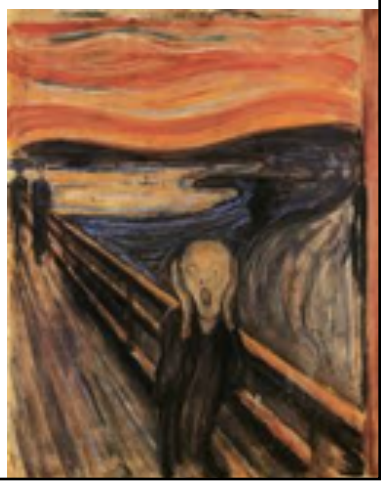
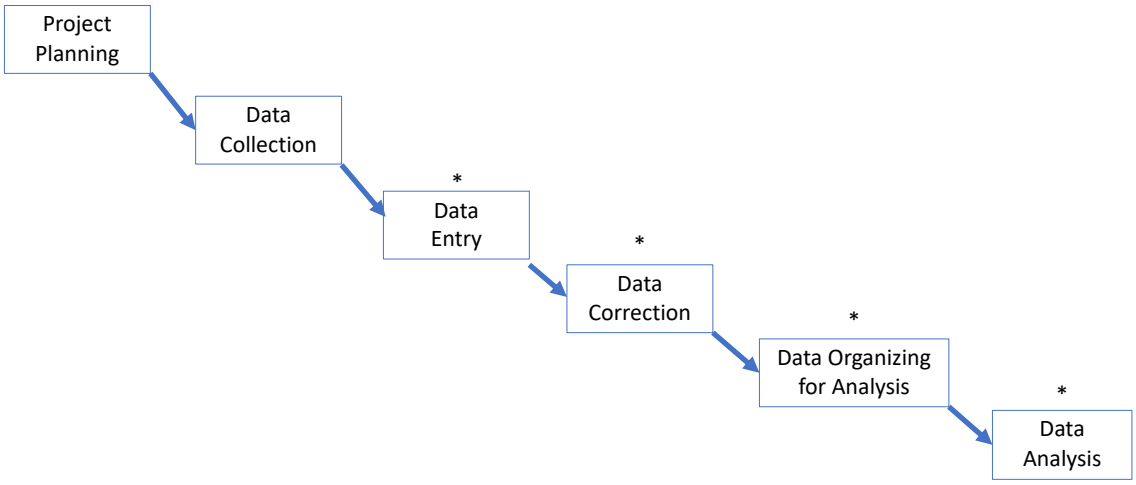
# Efficient Data Collection

1



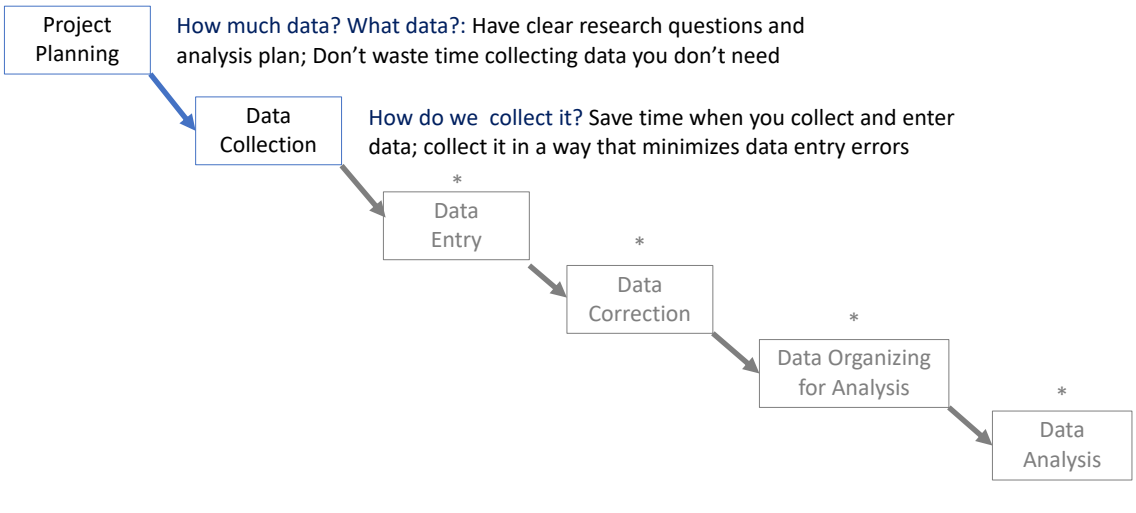
2

# How can we be more efficient?




3

# How can we be more efficient?




4

# Why does this matter?

5

# 1-10-100 Rule

"the cost of quality"

Data entry errors multiply costs exponentially according to the stage at which they are identified and corrected.

**$1:** Price to check the data at first point of entry

**$10:** Price to find and correct error when it is part of a batch

**$100:** Cost of fixing the mistake when it reaches customers

*prevention* is less costly than correction is less costly than *failure*

6

Effort **now** saves time, money, & stress later.

7

## Where can errors be introduced?

"Process Audit"

8

9

1. Scribe reads out incorrect number of tree he wants measured
2. Scribe reads out correct number of tree he wants measured but assistant hears wrong number
3. Scribe reads the number of the tag or tree incorrectly (so 'correct' measurement is recorded, but for a tree different from the one the scribe wanted).
4. Scribe incorrectly measures tree (doesn't know how to use dbh tape, knows how to use it but makes a mistake, measures tree in the wrong place, tape is poor quality, different brand tapes at different times, measures to wrong level of precision)
5. Scribe writes down incorrect value
6. Scribe writes down illegible value
7. Fail to record data you need (gps points, plot, number)
8. Misidentify species
9. Write down incorrect species
10. Switch jobs and so record data inconsistently or incorrectly
11. Lose data sheet
12. Data sheet partially damaged

10

# What can I do?

1. Automation
2. Asset Management
3. UX/UI

11

# Asset Management

Save time and reduce errors by labeling items (e.g., vials, sheets, forms) and “fill out” forms in advance.

