

Dissertation Synopsis and Survey Instrument: Non-Response Bias on Web-based Surveys

As Influenced by the Digital Divide and Participation Gap

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Higher education scholars, policy makers, and administrators know little about the experiences of undergraduate students who matriculate with minimal experience with technology. It is often assumed that all students, particularly traditionally-aged students, have significant experience with, knowledge of, and comfort with technology. Although that assumption is correct for many students, it is false for others. Moreover, web-based assessment efforts likely are not collecting adequate and accurate data about these students.

Although little is known about these students, there are tantalizing glimpses. National surveys of institutions or students indicate that a significant number of students do not own a computer. National surveys of students have reported different numbers of students without computers, from 1.2% of respondents (Smith, Salaway, & Caruso, 2009) to 2.7% of respondents (Junco & Mastrodicasa, 2007). EDUCAUSE member institutions report that between 10% and 20% of their students do not own computers (EDUCAUSE, 2009). Similarly, studies have revealed differences in how college students and youths use computers, differences that are significantly influenced by economic and cultural factors such as how easily and often they can use Internet-connected computers (Palfrey & Gasser, 2008; Ito et al., 2010; Watkins, 2009). So it is clear that there are some students who neither own computers nor use them in ways that most of their peers use them.

Problem

No one knows how many of these students are on American college campuses. Little is known about who they are. And very little is known about their experiences and how their technological aptitude is shaping their academic and social experiences. Moreover, no one knows if our current methods of assessment – methods that often rely exclusively on web-based surveys advertised via e-mail – are gathering adequate information from these students and adequately representing their experiences, opinions, and needs.

Purpose

This study will explore the non-response bias of first-year undergraduate students on a self-administered web-based survey. Specifically, this study will examine the impact of those students' previous computer ownership, access, and use on their decision to respond. The specific research questions guiding this dissertation:

RQ1: In this sample of first-year students at American institutions of higher education, how can we describe their different patterns of Internet-connected computer ownership, access, and use?

RQ2: Do students exhibit a significant non-response bias to a Web-based survey based on their previous computer ownership, access, and use?

Methodology

To answer the first question, I will construct a brief survey of previous computer ownership and use to be administered to students participating in the on-campus, paper administration of the Beginning College Survey of Student Engagement (BCSSE) (The pilot survey instrument is attached as Appendix A and notes on the construction of the instrument are in Appendix B). I will answer the second question using data from the same institutions who administer the web-based version of the National Survey of Student Engagement (NSSE). Using the BCSSE data in a linked-records approach (Porter & Whitcomb, 2005), I will be able to use logistic regression (Korkmaz & Gonyea, 2008) to see if students with less exposure to technology respond in numbers proportional to their representation. I will employ logistic regression in a blocked, hierarchical scheme to control for and explore the impact of personal demographics, institutional selectivity, and institutional enrollment size.

If the population is sufficiently diverse, I expect a non-trivial number of students will have had less experience with technology than the majority of their peers. I also expect that they will be disproportionately from lower SESes and racial/ethnic minorities. Finally, I expect to find a small but significant non-response bias on the web-based version of NSSE, a finding that may be generalizable to other web-based self-administered surveys.

References

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Appendix A

Instrument

The instrument is included on following page. Details about the construction of the survey, including revisions made during its construction and following a pilot administration, follow in Appendix B.

Note the blank box in the bottom right corner. Each survey instrument is assigned a unique ID number and it is printed in that box. That ID number corresponds with the ID number of the BCSSE survey instrument into which that instrument is placed so I can match the results of both surveys for each respondent.

Additional Questions

You are requested to answer some additional questions regarding your previous Internet access experiences. These questions take about three minutes to answer. Your continued participation is voluntary.

During the last 12 months...

- A1.** How often did you use a computer (desktop, laptop, notebook, tablet, etc.) to access the Internet?
- Several times a day
 - About once a day
 - 3-5 days a week
 - 1-2 days a week
 - Every few weeks
 - Less often or never
- A2.** On a typical day, for how many hours each day did you use a computer (desktop, laptop, notebook, tablet, etc.) to access the Internet?
- 7 hours or more
 - 6 to 7 hours
 - 5 to 6 hours
 - 4 to 5 hours
 - 3 to 4 hours
 - 2 to 3 hours
 - 1 to 2 hours
 - Less than 1 hour
- A3.** On the computer you use most often to access the Internet, could you connect to all websites, (i.e. was the Internet connection censored or filtered)?
- Yes, but I could connect to all websites
 - No, but I could connect to most websites
 - No, I could only connect to a few websites
 - I did not use a computer to access the Internet at all
 - I do not know
- A4.** When you connected to the Internet on the computer you used most often, were you supervised by parents, teachers, librarians, or others?
- No, I was always unsupervised
 - Yes, I was sometimes supervised
 - Yes, I was always supervised
 - I did not use a computer to access the Internet at all
 - I do not know

- A5.** Did you or your family own the computer you used most often to connect to the Internet?
- Yes, the computer belonged just to me
 - Yes, the computer belonged to my family
 - No, the computer did not belong to me or my family
 - I did not use a computer to access the Internet at all
- A6.** Did you regularly use multiple computers (your computer, school's computer, library's computer, etc.) to access the Internet?
- Yes, I used multiple computers
 - No, I only used one computer
 - I did not use a computer to access the Internet at all
- A7.** How often did you use a handheld mobile device (cell phone, Blackberry, iPhone, etc.) to access the Internet?
- Several times a day
 - Once or twice a day
 - Several times a week
 - Once or twice a week
 - Several times a month
 - Never
- A8.** Did you regularly use something other than a computer or mobile device (game console, e-book reader, etc.) to access the Internet?
- Yes, I accessed the Internet using other devices
 - No, I only accessed the Internet using a computer or mobile device
 - I did not access the Internet at all
- 2. How will you access the Internet on a regular basis during your next year in college? (Select all that apply.)**
- I will use my own computer
 - I will use my family's computer
 - I will use someone else's (friend, roommate, etc.) computer
 - I will use computers on campus (computer labs, library, etc.)
 - I will use something other than a computer (cell phone, game console, etc.)
 - I will not access the Internet
 - I do not know

Appendix B

Survey Instrument Notes

The primary concept I am hoping to capture with this instrument is Internet access. Specific dimensions of access include: frequency, openness (i.e. filtered or unfiltered), supervision, ownership, and location. These are derived largely from qualitative work that has been conducted over the past five years, work that has explored how young people access and use the Internet (Ito et al, 2010, Palfrey & Gasser, 2008, Watkins, 2009, etc).

