they are less likely to occur with a high response rate. Poor response rates appear to be a characteristic of the LSA and other online teaching evaluations, particularly when compared with paper surveys (Hmieleski, 2000). Improving response rates can be achieved by use of follow-up e-mail, telephone support and incentives but these approaches ultimately decrease the cost-effectiveness of online surveys. It is possible that the complex format of our GSS survey may have deterred some respondents, regardless of e-mail and telephone follow-up. Hence, the design of online surveys to decrease non-response also needs to address other issues such as use of screen formats that minimise download time (e.g. no images), use of CGI rather than Javascript, levels of computer literacy and cross browser compatibility.

Conclusions

Conducting research in a new environment with new tools presents many opportunities. This paper describes some of the methodological and ethical challenges that also arise from Internet-based research and evaluation and presents some practical solutions. More broadly though, a thorough understanding of information and communications technology and of Internet communities is needed to fully comprehend the complexities involved in scholarly Internet-based research.

References


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