Implementing Quality 202:

Data Analysis, Interpretation, and Visualization

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HOUSEKEEPING

- Restrooms
- Snacks and Breaks
- Wi-fi
  - CHAGUEST
  - ficguest
  - ficwireless

INTRODUCTIONS

- Name
- Organization

TODAY'S PLAN

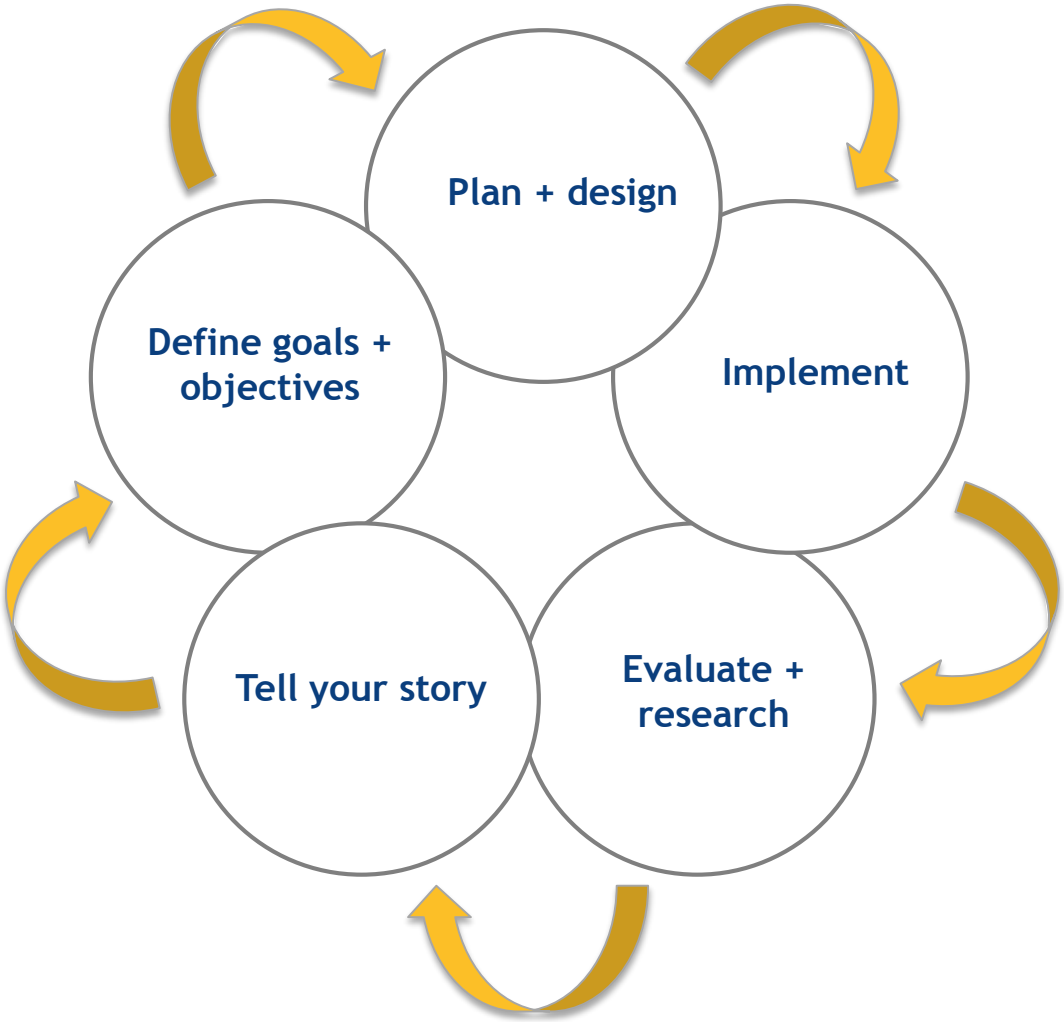
Our hopes for today's session: build your skills for analyzing and interpreting quantitative and qualitative data

We'll be covering:

1. Choosing the right analytical tool for your data
2. Using different analytical tools
3. Interpreting your data
4. Making meaning from your data analysis