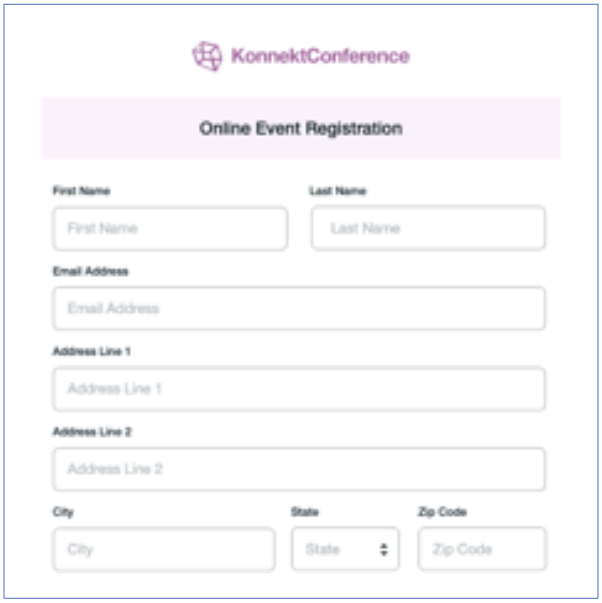
12

# UX/UI

Save time and reduce errors by formatting forms to speed up data collection, minimize errors, and streamline data entry.

Bisits Bullen, Piroska. How to design survey forms for quick data entry.

Coyle, Andrew. "Form design best practices"




13

**CWAC**
COORDINATED WATERBIRD COUNTS
(CWAC forms part of Wetland International's African Waterbird Census Programme)

**SITE DATA COLLECTION FORM**

Please return this form to: CWAC, Animal Demography Unit, University of Cape Town, Rondebosch, 7701. Or email to cwac@adu.org.za. For assistance with filling in the form, please refer to CWAC Information Sheet number 8

NAME OF SITE: | SITE CODE:

Degrees-minutes-seconds or Decimal degrees or Deg. & decimal minutes | GPS setting
S ° ' . " S . ° S ° ' . " Cape datum Clarke 1880
E 0 ° ' . " E 0 . ° E 0 ° ' . " WGS-84 datum HBH94

PROVINCE *(underline applicable option)*
LP MP GP NW FS KN EC NC WC

DATE OF SURVEY:
ADU OBSERVER CODE:
COMPILERS DETAILS *(name, address, telephone, email etc.):*

NEAREST TOWN:

**CONSERVATION MEASURES SURROUNDING THE SITE / WETLAND** *(underline applicable option)*

**Conservation status:** 1 – Protected 2 – Partially protected 3 – Unprotected 4 - Unknown

**Site / Management status** *(underline applicable option or add additional)*

- Part of a National Park
- Part of a Provincial Reserve
- Part of a Local / Municipal Reserve
- Part of a Private Reserve
- Registered Conservancy
- Private Land
- State Land
- Municipal Land
- Mining Property

**Name of protected area / farm / private land etc:**

**Current land use surrounding site** *(e.g. agriculture, grazing, hunting, urban – indicate dominant type):*

**Ownership / Management of site** *(name, email and telephone number):*

**Is it a Ramsar site** *(name):*

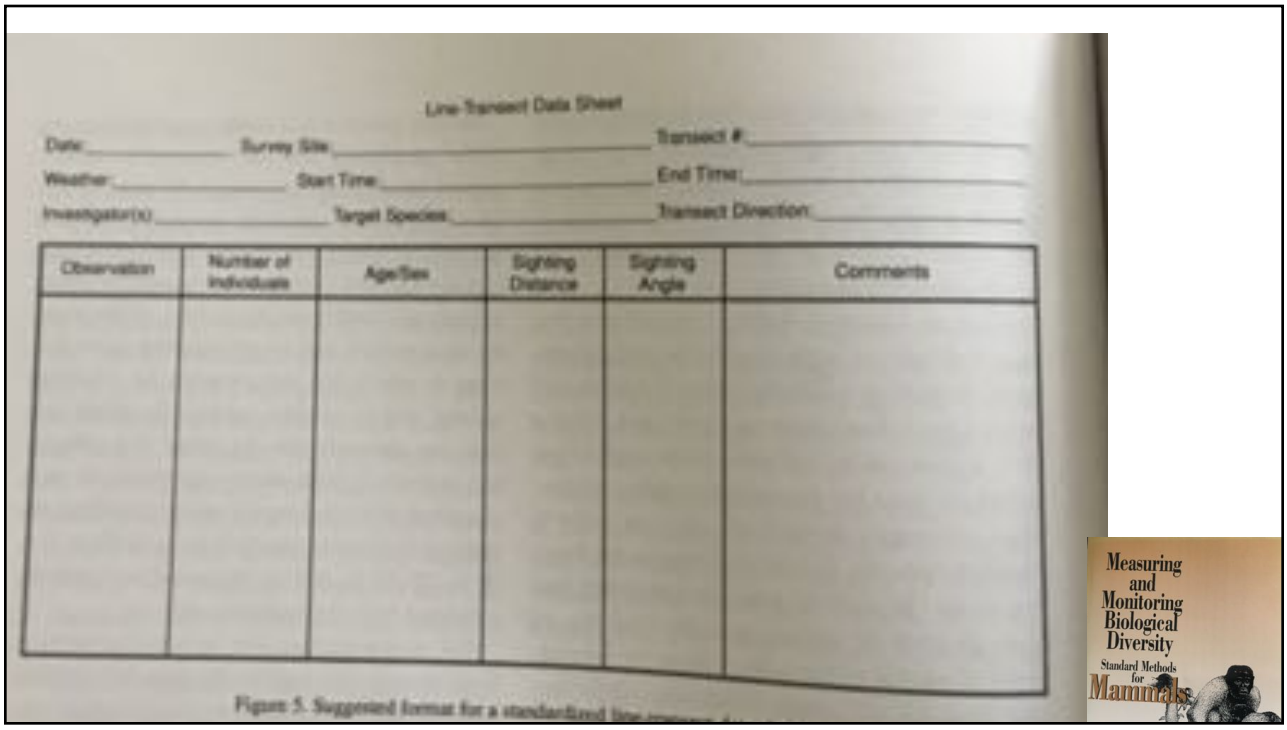
**Is it within an Important Bird Area** *(name):*

