

REDCAP DATA DICTIONARY CLASS

November 9, 2017



 **REDCap**
Research Electronic Data Capture

ITHS

Institute of Translational Health Sciences
Accelerating Research. Improving Health.

LEARNING OBJECTIVES

- Learn how to leverage the data dictionary
- Data dictionary basics
- Column descriptions
- Best practices
- Interplay with longitudinal features
- Interplay with repeatable forms



ITHS' Focus

- Speeding science to clinical practice for the benefit of patients and communities.
- Promotes translation of scientific discovery by:
 - ❑ Fostering innovative research
 - ❑ Cultivating multi-disciplinary partnerships
 - ❑ Training the next generation of researchers
- More information: www.iths.org



Laboratory

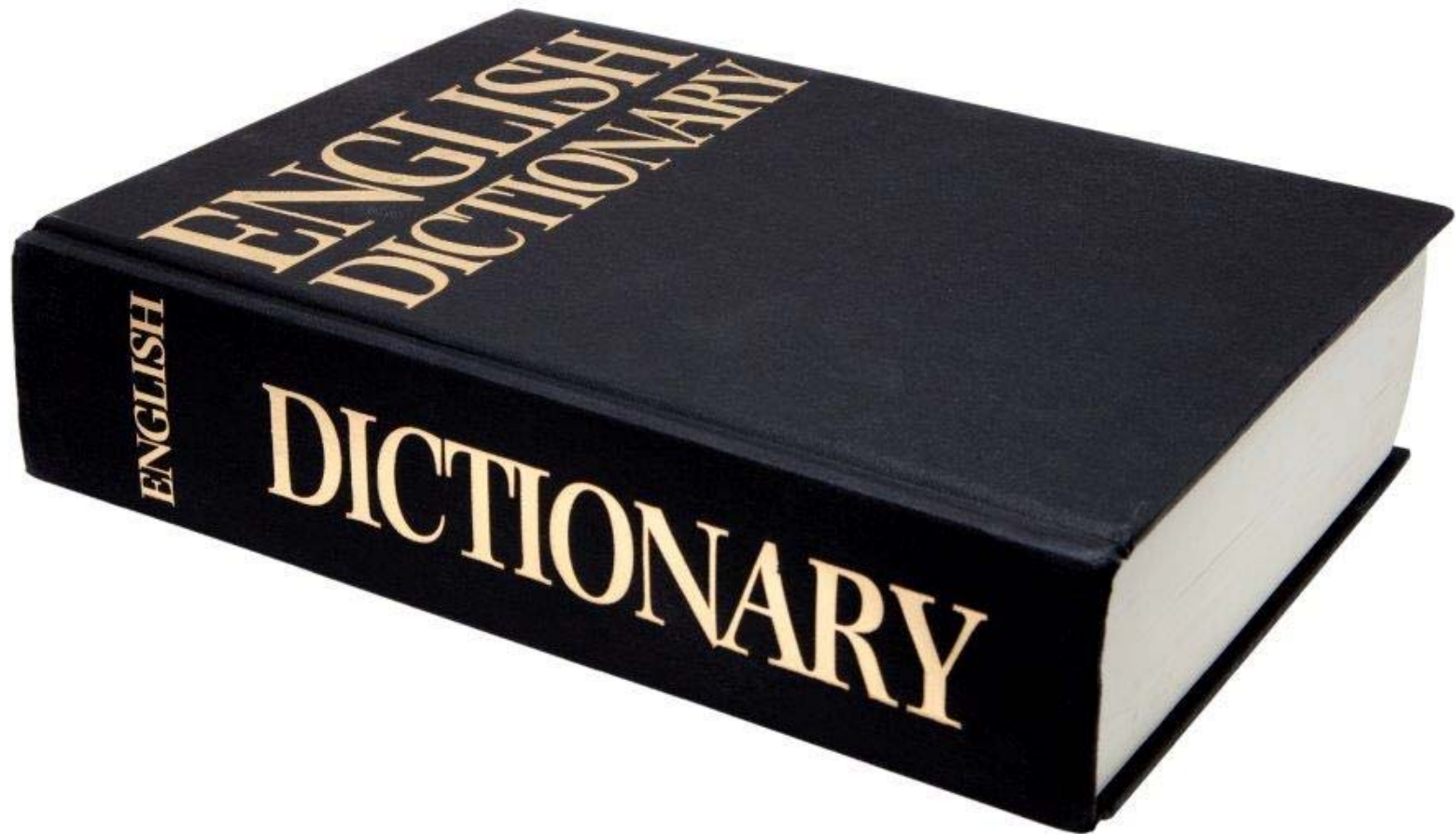
Clinic

Community

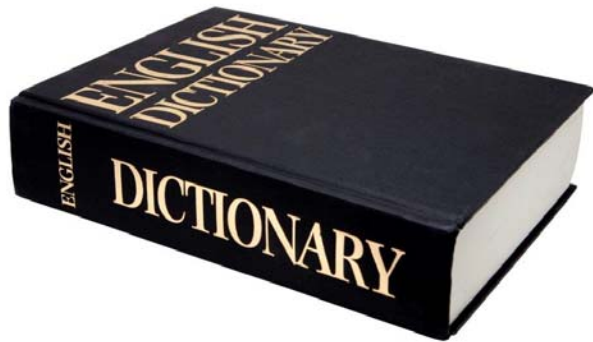


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Data Dictionary



What's the data dictionary?



**Higher learning threshold,
larger risk for errors, but
quicker form development.**

- ▶ CSV spread sheet that defines an entire project
 - ☐ Forms
 - ☐ Variables
- ▶ Does NOT define:
 - ☐ Events
 - ☐ Surveys, survey queues & settings
 - ☐ Project settings
 - ☐ User rights & data access groups
 - ☐ Schedules
 - ☐ Randomization
 - ☐ Data quality rules
 - ☐ Reports

Data dictionary workflow

Recommended best practice

Download current data dictionary and backup

Data dictionaries can be downloaded in the data dictionary upload page located on the project setup page.

Store a local backup of the data dictionary or use the snapshot feature.

Modify the data dictionary