THE CYCLE OF EVALUATION

Today's focus



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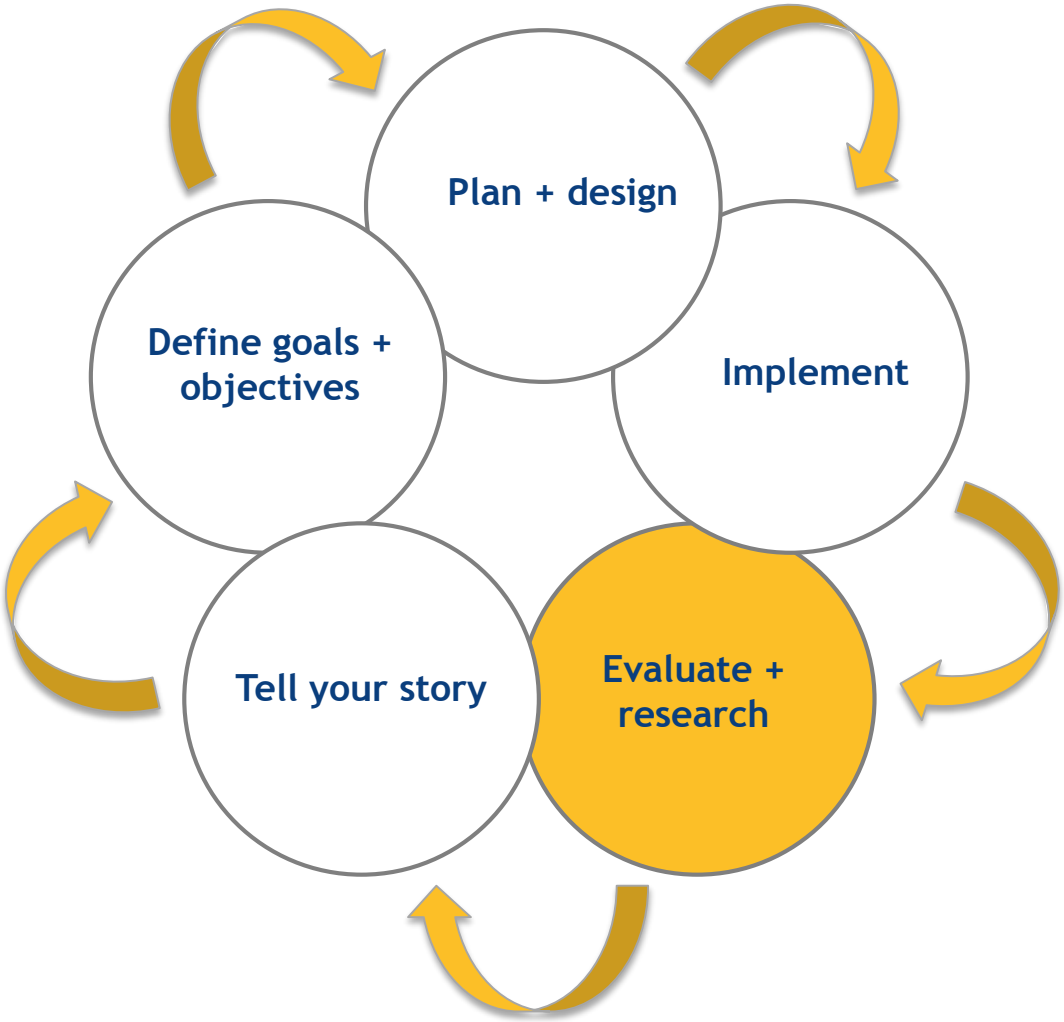
THE CYCLE OF EVALUATION

Today's focus



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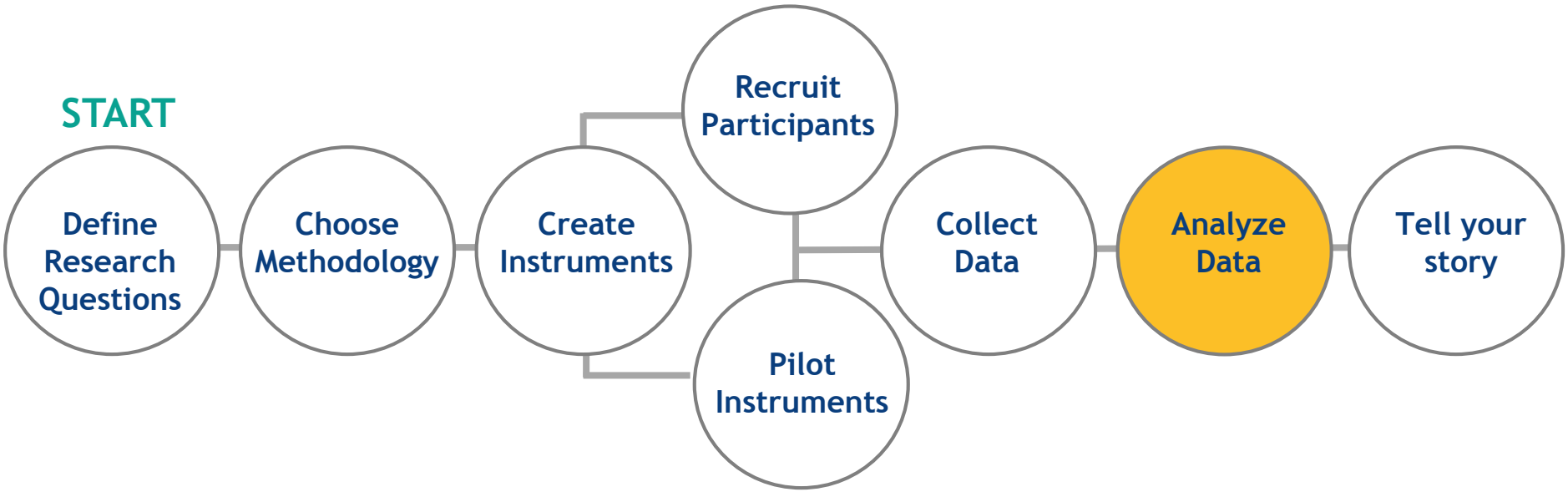
COLLECTED YOUR DATA?