**WETLAND / SITE CLASSIFICATION** *(underline the relevant options and indicate the % make-up of each)*

| Wetland classification | (%) | Wetland classification | (%) |
|---|---|---|---|
| **Marine / Coastal Wetlands** | | Seasonal rivers / streams (inc. waterfalls) | |
| Permanent shallow marine waters (<6m at low tide) | | Permanent freshwater lakes (>8ha) (inc. oxbow lakes) | |
| Rocky marine shores (inc. cliffs and offshore islands) | | Seasonal freshwater lakes (>8ha) (inc. floodplain lakes) | |
| Sandy or pebble shores (inc. sand banks and dunes) | | Permanent freshwater marshes (<8ha) (inc. swamps) | |
| Estuarine waters (permanent water of est. systems) | | Seasonal freshwater marshes (<8ha) (inc. vle's) | |
| River mouth | | Permanent brackish / saline / alkaline lakes | |
| Intertidal mud, sand or salt flats | | Seasonal brackish / saline / alkaline lakes (inc. flats) | |
| Intertidal marshes (inc. salt, brakish and freshwater) | | Permanent brackish / saline marshes (inc. pans and pools) | |
| Intertidal forested wetlands (inc. mangrove swamps) | | Seasonal brackish / saline marshes (inc. pans and pools) | |
| Coastal brackish / saline lagoons | | Freshwater shrub-dominated wetland | |
| Coastal freshwater lagoons | | Freshwater tree-dominated wetland (inc. swamp forest) | |
| **Inland Wetlands** | | Freshwater springs and oases | |
| Permanent rivers / streams (inc. waterfalls) | | | |

1. Conduct a "Process Audit" of these data collection forms
2. What would your UX be if you were filling out these forms?

14



Line-Transect Data Sheet

Date: _____ Survey Site: _____ Transect #: _____

Weather: _____ Start Time: _____ End Time: _____

Investigator(s): _____ Target Species: _____ Transect Direction: _____

| Observation | Number of Individuals | Age/Sex | Sighting Distance | Sighting Angle | Comments |
|---|---|---|---|---|---|
| | | | | | |

Figure 5. Suggested format for a standardized line-transect data sheet



15

# CWAC

## COORDINATED WATERBIRD COUNTS

(CWAC forms part of Wetland International's African Waterbird Census Programme)

## SITE DATA COLLECTION FORM

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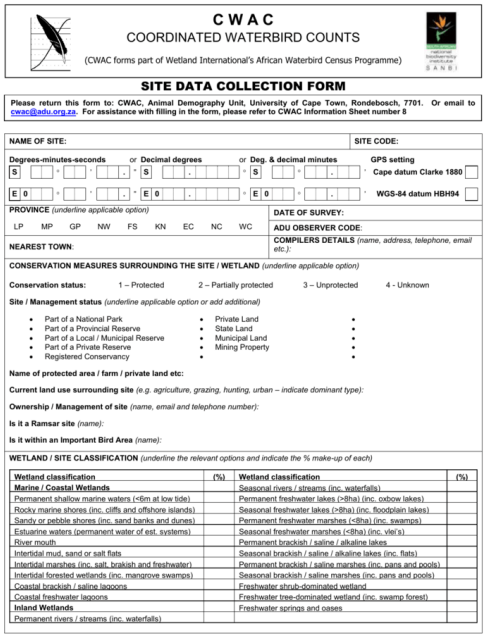
| NAME OF SITE: | SITE CODE: |
|---|---|
| Degrees-minutes-seconds: S ° ' " E 0 ° ' " | or Decimal degrees: S . ° E 0 . ° | or Deg. & decimal minutes: S ° . ' E 0 ° . ' | GPS setting: Cape datum Clarke 1880 ☐ WGS-84 datum HBH94 ☐ |
| PROVINCE *(underline applicable option)*: LP MP GP NW FS KN EC NC WC | DATE OF SURVEY: |
| | ADU OBSERVER CODE: |
| NEAREST TOWN: | COMPILERS DETAILS *(name, address, telephone, email etc.):* |
| CONSERVATION MEASURES SURROUNDING THE SITE / WETLAND *(underline applicable option)* | |

16

1. Reduce Cognitive Overload (aka keep it simple)
2. Write as little as possible



**C W A C**
COORDINATED WATERBIRD COUNTS
(CWAC forms part of Wetland International's African Waterbird Census Programme)

**SITE DATA COLLECTION FORM**

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**NAME OF SITE:** | **SITE CODE:**

**Degrees-minutes-seconds** or **Decimal degrees** or **Deg. & decimal minutes** | **GPS setting**

S ___ ° ___ ' ___ . ___ " S ___ . ___ ° S ___ ° ___ . ___ ' **Cape datum Clarke 1880** ☐

E 0 ___ ° ___ ' ___ . ___ " E 0 ___ . ___ ° E 0 ___ ° ___ . ___ ' **WGS-84 datum HBH94** ☐