Originally, I hoped that a single continuous latent construct would underlie this instrument and its questions. However, it seems clear that there are multiple related but distinct sub-constructs underlying access. I believe and hope that the responses to these questions will be related such that I can – without losing too much nuance and context – combine the responses to these questions into one or two scales that are easy to understand and use. Alternatively, I may be able to employ cluster analysis to reduce the dimensionality of the data.

Instrument Construction

In constructing this instrument, I looked at many other instruments that ask about computer ownership and use. Although most of these instruments were of limited utility in that nearly all focused on present computer ownership and Internet access with few questions focusing on retrospective ownership and access, basing this instrument on existing instruments and research helps establish face validity. Most notable among the many resources I examined are the following multi-year studies:

- ECAR Study of Undergraduate Students and Information Technology surveys (2004-2009)
- North Carolina State University ResNet surveys (1998-2009) (http://ncsu.edu/resnet/general_info/surveys.php)

- Oxford Internet Surveys (2003, 2005, 2007)
(<http://www.oii.ox.ac.uk/microsites/oxis/methodology.cfm>)
- Pew Internet & American Life survey questions (<http://pewinternet.org/Data-Tools/Explore-Survey-Questions.aspx>)
- Stanford University Residential Computing annual surveys (2000-2009)
(<http://rescomp.stanford.edu/info/survey/>)
- U.S. Bureau of Labor Statistics and Bureau of the Census Internet and computer use questionnaires (1994, 1997, 1998, 2000, 2001, 2003)
(<http://www.bls.census.gov/cps/computer/computer.htm>)

The 2010 U.S.IMPACT Study (Becker et al.) also deserves particular mention as one study that specifically focused on where, how, and why respondents accessed the Internet during the past 12 months. The web survey instrument employed by Becker et al. was particularly informative as it is very recent and deals with issues that are only now becoming an issue for researchers in this field. For example, the wording they used to describe mobile devices (“a handheld mobile device like a cell phone, Blackberry, or iPhone,” Appendix 5, p. 2) was very instructive. The thorough process employed by Becker et al. to develop their instrument (described in Appendix 1 in their final report) makes it particularly informative and useful.

The demographic questions on this pilot instrument were taken directly from the current paper version of BCSSE. These questions will not be included in cognitive interviews but they will be included in pilot administrations of this instrument. Previous research indicates that responses to most of these demographic questions should correlate to responses to the technology questions and thus provide evidence of validity. Gender should not correlate with most of these questions and will thus serve as a useful test of validity.

The survey was piloted with undergraduate students at Indiana University-Bloomington in May 2010. It was approved for administration by Indiana University-

Bloomington Human Subjects Committee (HSC) as IRB Study #1004001240 on April 20, 2010. Participation was low in both the cognitive interviews and pilot administration.

However, the results were heartening and no significant revisions were made as a result of the pilot and cognitive interviews.

Content Validity

To establish the content validity of this instrument, drafts of the instrument were sent to several experts. Three content experts with expertise in college student technology support were consulted:

- Carol Anderer, Associate Director of Client Support & Services, University of Delaware
- Jan Gerenstein, Associate Director of Residential Technology, Northern Illinois University
- Rich Horowitz, Director of Academic Computing Services, Stanford University

Additionally, five researchers with expertise in survey design and analysis of survey data were consulted:

- Dr. Jim Cole, Beginning College Survey of Student Engagement (BCSSE) Project Manager, Center for Postsecondary Research (CPR), Indiana University
- Dr. Robert Gonyea, Associate Director, CPR, Indiana University
- Dr. Ali Korkmaz, Associate Research Scientist, CPR, Indiana University
- Dr. Amber Lambert, Assistant Research Scientist, CPR, Indiana University
- Dr. Tom Nelson-Laird, Faculty Survey of Student Engagement (FSSE) Project Manager, CPR, and Assistant Professor, Indiana University

Staff in Indiana University's Center for Survey Research (CSR) also reviewed the instrument as part of their regular processes in finalizing its format. In particular, Nancy Barrister,

Associate Director, and Dr. John Kennedy, Director, reviewed the instrument and offered constructive feedback.

In response to feedback offered by these reviewers and further analysis of available surveys and literature, the following changes were made to the initial draft of the instrument:

1. Changed response options to “How often did you use a computer” question to match Pew response set (the previous response set was already nearly identical so this was a small adjustment).
2. Added parenthetical examples defining a “computer.”
3. Added question asking “How many hours each day did you use a computer.” Used Pew response sets as starting point and increased upper limit based on reported average weekly computer use.
4. Added question specifically asking about cell phone and remove cell phone from “other” question.
5. Changed “mobile phone” to “mobile device” both in response to suggestions from reviewers and as used in Becker et al. (2010).
6. Tweaked question asking about using multiple computers; previous wording suggested it was only about computer use in multiple locations.
7. Removed contractions.
8. Reordered response options so that “I do not know” is always last.