Research Methods in Human-Computer Interaction

Chapter 5- Surveys
Introduction

• Surveys are a very commonly used research method
• Surveys are also often-maligned because they are not done in the proper manner
• A survey is a well-defined and well-written set of questions to which an individual is asked to respond
• Surveys are typically self-administered
Introduction

• Surveys are good at:
  – getting a large number of responses
  – Quickly
  – From a geographically dispersed population
• You can capture the “big picture” relatively quickly
• If structured random sampling is used, you might be able to make accurate population estimates
Introduction

• Doing a survey research study is easy, but doing a well-planned, valid survey study takes a lot of work
  – Surveys must reach the actual population of interest
  – Appropriate sampling methods must be used
  – Questions must be well-worded and tested

• Researchers are not present when users fill out a survey, so it must be easy to use, easy to understand, and easy to return
What is a survey?

• Is a survey the same thing as a questionnaire?
• A questionnaire is the actual list of questions
• A survey is the complete methodological approach
• But the two terms are often used interchangibly
Benefits of Surveys

- You can collect data from a large number of people, at a relatively low cost
- You can get an overview of a population of users in a short amount of time
- Surveys do not require any special equipment
- Surveys are generally approved by institutional review boards because they are usually non-intrusive
Drawbacks of surveys

• Surveys are good at getting shallow data from a large number of people, but not good at getting deep data.
• Since surveys are usually self-administered, it is usually not possible to ask follow-up questions.
• Surveys can lead to biased data when the questions are related to patterns of usage, rather than clear factual phenomena.
Drawbacks of Surveys

• User’s age or gender is a factual statement

• If you are asking users to recall usage patterns or mood, there may be recall bias
  – E.g. how many times did you use this software application over 6 months?
  – What was your mood when you used the software application?

• If recall bias may occur, use time diaries or data logging (or a combination) instead
Target user population

• The target population, or the population of interest, are the computer users who you want to study

• Is it a well-defined population? Do you know approximately how many people are in the target user population

• Set some parameters:
  – Age, gender, education, computer experience
  – Users of certain web sites, applications, OS
Target user population

• How will you contact the members of the target user population?
  – Is there a directory of targeted users?
  – An e-mail distribution list?
  – A postal mailing list?
  – A web site they all visit?
  – A social networking group?
  – Face-to-face meetings?
  – Membership in a certain organization
  – Job licensing or certification?
How to sample?

- Two major types of sampling methods:
  - Probabilistic sampling
    - Where there is a known probability of someone being chosen
  - Non-Probabilistic sampling
    - It is not exactly known what the likelihood of being chosen is
- Note that non-probabilistic sampling is accepted in HCI research, although some social sciences do not believe in it
Probabilistic sampling

- Two types of probabilistic sampling:
  - A census
    - Where every single person in the targeted user population is chosen to take part in the survey
  - A random sample
    - Where not all people are chosen to participate, but it is known what the likelihood is of being chosen to participate
- This can be targeted users, or targeted organizations (such as libraries)
Stratified sample

- A stratified sample is when you have an appropriate number of responses from each subset of your user population.
- Example: a random sample of college students would not have an equal number of freshman, sophomores, juniors, and seniors.
- A stratified random sample would have an equal number from each class year.
- But It doesn’t need to be equal. It would still be stratified if you took 40% seniors, 40% juniors, 10% sophomores, and 10% junior. The researcher decides what is the appropriate breakdown.
Response size

• What response is considered to be sufficient for a random sample?
• It depends on the confidence level and margin of error you consider acceptable
• For instance, to get a 95% confidence level and +/-5% margin of error, you need 384 responses
• If the sample is large (5-10%) compared to the population size, the margin of error is smaller
• Only relevant for random sampling
Sources of error and bias

• Sampling error (not enough responses)
• Coverage error (not all members of the population of interest have an equal likelihood of being sampled)
• Measurement error (questions are poorly worded)
• Non-response error (major differences in the people who were sampled and the people who actually responded)
Non-probabilistic sampling

- Non-probabilistic sampling is used when:
  - You do not use a strict random sample
  - You do not know the likelihood of an individual being selected
  - You are not interested in a population estimate
  - There may not be a clearly defined population of interest

- Non-probabilistic sampling is considered acceptable in HCI research, because often, the HCI researcher must collect their own data (different from many other fields)
Demographic data

• Collecting demographic information is always important in survey data, but becomes more so when using non-probabilistic sampling

• Goal should be to demonstrate either:
  – Diverse, cross-section of respondents
  – A response that is somewhat representative of already-established, baseline data

• Often, non-probabilistic responses are fully anonymous, with no identifying data
Oversampling

• When there isn’t a well-defined list of users, no exact knowledge of population size, and random sampling isn’t possible, the number of responses becomes more important

• When the number of survey responses is large in proportion to the estimated or perceived population size, this is known as oversampling

• Helps establish informal validity
Oversampling

• Having a large number of responses can reduce the likelihood of excluding any segment of the population.
• Not all researchers agree that oversampling increases validity.
• 30 survey responses might be a baseline minimum for small estimated populations, while 500 or more might be considered minimum for larger estimated populations.
• Oversampling would mean many more responses than 30 or 500, in those cases.
Other techniques

• Random sampling of usage, not users
  – If a survey appears every 10th time that a web page is loaded, this is a random sampling of usage, not users. Users who visit the web page often will be over-represented (unless instructions or IP addresses are used to limit)

• Self-selected surveys
  – If a web page always has a link to a survey, everyone is invited to fill out the survey
  – Often, non-probabilistic surveys are self-selected, not random
Establishing informal validity

- If non-probabilistic surveys are used, both demographic information and response size both become important in establishing informal validity.
- Self-selected, non-probabilistic surveys are often used as a first step in researching unknown research phenomena or user groups, where little is known about the user group or
Uninvestigated populations

• If researching an uninvestigated population, it may be challenging to find and recruit users who meet the criteria.