**PROVINCE** *(underline applicable option)*

LP MP GP NW FS KN EC NC WC

**DATE OF SURVEY:**

**ADU OBSERVER CODE:**

**NEAREST TOWN:**

**COMPILERS DETAILS** *(name, address, telephone, email etc.):*

**CONSERVATION MEASURES SURROUNDING THE SITE / WETLAND** *(underline applicable option)*

**Conservation status:** 1 – Protected 2 – Partially protected 3 – Unprotected 4 - Unknown

**Site / Management status** *(underline applicable option or add additional)*

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- Part of a Provincial Reserve
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- State Land
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**Name of protected area / farm / private land etc:**

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| Sandy or pebble shores (inc. sand banks and dunes) | | Permanent freshwater marshes (<8ha) (inc. swamps) | |
| Estuarine waters (permanent water of est. systems) | | Seasonal freshwater marshes (<8ha) (inc. vlei's) | |
| River mouth | | Permanent brackish / saline / alkaline lakes | |
| Intertidal mud, sand or salt flats | | Seasonal brackish / saline / alkaline lakes (inc. flats) | |
| Intertidal marshes (inc. salt, brakish and freshwater) | | Permanent brackish / saline marshes (inc. pans and pools) | |
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| Coastal brackish / saline lagoons | | Freshwater shrub-dominated wetland | |
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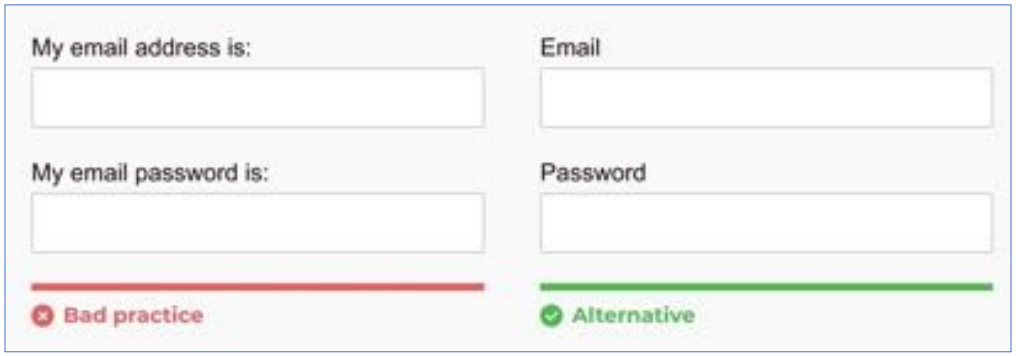
| **Inland Wetlands** | | Freshwater springs and oases | |
| Permanent rivers / streams (inc. waterfalls) | | | |

17

Use labels & keep them short…




18

## Be careful with the location of input labels to avoid mistakes

Poor alignment leads to filling out forms incorrectly

19

## …and pay attention to where you put the labels

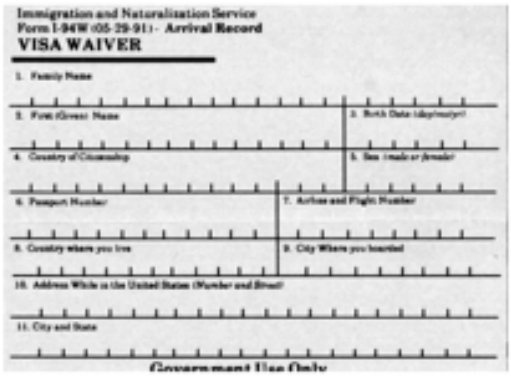



Figure 17 — Part of a US Immigration form: *a high error rate caused by faulty*

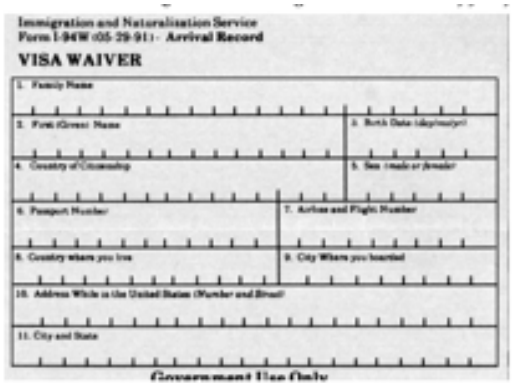



Figure 18 — A better approach: *completing the box would solve the problem*

20

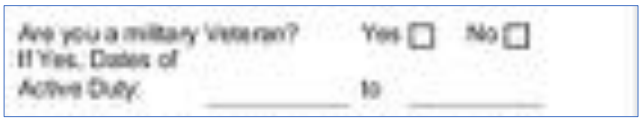
## Use the appropriate input type and tag…

Radio Button vs. Check Box

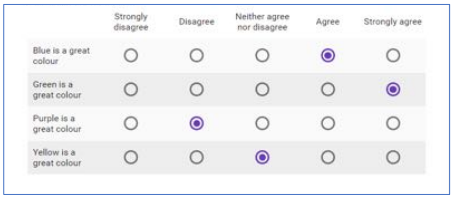
21

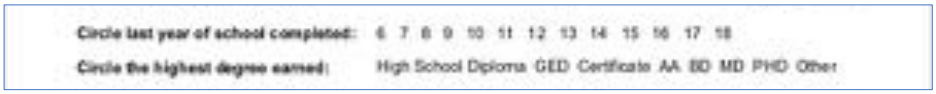
## Use the appropriate input type and tag…and format them in helpful ways

Blanks vs. Fill-in Boxes (narrow, wide, height)
Circling Options vs Check Boxes (distance between)
Likert scale options (vertical vs. horizontal, direction of impact, words vs. numbers)
Options to constrain errors vs. Unknown Results




M? D? Y?