Let's Talk About What Comes Next



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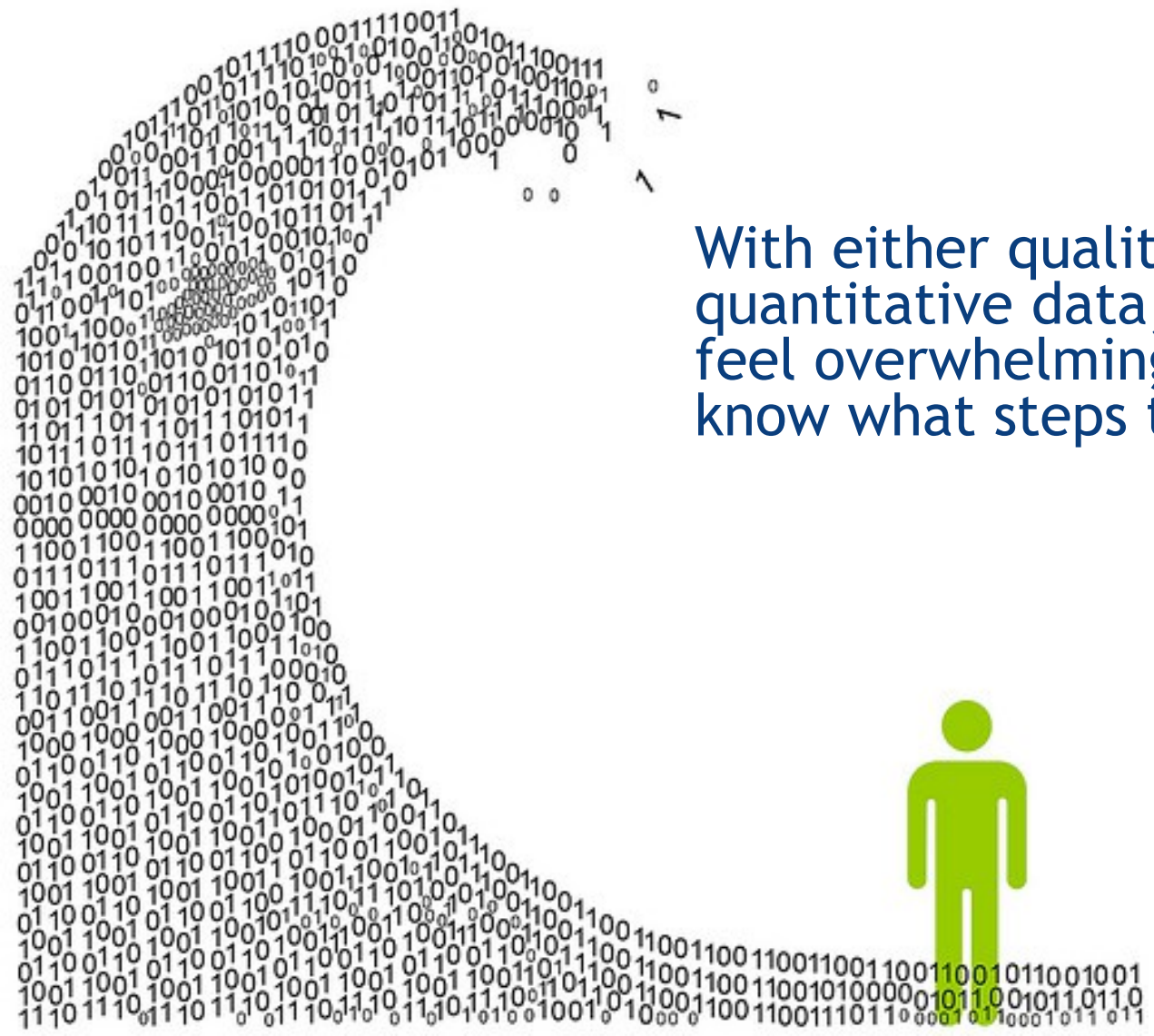
COLLECTED YOUR DATA?



With either qualitative or quantitative data, a data set can feel overwhelming if you don't know what steps to take first…

TODAY, WE'LL BEGIN TO ANSWER…

TYPES OF RESEARCH METHODS

Quantitative, Qualitative or Mixed methods

What's the difference?

Qualitative

In-depth interviews
Focus groups
Observations
Ethnography
Rubric
Surveys…

Quantitative

Surveys
Timing and tracking

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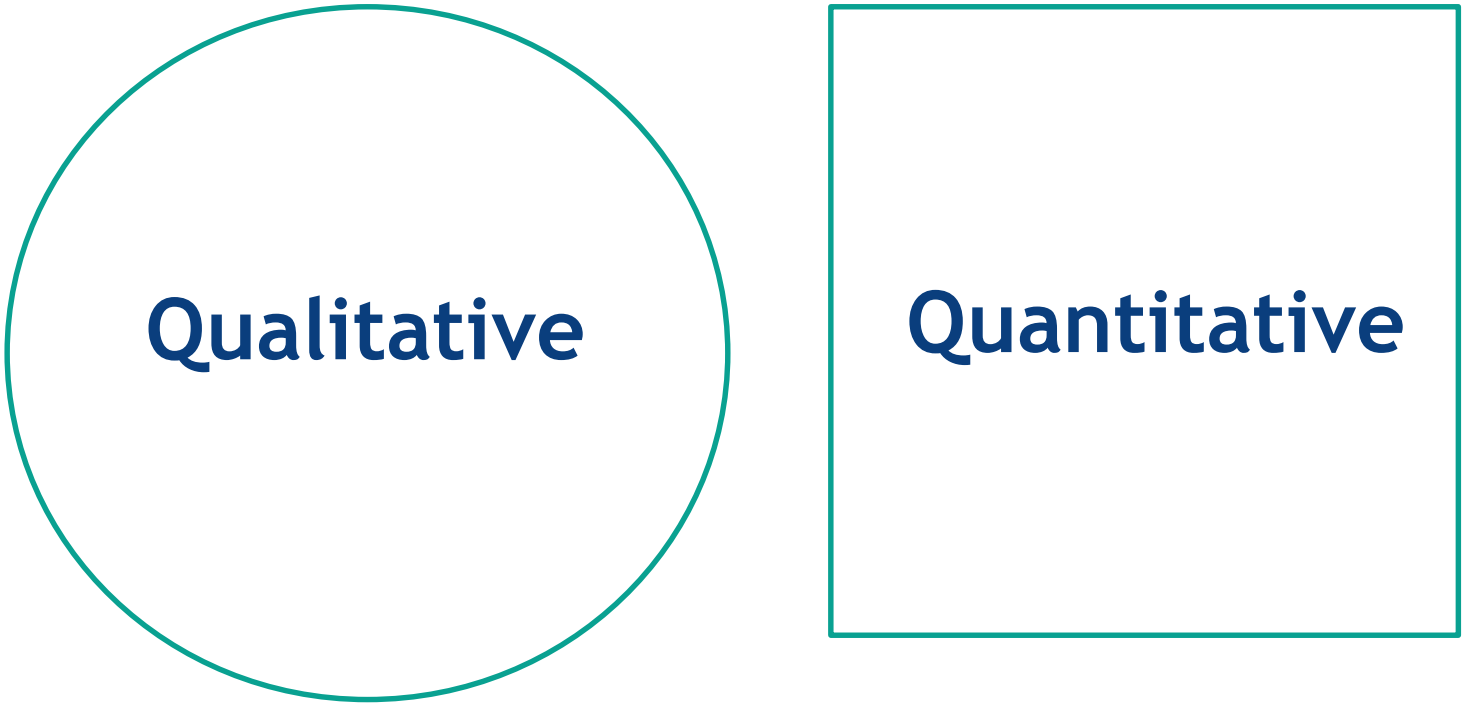
WITHIN SURVEYS