Add or edit fields/forms/logic as needed.

Only use one mode of design at a time to prevent overwrites.

Upload your new data dictionary

REDCap will provide you with an overview of any errors it detected in your data dictionary. Correct those and re-upload.

Commit your data dictionary

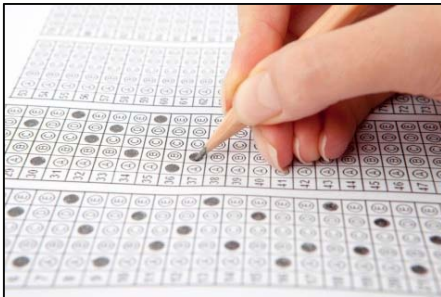
When no critical errors are detected, you can commit your data dictionary to your project.

Data dictionary basic overview



- ▶ Columns list aspects of variables
- ▶ Each row defines 1 variable:
 - ❑ Exception:
First row defines the aspect headers
 - ❑ Do not mess with row 1
- ▶ Row 2 defines the REDCap record ID:
 - ❑ Mandatory row, but modifiable

General



- ▶ Four types of aspects:
 - ❑ Mandatory (A, C, D, E)
 - ❑ Conditionally Mandatory (F)
 - ❑ Non-mandatory
(B, G, H, I, J, K, L, M, N, O, R)
 - ❑ Matrix fields (P, Q)

Aspects

Aspects - Variable name

Column A

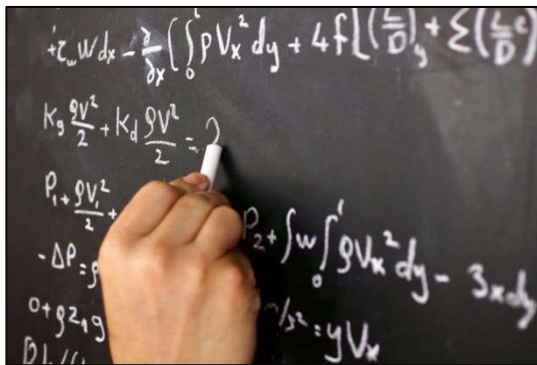
Mandatory

Variable name

Conditionally mandatory

Non-mandatory

Matrix fields



Defines:

- The unique variable name of the variable. Used to store and reference that variable throughout the project

Do's:

- Only use lower case, numbers, underscores
- Has to have at least 2 characters
- Has to be unique within the project
- Keep the variable name as short as possible

Don'ts:

- Start with a number
- Make the name longer than 32 characters
- Use special characters (#,\$,%,!,? etcetera)

Aspects - Form name

Column B

Mandatory

Form name

Conditionally mandatory

Non-mandatory

Matrix fields



Defines:

- ▶ The name of the form that variable lives in.