22

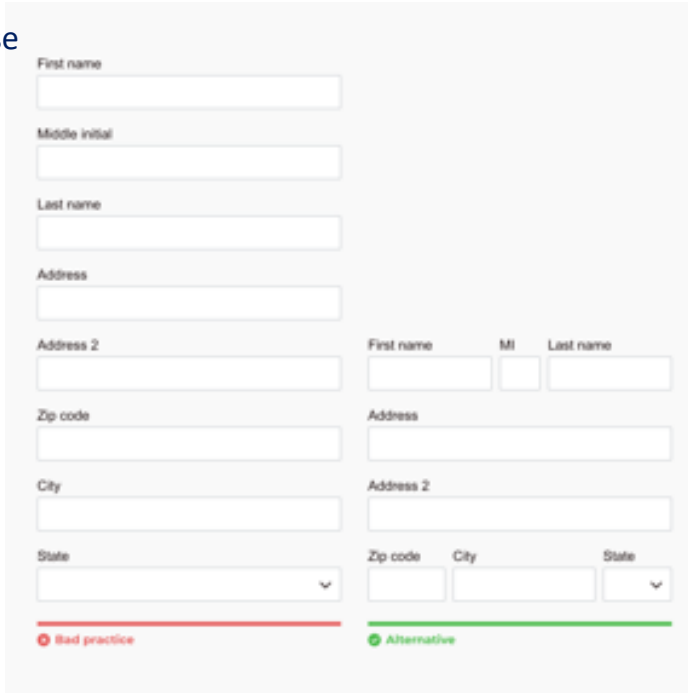
## Forms should be one column…

One-column forms are more comfortable to scan and conform better to mobile displays. Multiple columns can strain a user and cause them to skip fields accidentally.

23

## …Except when multi-column makes sense

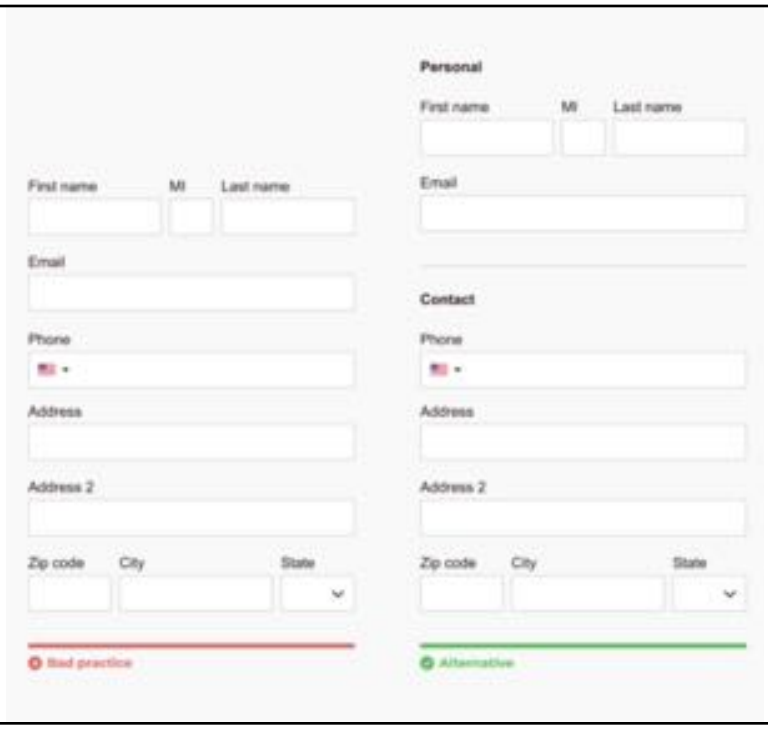
Fields that logically go together should be inline