You can have BOTH Quantitative & Qualitative data



Today, we'll be focusing on surveys

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STARTING WITH
Quantitative survey questions

Quantitative

TWO MAIN TYPES OF QUANTITATIVE SURVEY QUESTIONS

- **Select-all-that-apply questions** in which respondents can choose multiple options on one question
- **Single-select questions** in which a respondent can just choose one option
  - Categorical questions with 2 categories (e.g., yes/no)
  - Categorical question with multiple options
    - Scale questions (Likert)

	Strongly Disagree 1	Disagree 2	Agree 3	Strongly Agree 4
The program made me feel more connected to my school community.				

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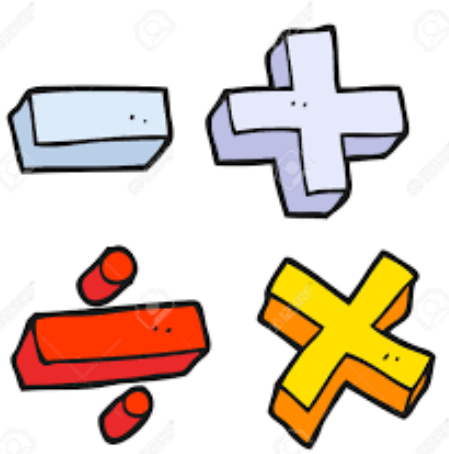
LESS COMMON TYPES OF QUANTITATIVE SURVEY QUESTIONS

- **Rank order:** respondents order a set of response options based on the priority offered in a list (e.g. from highest to lowest, rank the following …)
- **Constant-sum questions:** respondents enter numeric data and each numeric entry is summed and can be displayed to the respondent (most often used in online surveys)

ANALYSIS TOOLS FOR QUANTITATIVE DATA

- For quantitative data, most analysis tools help summarize across respondents
- What are the most helpful summary analysis tools?
  - Means
  - Tallies/Sums
  - Percentages
  - Differences (through subtraction)



CHOOSING THE RIGHT QUANTITATIVE ANALYSIS TOOLS

Consider your Questions

Consider your **hypotheses & research questions**

- What does your organization most want to/ need to measure?

CHOOSING THE RIGHT QUANTITATIVE ANALYSIS TOOLS

Consider your Questions

Consider your **hypotheses & research questions**

- Are you interested in proportions?
  → Use percentages
- Are you interested in totals?
  → Use tallies
- Are you interested in the “average” participant?
  → Use means
- Are you interested in differences across related questions?
  →Use subtraction

CHOOSING THE RIGHT QUANTITATIVE ANALYSIS TOOLS

Consider your Data

Consider the **type of survey question**

- Single-select question with two categories
  - Use tallies and/or percentages
- Single-select scale question
  - Use means, tallies, and/or percentages
- Multiple-select question
  - Use tallies and/or percentages

GROUP ACTIVITY

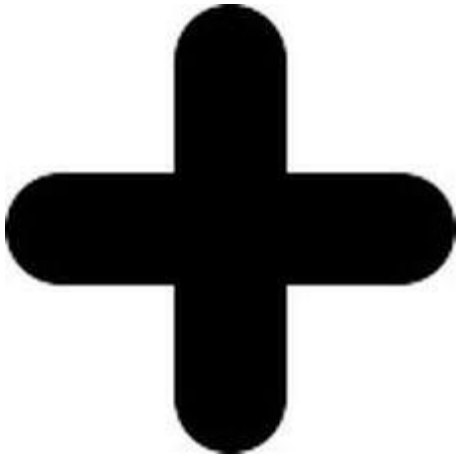
Picking the “right” analytical tool

ANALYZING DATA

- Tables of tallies
- Tallies to get to percentages
- Means

WHAT IS A TALLY AND WHAT IS IT USED FOR?

- A tally is a sum of all of the numeric data responses on each category from one survey question
- It's often the first step in analysis



Imagine you needed to report the total number of people who had participated in your program more than once.
Tally is your tool!

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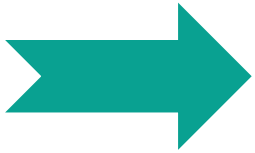
CREATING A TALLY TABLE FROM SURVEY DATA

A helpful step for understanding your data

Respondent	Q1. Has the respondent participated in the program before?
1	Yes
2	Yes
3	No
4	No
5	No
6	Yes
7	No