• You may need to:
  – Partner with leaders of that community
  – Use snowball sampling (where one respondent recruits others that they know)

• While snowball sampling may lead to bias in who responds, it increases sample size.
Developing survey questions

• The overall goal is to develop well-written, non-biased questions

• Since most surveys are self-administered, the questions need to stand alone, without any explanations

• You need to focus on both:
  – The overall structure of the entire survey
  – The wording of specific questions
Types of questions

• Open-ended questions
  – Respondents may provide more information, but it can be harder to do data analysis
  – Make sure to ask specific, not general questions. The answer should be open-ended, but the question should not be

• Closed-ended questions
  – Ordered response (e.g. ranking or likert scale)
  – Unordered response (e.g. multiple choice)
Common problems w/questions

• Asking two separate, and possibly related questions in one question (respondents often don’t answer both questions)
• The use of negative words in questions can cause confusion
• Biased wording in questions
• Identifying the position of a well-respected person or organization
• The use of “hot-button” words
Overall survey structure

- All surveys must begin with instructions
  - On paper, should checkboxes and ovals be filled in, checked, an “X” placed in them?
  - Should all respondents fill out all questions?
  - A reminder of who qualifies to participate, and who does not

- Each section of the survey should have a heading

- What path through the survey should the respondent take?
Overall survey structure

- If the survey is electronic, are help links provided?
- If a paper survey:
  - Is there enough white space?
  - Is white paper used? Are standard fonts used?
  - Do folds and staples interfere with any text?
- Is contact info (e-mail, phone, web site, etc.) provided if the respondent has any questions?
- If some questions are “contingent” make that clear using arrows, boxes, and indenting
Overall survey structure

- Questions related to a similar topic should be grouped together
- It’s generally NOT a good idea to randomize the order of the questions
- Provide interesting questions at the beginning of the survey
- Leave demographic questions until the end of the survey
- If there are any sensitive or objectionable questions, leave them until the end, when the respondent has become interested!
- Be reasonable about the length of the survey
Existing surveys

• There are some existing surveys that have been tested and validated in the HCI literature, primarily for usability testing and evaluation:
  – Computer System Usability Questionnaire
  – Interface Consistency Testing Questionnaire
  – Questionnaire for User Interaction Satisfaction
  – Website Analysis and Measurement Inventory

• See book and web site for a list of more surveys
Paper or online surveys?

• How could you contact the potential respondents?
  – Phone?
  – Postal mailing addresses?
  – E-mail addresses?
  – A social networking site?

• Find out if all potential respondents have internet/e-mail access
  – If not, you must use either paper surveys, or a hybrid approach
Paper or online surveys?

• Choose the most practical approach
• Using a hybrid design, with both paper and electronic surveys, can improve the number of responses and insure representation from different portions of the target user population
  – But make sure the different forms of the survey are exactly the same!
Paper or online surveys?

- Copying costs, mailing, postage, and data entry costs can be eliminated with electronic surveys.
- Initial set-up costs for web-based surveys are higher, but data entry can be automated, and error in data entry can be lower.
- Paper surveys are often preferred by people, and response rates can be higher.
- Responses themselves can be faster with electronic surveys.
Paper or online surveys?

- Responses from paper and electronic surveys are considered to be equally valid.
- In sensitive topical areas, people may feel more open about disclosing personal information using electronic surveys.
- Either paper or electronic, you may need to make sure that respondents/participants are made aware of their rights in the research (informed consent).
Testing the survey tool

• You must test both:
  – The survey interface/structure
  – The survey questions themselves

• In an ideal world, you should:
  – Have experts review the survey tool
  – Have interviews with potential respondents to evaluate content/motivational qualities
  – Have a pilot study of the survey tool and implementation procedures
Response rate

• One of the main challenges of a survey is getting a high response rate
• Incentives for survey respondents are typically lower, with a higher number of participants needed, than with other forms of research
• Because they are often self-administered, motivation is a factor
Response rate

• Techniques for improving the response rate:
  – Send an introductory letter from a respected member of the respondent community
  – Increase the ease of returning a survey (include a self-addressed envelope with postage paid)
  – Send out reminders
  – Send a replacement survey 2-4 weeks after the initial one was sent out
  – Make a final contact using a different form of communication
Data analysis

• Separate the quantitative and qualitative data

• “Clean” the data, looking for:
  – Invalid responses
  – Repeats (the same person submitted the same survey twice)
  – Incomplete responses

• Descriptive and inferential statistics
End-of-chapter

• Summary
• Discussion questions
• Research design exercise