24

## Group related fields

Filled out faster and reduces cognitive overload




25

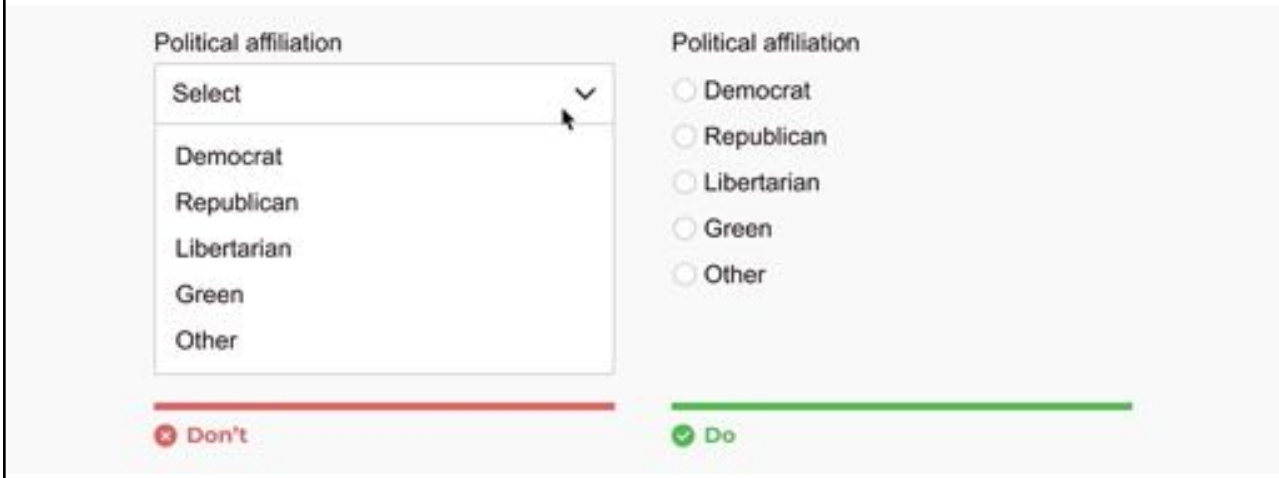
## AVOID ALL CAPS

All caps make things hard and tiring to read

26

## For online forms: Show all options if < 6 (unless space is limited)

Dropdown selector requires 2 clicks




27

## Number questions and responses

How many years of school did you complete? *(select only one)*

- None
- Grade 1-5
- Grade 6-9
- Grade 10-12
- College

5. How many years of school did you complete? *(select only one)*

1. None
2. Grade 1-5
3. Grade 6-9
4. Grade 10-12
5. College

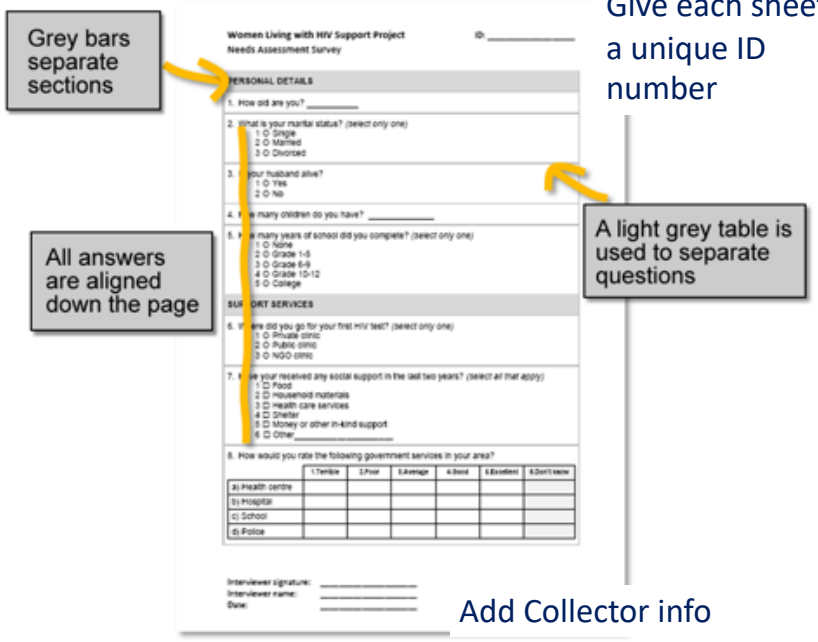
5. តើមីងបានទទួលការរៀនសូត្រកំរិតណា? (សូមជ្រើសយកចំលើយតែ១)

1. មិនបានរៀនទេ
2. ថ្នាក់ទី១-៥
3. ថ្នាក់ទី៦-៩
4. ថ្នាក់ទី១០-១២
5. មហាវិទ្យាល័យ

28

Use Formatting to guide the data collectors

Avoid 2x-sided sheets




29

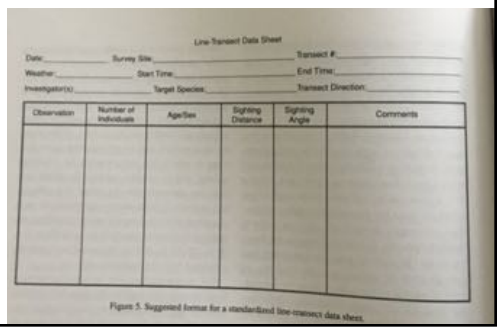
1. Reduce Cognitive Overload (aka keep it simple)
2. Write as little as possible

30

# Assignment

1. Redo your paper data form
2. Create a Google Form to enter the data
3. Send me:
   a. the original form
   b. the revised one
   c. A link to the google form

4. If you don't have one, you can do the assignment with the Line Transect Sheet"


Line-Transect Data Sheet

Date: Survey Site: Transect #:

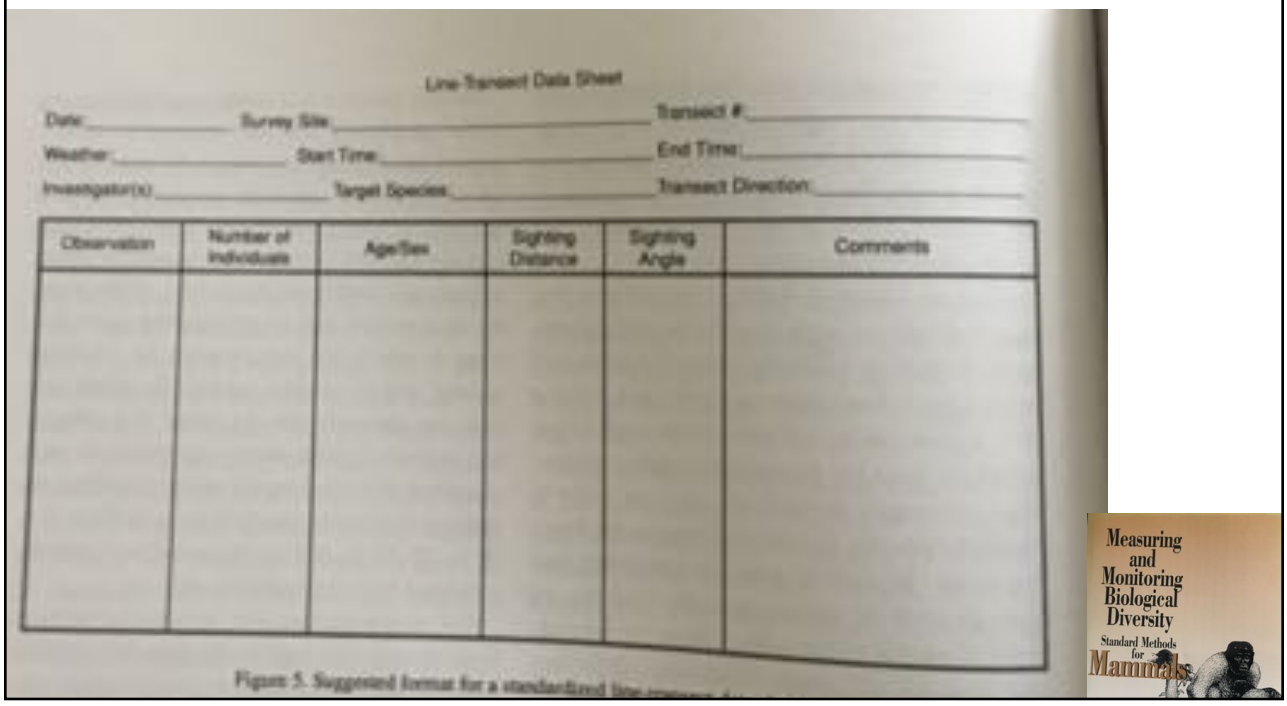
Weather: Start Time: End Time:

Investigator(s): Target Species: Transect Direction:

| Observation | Number of Individuals | Age/Sex | Sighting Distance | Sighting Angle | Comments |
|---|---|---|---|---|---|
| | | | | | |

Figure 5. Suggested format for a standardized line-transect data sheet.

31


Line-Transect Data Sheet

Date: Survey Site: Transect #:

Weather: Start Time: End Time:

Investigator(s): Target Species: Transect Direction:

| Observation | Number of Individuals | Age/Sex | Sighting Distance | Sighting Angle | Comments |
|---|---|---|---|---|---|
| | | | | | |

Figure 5. Suggested format for a standardized line-transect data sheet.

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## TRAPPING DATA SHEET - Elliott, Pitfall, Funnel, Cage, Camera...

OFFICE USE ONLY SITEID: ..... Surveynums: ..... Entered: ..... Checked: ..... Corrected: .....

SITE ALIAS (field code): .....

PROJECT: .....

Locality Info: (not required if site info datasheet already filled out)

Datum: _____ Location derivation:* _____ zone: _ _ easting: _ _ _ _ _ _ northing _ _ _ _ _ _ _

Accuracy:* _____ Altitude _____ Altitude accuracy: _____ m Altitude derivation:* _____

Locality description: .....

Tenure: ..... Reserve or Property Name: ..... Bioregion: .....

Habitat Description: .....

**Methods and Effort:**

Trapping notes (eg: T- design, square, straight line):

| | | | | |
|---|---|---|---|---|
| Elliott traps (SET) | _____ | Elliott traps open for | _____ nights | _____ m apart |
| Pitfall traps (SPT): | _____ | Pitfall traps open for | _____ nights | _____ m apart |
| Funnel traps (SFT) | _____ | Funnel traps open for | _____ nights | _____ m apart |
| Cage traps (SCT) | _____ | Cage traps open for | _____ nights | _____ m apart |
| Camera traps (RCT): | _____ | Camera traps deployed for | _____ nights | |
| Turtle traps (STU): | _____ | Turtle traps open for | _____ nights | |
| Other: | _____ | Effort: | | |

| TRAP NIGHT: | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Date | | | | | | |
| Max Temp | | | | | | |
| Min Temp | | | | | | |
| Wind Velocity* | | | | | | |
| Wind Direction | | | | | | |
| Cloud Cover (8ths) | | | | | | |
| Precipitation* | | | | | | |
| Moon* | | | | | | |
| Night Light* | | | | | | |
| Observer/s: | | | | | | |

**Records** Date traps open: ___/___/___ Date traps closed: ___/___/___ *Codes on back of page

| Trap Night | Method | Species | Spp. code | Num | Age | Sex | Comments (Repro condition, wt, sv, tail, etc) |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
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https://www.qld.gov.au/__data/assets/pdf_file/0030/68259/fauna-survey-datasheets.pdf

33

## 2019 Attitudes about abortion in the U.S.

(For Research Purpose Only)

Participant ID: _____

Interviewer's Name: _____

Interview Date: _____

1) What is your political affiliation?
   a. Democrat
   b. Independent
   c. Republican
   d. I prefer not to disclose
   e. Other _____

2) What is your family income?
   a. > $100,000/year
   b. $ 80,000/year
   c. $ 60,000/year
   d. $25,000/year
   e. I prefer not to disclose

3) Do you agree or disagree with any of these statements?
   a. A woman can decide what to do about her body and duration of pregnancy.
      i. YES
      ii. NO
   b. Government should regulate abortion access.
      i. YES
      ii. NO

C. Abortion at any stage should be illegal

i. Yes
ii. NO

**Date:** **Birders:** **Scribe:**

**Temp:** **Wind:** **Precipitation:**

| Grid/Plot/Time | Species | #In | #Out | Grid/Plot/Time | Species | #In | #Out |
|---|---|---|---|---|---|---|---|
| K.1/K.1.1/0445 | Rattling Cisticola | 4 | 2 | | | | |
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**How to fill out this form:** Enter the date, names of birders and scribe. For each plot, enter the Grid, plot number and start time for each plot. Estimate the temp in ~C, wind on the Beaufort scale (0-none; 1 light, felt on face; 2-mild, leaves sway; 3-moderate, branches move; 4 branches in constant motion) and cloud cover/precipitation (None, overcast, fog, light). Enter the species—use species pairs (e.g. Levaillant's/Jacobin Cuckoo) or genus names (e.g. *Falco* spp.) if you cannot identify a bird to species. Enter the number of birds in and out of the plot for each species— see protocol for details.

**Survey protocol:** Begin 50m from the center of the plot, surveying for 2 mins. Count all birds detected ≤50m from the center of the plot as "in" and birds >50m from the center as "out" for the entire survey.After 2 mins, proceed to the center of the plot and survey until 6 mins into the survey. After 6 mins, walk throughout the plot to flush any birds holding to cover. Resume surveying in place and continue until 8 mins have elapsed. Slowly walk to the edge of the plot, surveying until 10 mins have passed. The survey is now complete. Notes: A bird counts as "in" if it enters the circle at any point during the survey. Survey conditions— do not survey after 1030 hrs, in winds over 20 kph (~4-5 on the Beaufort scale), or in active precipitation.