Q1. Category	Number
Yes	3
No	4

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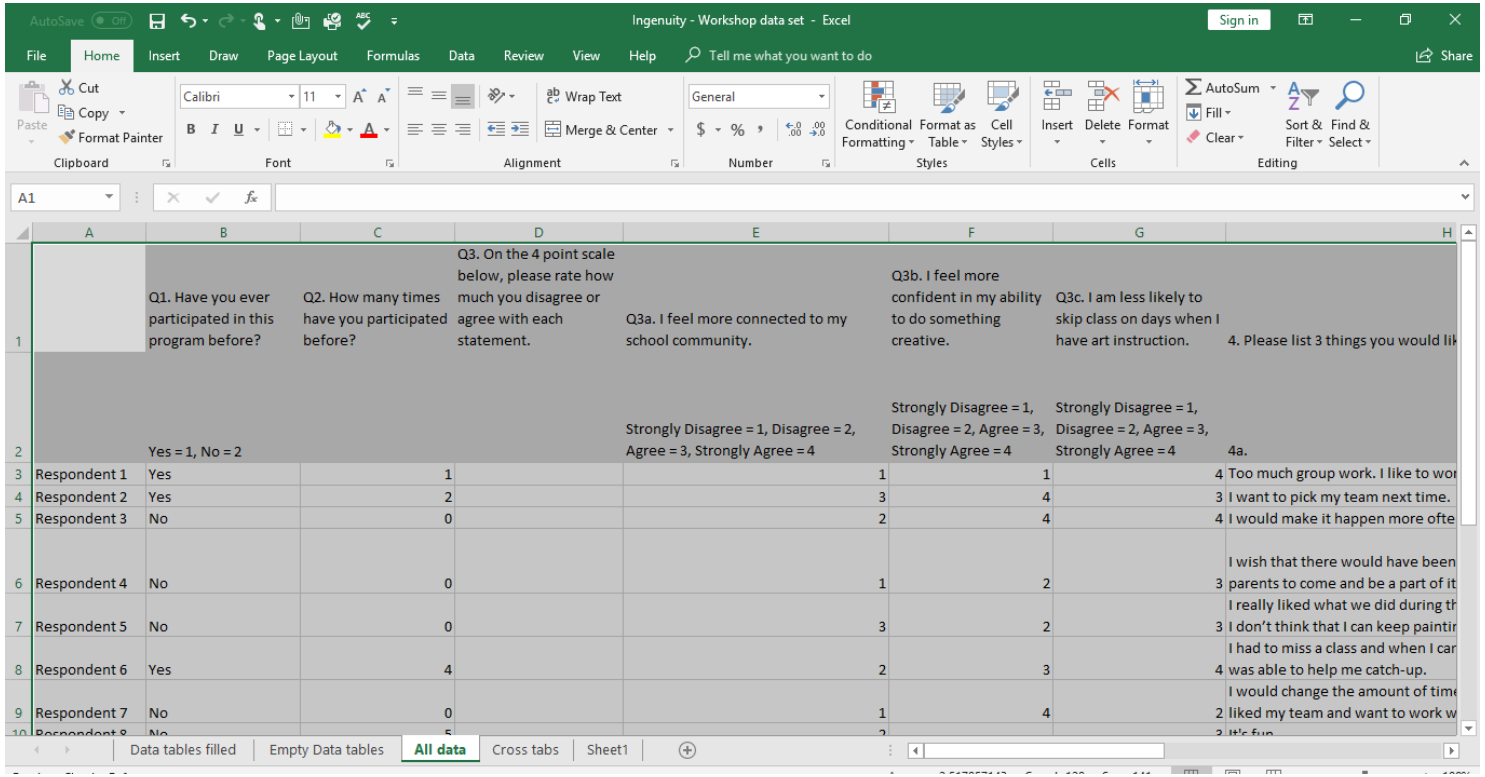
HOW TO CREATE A TALLY IN EXCEL

- Go to your data worksheet and select your whole dataset (click top left box)



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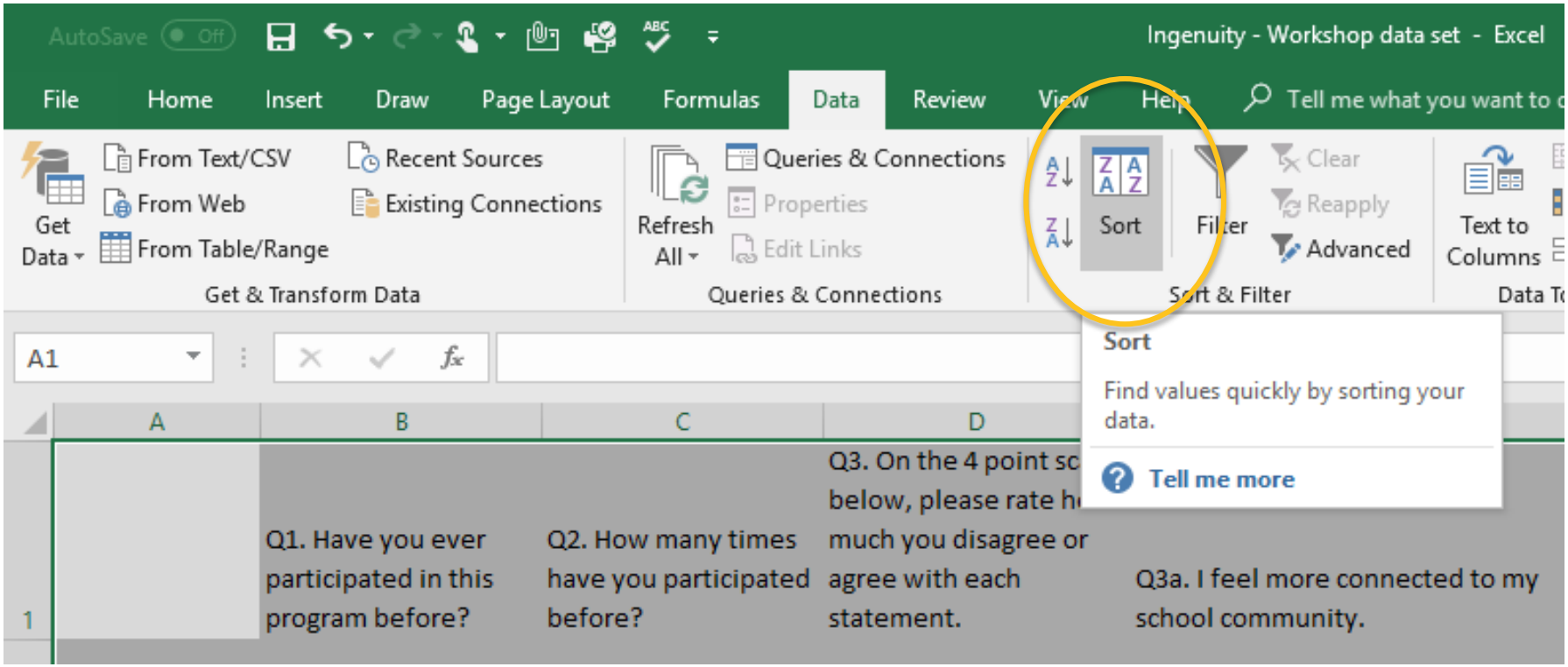
HOW TO CREATE A TALLY IN EXCEL