Do's:

- ▶ Use lower case, numbers, underscores.
 - ☐ Can be changed later to include capitalizations or special characters.
- ▶ Needs to have at least 2 characters.
- ▶ Has to be unique within the project.
- ▶ All variables in one form have to be sequential.

Don'ts:

- ▶ Make forms names really similar.

Aspects - Section Header

Column C

Mandatory

Conditionally mandatory

Non-mandatory

Section Header

Matrix fields



Defines:

- This column creates a bar with the provided text in it. It can be used to define page breaks in surveys. Section headers are linked to other variables.

Do's:

- ▶ Use any type of text you want.
- ▶ Feel free to use HTML to format the text to your liking.
- ▶ Assign it to the row of which you want the section header to appear above of.

Don'ts:

- ▶ Create a unique row for the section header.
- ▶ Be careful when combining with fields that contain branching logic.
- ▶ Test special characters (#,\$,%,!,?, etcetera) to make sure they translate well to your online form.

Aspects - Field Type

Column D

Mandatory

Field Type

Conditionally mandatory

Non-mandatory

Matrix fields



Defines:

- Defines what kind of variable this variable will be. You can only use REDCap-supported field types.

Do's:

- Only use the allowed shorthand codes (*text, notes, dropdown, radio, checkbox, file, calc, descriptive, slider, yesno, truefalse*).
- Lookup the field type table in the FAQ for more info.

Don'ts:

- Don't use the sql field type. That one is reserved for REDCap administrators.
- Don't edit any existing rows with the sql field type.

Aspects - Field label

Column E

Mandatory

Field Label

Conditionally mandatory

Non-mandatory

Matrix fields



Defines:

- ▶ The question text that will be displayed to the survey participant or data entry user.

Do's:

- ▶ Use any type of text you want.
- ▶ Feel free to use HTML to format the text to your liking.
- ▶ Make the question understandable and to the point.

Don'ts:

- ▶ Double barrel the question.
- ▶ Create a leading question.
- ▶ Leave it totally empty.
(technically allowed, but considered bad form design)

Aspects - Choices, Calculations, or Slider labels

Column F

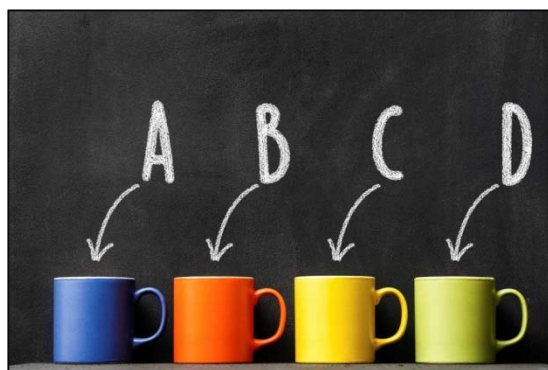
Mandatory

Conditionally mandatory

Choices, Calc's or sliders

Non-mandatory

Matrix fields



Defines:

- Defines question choices, calculations or slider labels depending on the chosen field type.

Do's:

- Use the following syntax for choices:
 - ❑ *raw value, label | raw value, label*
- Use the following syntax for slider labels:
 - ❑ *label | label or label | label | label*
- For calculations, use the same syntax as for branching logic. Main difference is that the calculation has to end in a number instead of a true or false statement.
- Use special functions for calculations.
- Add shortcuts for enabling a Bioportal lookup (see FAQ).

Don'ts:

- Add a comma to a raw value.
- Make overly complex calculations.

Aspects - Field Note

Column G

Mandatory

Conditionally mandatory

Non-mandatory

Field Note

Matrix fields



Defines:

- ▶ The field note will allow you to add a short instruction to variable (e.g., adding a date format to a date validated field).

Do's:

- ▶ Use any type of text you want.
- ▶ Feel free to use HTML to format the text to your liking.
- ▶ Make the note short and to the point.

Don'ts:

- ▶ Put a lot of text in the field note.