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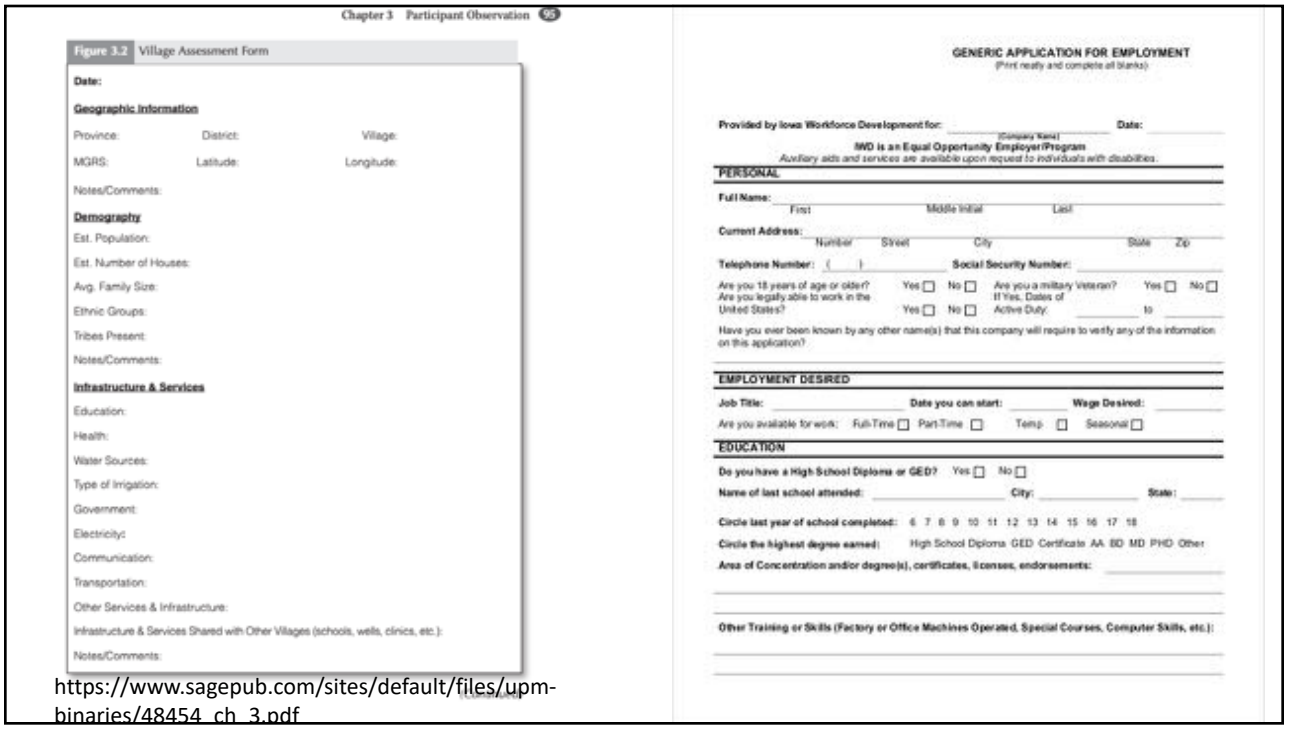

Chapter 3 Participant Observation 95

Figure 3.2 Village Assessment Form

Date:

Geographic Information

Province: District: Village:

MGRS: Latitude: Longitude:

Notes/Comments:

Demography

Est. Population:

Est. Number of Houses:

Avg. Family Size:

Ethnic Groups:

Tribes Present:

Notes/Comments:

Infrastructure & Services

Education:

Health:

Water Sources:

Type of Irrigation:

Government:

Electricity:

Communication:

Transportation:

Other Services & Infrastructure:

Infrastructure & Services Shared with Other Villages (schools, wells, clinics, etc.):

Notes/Comments:

GENERIC APPLICATION FOR EMPLOYMENT

(Print neatly and complete all blanks)

Provided by Iowa Workforce Development for: _____ Date: _____

(Company Name)

IWD is an Equal Opportunity Employer/Program

Auxiliary aids and services are available upon request to individuals with disabilities.

PERSONAL

Full Name: _____

First Middle Initial Last

Current Address: _____

Number Street City State Zip

Telephone Number: ( ) _____ Social Security Number: _____

Are you 18 years of age or older? Yes ☐ No ☐ Are you a military Veteran? Yes ☐ No ☐

Are you legally able to work in the United States? Yes ☐ No ☐ If Yes, Dates of Active Duty: _____ to _____

Have you ever been known by any other name(s) that this company will require to verify any of the information on this application?

EMPLOYMENT DESIRED

Job Title: _____ Date you can start: _____ Wage Desired: _____

Are you available for work: Full-Time ☐ Part-Time ☐ Temp ☐ Seasonal ☐

EDUCATION

Do you have a High School Diploma or GED? Yes ☐ No ☐

Name of last school attended: _____ City: _____ State: _____

Circle last year of school completed: 6 7 8 9 10 11 12 13 14 15 16 17 18

Circle the highest degree earned: High School Diploma GED Certificate AA BD MD PHD Other

Area of Concentration and/or degree(s), certificates, licenses, endorsements: _____

Other Training or Skills (Factory or Office Machines Operated, Special Courses, Computer Skills, etc.):

https://www.sagepub.com/sites/default/files/upm-binaries/48454_ch_3.pdf

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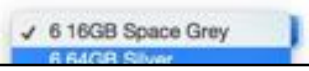
# Format Data Sheets (paper or digital) to simplify data collection, minimize errors, and simplify data entry

Options
Constraints
Validation
Formatting

Codes / Minimize Writing
Large Text, White Space
Few Columns

Bold, Boxes, & other visual Cues
Pre-test

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