- Use the Sort tool (go to Data → sort)



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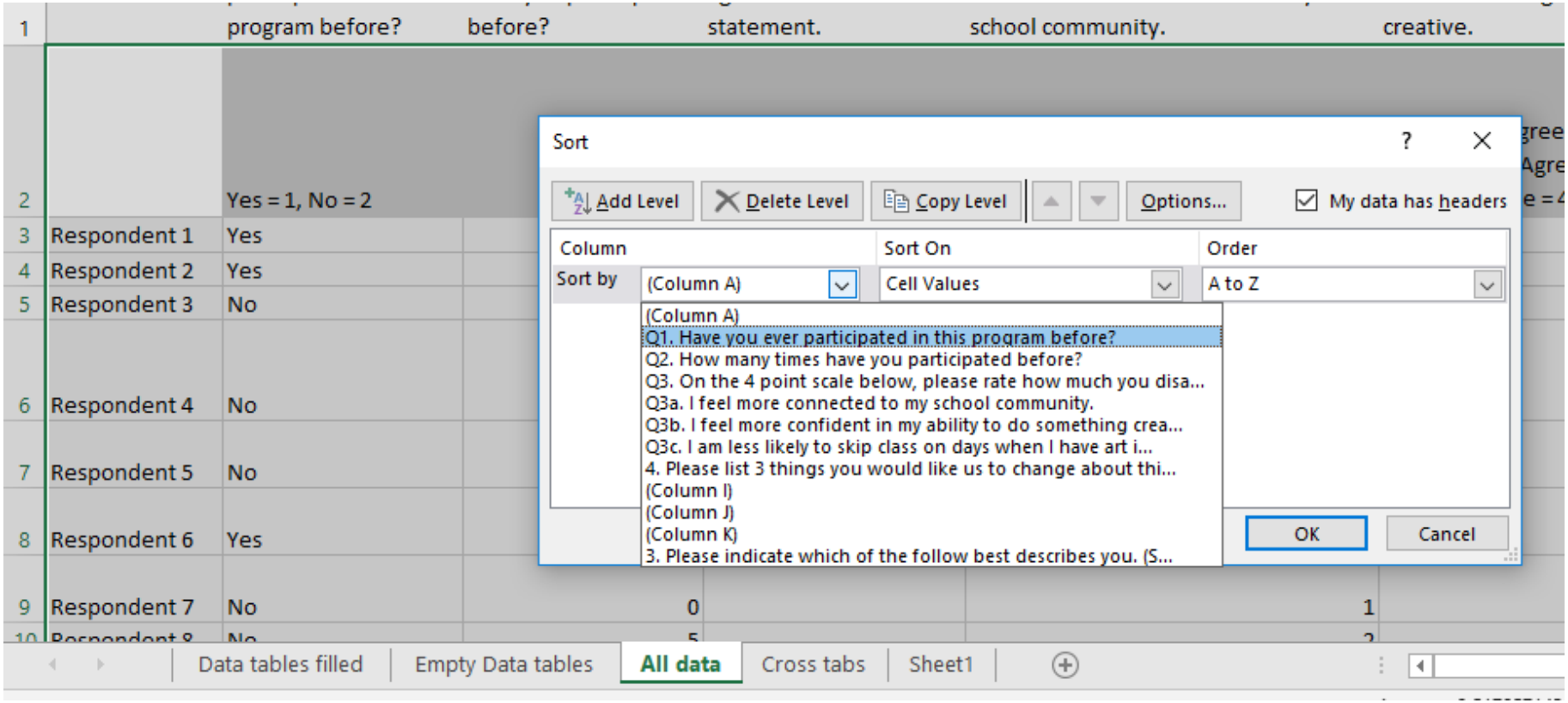
HOW TO CREATE A TALLY IN EXCEL