Aspects - Text validation type or show slider number

Column H

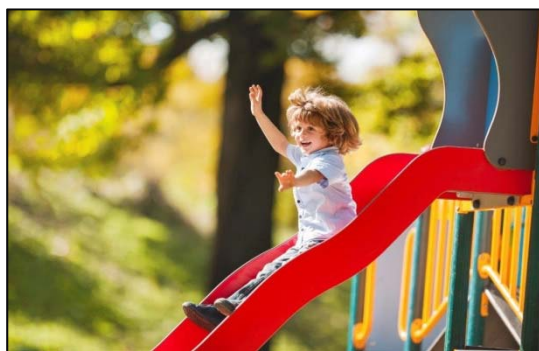
Mandatory

Conditionally mandatory

Non-mandatory

Text validation type or slider #

Matrix fields



Defines:

- ▶ The type of validation a text field might have or if you want to display the numeric value behind a slider field.

Do's:

- ▶ Fill in the text “number” to enable the number counter behind a slider.
- ▶ Only use the allowed shorthand codes for text validation.
- ▶ Lookup the text validation shortcuts table in the FAQ for more info.

Don'ts:

- ▶ Put in a text validation shortcut or the slider shortcut in this column for other field types. REDCap will not accept this and won't allow you to import the data dictionary.

Aspects - Text validation minimum and maximum

Column I & J

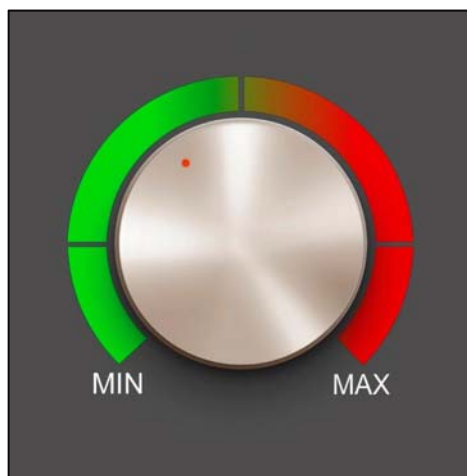
Mandatory

Conditionally mandatory

Non-mandatory

Text validation min/max

Matrix fields



Defines:

- ▶ These two columns define a minimum and/or maximum value for a validated text variable.

Do's:

- ▶ Use a minimum, maximum, or both when appropriate.
- ▶ Always build in a bit of extra space to allow for outliers.
- ▶ Match the entered value to the field type (e.g., date for a date field).

Don'ts:

- ▶ Put in a minimum or maximum in this column for other field types. REDCap will not accept this and will not allow you to import the data dictionary.

Aspects - Identifiers

Column K

Mandatory

Conditionally mandatory

Non-mandatory

ID's

Matrix fields



Defines:

- Flags the variable as an identifier or not. This does not have any effect on the data entry process but does impact the data export process.

Do's:

- Use a single “y” to flag a variable as an identifier.
- Leave the field blank to flag the variable as a non-identifier.

Don'ts:

- Make everything an identifier.
- Put in anything other than the allowed “y” code. REDCap will not accept the data dictionary.

Aspects - Required Column M

Mandatory

Conditionally mandatory

Non-mandatory

Required

Matrix fields



Defines:

- ▶ Makes a variable required. This does have any effect on the data entry process but does not impact the data export process.

Do's:

- ▶ Use a single "y" to flag a variable as required.
- ▶ Leave the field blank to flag the variable as optional.
- ▶ Add a field note to unstructured required fields to explain what to do when no answer can be given.

Don'ts:

- ▶ Make a checkbox required.
- ▶ Make a variable required without "exit" options.
- ▶ Put in anything other than the allowed "y" code. REDCap will not accept the data dictionary.

Aspects - Branching Logic

Column L

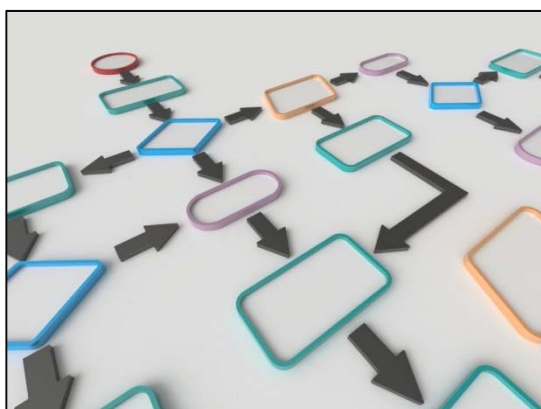
Mandatory

Conditionally mandatory

Non-mandatory

Branching logic

Matrix fields



Defines:

- ▶ The branching logic attached to this specific variable.

