

Pre-Class Preparation (Instructor):

Send in an email to students:

- content of any pre-class emails.

Bring to Class:

- Snacks
- Flip charts and markers
- Dry write markers
- Tent cards for student names

Objectives and Competencies:

- Learn to evaluate data collection procedures to identify steps at which errors are likely to enter and propagate
- Critique and improve data collection forms
- Learn to prepare and use checklists for complex procedures such as data collection

Pre-class Preparation (Students):

Readings

1. Redman, T. 2016. Bad Data Costs the U.S. \$3 Trillion Per Year. Harvard Business Review. [\[download pdf\]](#)

Online Lectures:

1. Atul Gawande's TED Talk: [The Importance & Value of the CHECK LIST](#). Follow-up with the details in this good [animated summary](#).
2. Jess Stratton (LinkedIn Learning) Video Overview: [Use Google Forms to Create Surveys](#) (7 min.)
3. OPTIONAL: A more advanced, multi-video [Google Forms Essential Training Course](#) has short (1-3 min) videos explaining each step in more detail. It's great, and only 39 min long from start to finish.

Class Outline

Topic 1 Overview: Intro to Efficient Data Collection (20 min)

1. **Goal:** Error reduction
 - At the time of data collection
 - When transferring to electronic format

2. **Process Audits** : A tool borrowed from industrial engineering - - can help identify where errors are likely to sneak in.
3. **Most people, whether they know it or not, collect data on some kind of form.** Sometimes these forms are paper, sometimes electronic. Notes scribbled on a piece of paper or MS Word document? Both simple forms. To design better forms - forms that reduce the number of errors at both the collection and entry phases - we will use some ideas from manufacturing, shipping, and design industries, along with loads of research on forms themselves.
 - **Lists:** We forget things we need, and we forget things we need to do. Lists prevent that.
 - **Automation:** When collected repeated measurements on a single thing, or the same measurement on many things, attempt to invest in automation.
 - **Asset Management:** There is no need to have people (data collectors or study subjects) write down information you know in advance. Use things like labels & Bar/QR codes to simplify things as much as possible.
 - **UX/UI:** The arrangement of things on a page, and the cues used to guide input, can help reduce errors and increase form completion rates. We know this thanks to websites that depend on you filling out information to get your business; they have done lots of testing to come up with forms that ensure you don't leave the site without giving them the information they need. And so with that in mind....

Breakout & Return Results

1. **Breakout (15 min):** Process Audit of Data Forms
 - Look over these forms and conduct a process audit. Where do you think errors are most likely to sneak in?
2. **Returning results & Take-home message (15 min)**
 - Summary and Discussion of results.

Topic 2 Overview: Lessons from UI/UX (30 min):

1. Reduce Cognitive Overload (aka keep it simple)
2. Write as little as possible
 - Use labels & keep them short...
 - ...and pay attention to where you put the labels
 - Use the appropriate input type and tag...
 - ...and format them in helpful ways
 - Forms should be one column...
 - ...Except when multi-column makes sense
 - Group related fields
 - AVOID ALL CAPS

- For online forms: Show all options if < 6 (unless space is limited)
- Number questions and responses
- Use Formatting to guide the data collectors
- Avoid 2x-sided forms
- Give each sheet a unique ID number
- Add collector info

Break (10 min)**Breakout 2: In-class Assignment (45 min)**

Now let's implement some of the things we've learned. 1. Conduct a Process Audit of your personal data collection sheet. (If you do not have one of your own, you can do the assignment with the "Line Transect Sheet" used in class) 2. Redo your paper data sheet based on your process audit 3. Create an electronic version of the data sheet using Google Forms 4. When done, submit the following via canvas:

- the original form
- the revised form
- A link to the google form

OR

Let's make a checklist for a research trip.

Grading Rubric:

50: Ways errors can get incorporated have been identified; revised form and google doc use UI/UX principles to reduce most data recording errors. **35:** Some (but not all) ways that errors can get incorporated have been identified; revised form and google doc use UI/UX principles to reduce some of the potential data recording errors. **20:** Few of the ways errors can be included are identified; data collection still likely to be error-prone and inefficient.

Free Time

There are 45 min remaining that can be used to —

Sources, Tools, & Resources

Forms

1. Schiavo, F. [The bad design of everyday things #3 — Paper Forms](#).
2. Maloney, S. [Best Practices for PaperBased Form Design](#)
3. [How to design survey forms for quick data entry](#). This is a great post with suggestions on designing survey forms for work in an international / multi-language context.

4. [Best Practice for Form Design](#). These suggestions come from a UX-perspective for online forms, so they might seem most appropriate for online surveys. But the suggestions are really good for paper survey forms as well.
5. [make a template for data entry \(form\) with Excel](#)
6. [‘Using Google Forms, Google Sheets & Excel to Collect and Analyze Data’](#)
7. [Interesting examples of poor UX practices](#)
8. [‘Form Design: 13 Empirically Backed Best Practices’](#)
9. [‘Best Practices For Mobile Form Design’](#)
10. Software: [TapForms](#)
11. Software: [Jotform](#)

Checklists

1. Atul Gawande’s [The Checklist Manifesto](#)
2. Paula Rizzo’s LinkedIn Course [The Power of Lists](#)
3. Clear for [iOS](#) and for [Android](#)
4. [ToDoist](#) especially powerful; lists can be shared with team members and sync across devices
5. [Evernote](#) really more of a note-taking app, but good for lists too
6. Lifewire Review of [8 Best To-Do List Apps](#)

Creating and Printing Labels

1. [Avery Waterproof labels](#)

QR Codes

1. Leila Gharani: [Create QR Codes for FREE | Use Anywhere \(Excel, Word & PowerPoint\)](#)
2. [How to Create a QR Code and Use It Effectively](#)
3. [Mass Generate QR Codes to Prefill Google Forms](#)
4. [‘Top 10 Barcode Scanner AppsFor iPhone and Android’](#)