- Select one of the possible responses in the check box menu



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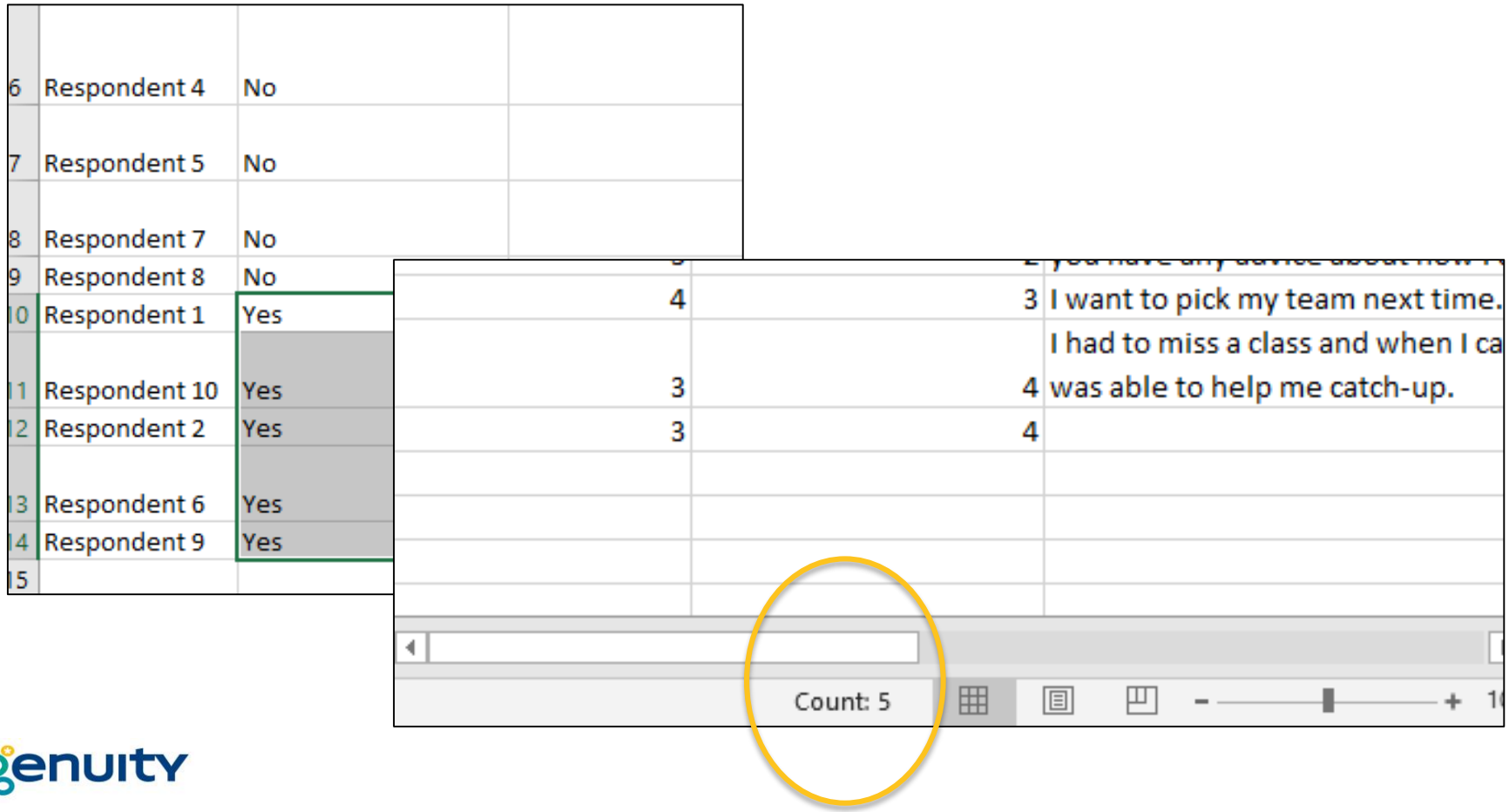
HOW TO CREATE A TALLY IN EXCEL

- Highlight the responses and read the Count in the bottom right corner



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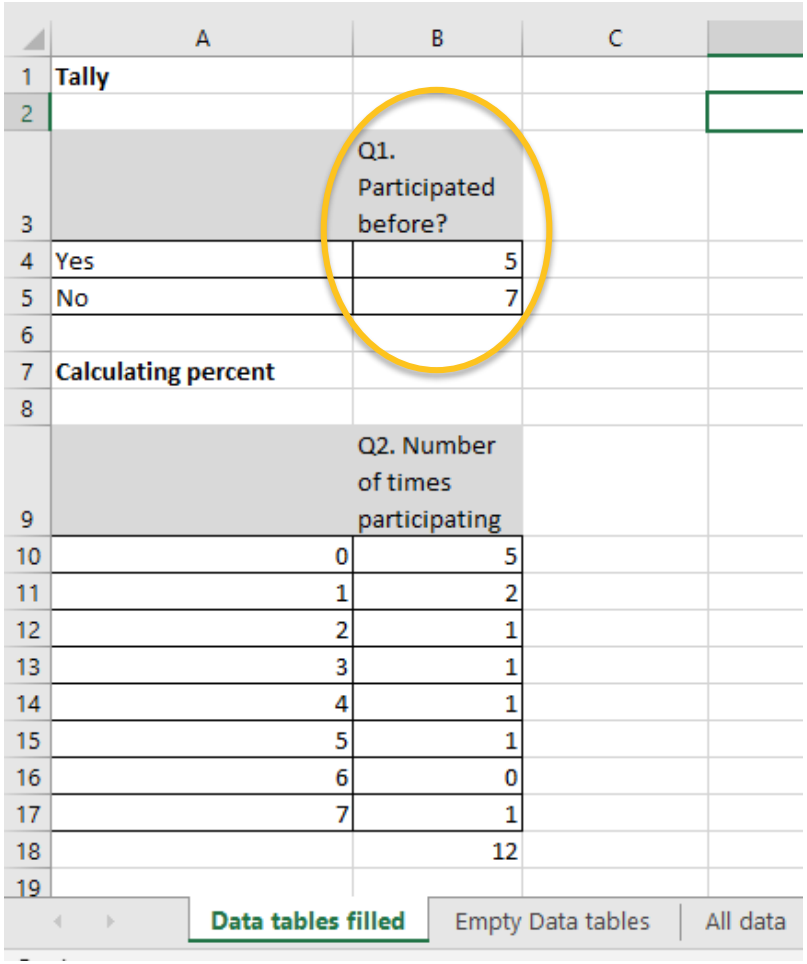
HOW TO CREATE A TALLY IN EXCEL