Do's:

- ▶ Make use of the copy and paste features to quickly add logic to a lot of variables.
- ▶ Use excel function to craft custom branching logic quickly.
- ▶ Test your logic to work out the bugs.

Don'ts:

- ▶ Craft logic that never can be true.
- ▶ Use double quotes instead of single quotes.

Aspects - Custom alignment

Column N

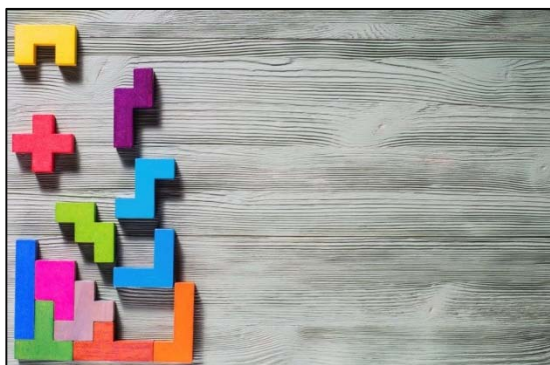
Mandatory

Conditionally mandatory

Non-mandatory

Custom alignment

Matrix fields



Defines:

- ▶ Allows you to slightly modify the way REDCap displays variables.

Do's:

- ▶ Use the shortcuts codes for the four options:
 - ☐ LV: Left Vertical
 - ☐ LH: Left Horizontal
 - ☐ RH: Right Horizontal
 - ☐ RV: Right Vertical (the default option when left blank)

Don'ts:

- ▶ Put in anything other than the allowed shortcut codes. REDCap will not accept the data dictionary.

Aspects - Question numbering

Column O

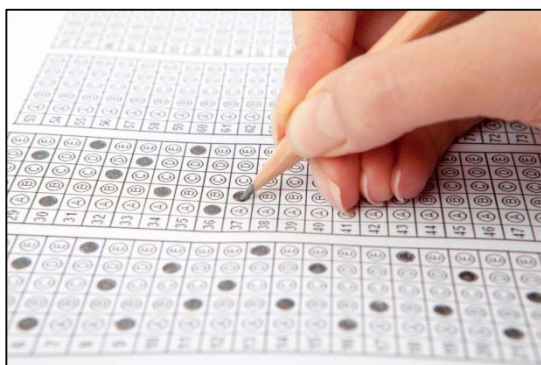
Mandatory

Conditionally mandatory

Non-mandatory

Question numbering

Matrix fields



Defines:

- ▶ Allows you to add a custom number per variable in survey mode.

Do's:

- ▶ Use logical ordering.
- ▶ Take branching logic into account.
 - ☐ Create sub-numbers (1a, 1b, etcetera).
- ▶ Leave blank if you don't want any numbers for questions.

Don'ts:

- ▶ Add question number for non-surveys.

Aspects – Matrix group

Column P

Mandatory

Conditionally mandatory

Non-mandatory

Matrix fields

Matrix group



Defines:

- Groups variables into a matrix.

Do's:

- Only use lower case, numbers, underscores.
- Has to have at least 2 characters.
- Has to be unique within the project.
- Matrices have to be sequential and need to have the same options for all variables.
- Use a section header in the top variable of a matrix to create a matrix header.

Don'ts:

- Add a matrix name for field types that are not radio buttons or checkboxes.
- Create matrices with a lot of options.

Aspects – Matrix ranking

Column Q

Mandatory

Conditionally mandatory

Non-mandatory

Matrix fields

Matrix ranking



Defines:

- Flags whether or not a matrix is a ranking matrix or not.

Do's:

- Use a single “y” to flag a variable as required.
- Leave the field blank to flag the variable as optional.
- Ranking matrices are only allowed for radio button matrices.

Don'ts:

- Create a checkbox ranking matrix.
- Put in anything other than the allowed “y” code. REDCap will not accept the data dictionary.

Aspects - Field annotation & Action tags

Column R

Mandatory

Conditionally mandatory

Non-mandatory

Field annotation & Action tags

Matrix fields



Defines:

- Ability to add a note about the field for the designer. Or enable 1 or more action tags for this field.

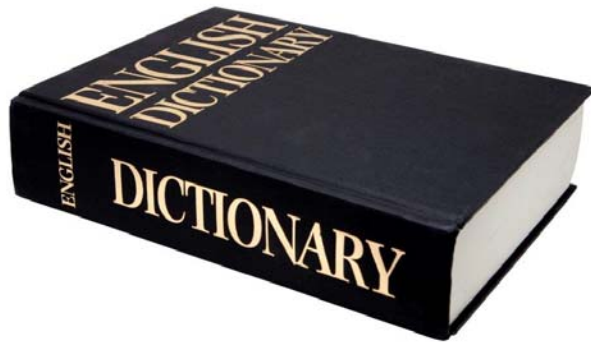
Do's:

- Use any text you want for an annotation
- Use the following shorthand codes for action tags:
@HIDDEN, @HIDDEN-FORM, @HIDDEN-SURVEY, @HIDDEN-APP, @READONLY, @READONLY-FORM, @READONLY-SURVEY, @READONLY-APP, @LATITUDE, @LONGITUDE, @PASSWORDMASK, @NOW, @TODAY, @BARCODE, @DEFAULT
- Use piping in combination with the default tag to prefill a variable with a previously entered value.

Don'ts:

- Start typing the @ sign into the cell. Format the cell first as a text field. Excel will register an error if you do not.

Data Dictionary Best Practices



- ▶ Format Optimizing
 - ☐ Mobile devices
 - ☐ REDCap mobile app
 - ☐ Matrices
- ▶ Interplay with Longitudinal
 - ☐ First form
 - ☐ Splitting up forms
 - ☐ Merging forms
- ▶ Interplay with repeatable forms
 - ☐ Form vs event
 - ☐ Scaling down
 - ☐ Branching logic

Best Practices

Format Optimizing

Format Optimizing

Longitudinal

Repeatable forms



Mobile devices

- ▶ Some field types work better on a smartphone than others
- ▶ Try to keep things short
- ▶ Test on your own device

REDCap Mobile App

- ▶ Limited functionality due to offline nature
 - ▶ e.g. Ontology Lookup
- ▶ Limit to 500 variables per form
 - ▶ Less if the form contains a ton of calculations/logic

Matrix formatting

- ▶ Scroll effect (header)
 - ▶ Use a maximum of 5 or 6 rows
 - ▶ Easy to split up matrix in the data dictionary

Best Practices

Interplay with longitudinal features

Format Optimizing

Longitudinal

Repeatable forms



Generalize your forms

- ▶ Use the same form in multiple events
 - ▶ e.g. Clinical measurements, follow up questionnaire

Splitting up / merging forms

- ▶ Change the form name in Column B
 - ▶ Not possible in the online designer

Record ID / First form

- ▶ REDCap needs a record ID to store data
 - ▶ Always in the very first form as a text box
 - ▶ Needs to be assigned to the first event

Branching Logic / Calculations

- ▶ Add event identifiers if necessary
 - ▶ e.g. [baseline_arm_1][dob]

Best Practices

Interplay with repeatable forms and events

Format Optimizing

Longitudinal

Repeatable forms



Form vs Event

- ▶ Can't repeat a form instead a repeated event
- ▶ Design for your desired repeat method
- ▶ e.g. Adverse Events

Scale down your form size

- ▶ Only include variables for a single repetition
- ▶ Allows for quick data entry
- ▶ Add a label variable unique enough to identify the repetition

Branching logic / Calculations

- ▶ No capability (yet) to identify a specific repetition
 - ▶ Can't setup a calculation to average a score in repeated forms
- ▶ Keep your logic / calculation "local" (as in with that form)

General Excel Wizardy

Sorting & Filter

Sorting on a form name or field type will allow you to modify specific things quickly without having to hunt for them.

Find and Replace

Update variable names, logic, calculations, etc quickly.

Crafting dynamic branching logic

When repeating the same variable over and over, you can have excel craft the logic for your with cell references.

Auto fill variable names

Excel can automatically increment numbers when using "Fill series". Only works when the text ends in a number.

Split screens

Allows you to keep the header row and variable names visible (found in the View menu → "Split" button)

Thank You

Questions?

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Funding

Members can apply for local and national pilot grants and other funding opportunities. ITHS also offers letters of support for grant submissions.

Collaboration

Members can connect with collaborators across the CTSA consortium.