- Enter that count into the tally table



	A	B	C
1	**Tally**		
2			
3		Q1. Participated before?	
4	Yes	5	
5	No	7	
6			
7	**Calculating percent**		
8			
9		Q2. Number of times participating	
10	0	5	
11	1	2	
12	2	1	
13	3	1	
14	4	1	
15	5	1	
16	6	0	
17	7	1	
18		12	
19			

Data tables filled | Empty Data tables | All data

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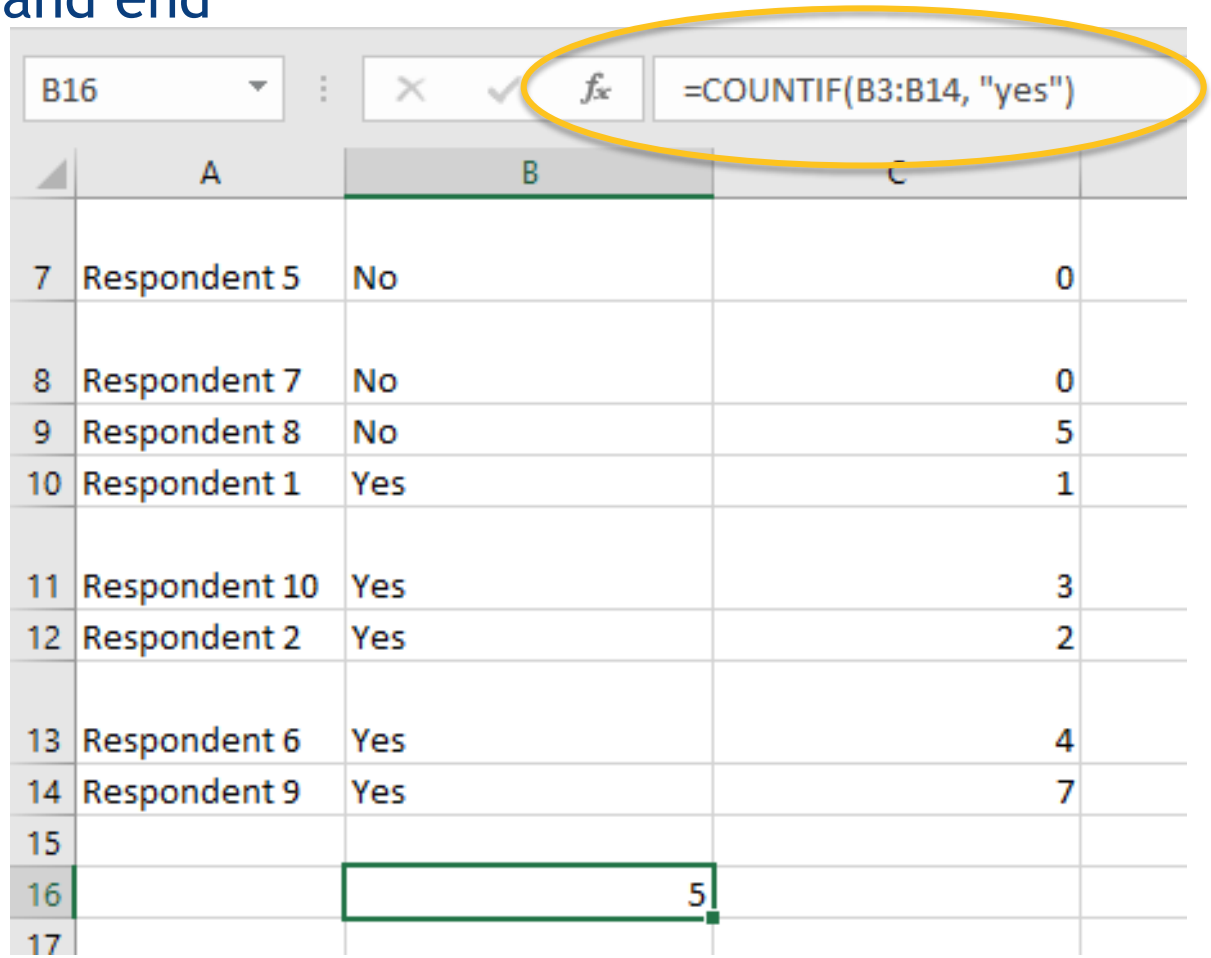
HOW TO CREATE A TALLY IN EXCEL

- OR use the “countif” formula to count each response type separately and end



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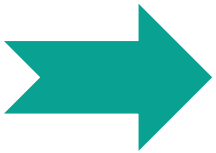
NEXT STEPS

Now imagine that you needed to better understand the proportion of returning participants to new participants from year to year

- You can compare raw numbers (tallies)
- And/or you can calculate percentages to aid in the comparison

USING YOUR TALLY TABLE TO GET PERCENTAGES

Q1. Category	Number (2017)
Yes	3
No	4



Q1. Participated in the program before?	Number (2017)	Percentage
Yes	3	43%
No	4	57%
TOTAL	7	

CACULATING PERCENTAGES IN EXCEL

- Add to your tally table
  - A row at the bottom for SUM
  - A column at the right for PERCENTAGE

7	**Calculating percentages**		
8			
9	Q2. Number of times participating	Tallies	Percentages
10	0	5	
11	1	2	
12	2	1	
13	3	1	
14	4	1	
15	5	1	
16	6	0	
17	7	1	
18	Total		

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CACULATING PERCENTAGES IN EXCEL

- Use the “sum” formula to get the total number of responses

7	**Calculating percentages**		
8			
9	Q2. Number of times participating	Tallies	Percentages
10	0	5	
11	1	2	
12	2	1	
13	3	1	
14	4	1	
15	5	1	
16	6	0	
17	7	1	
18	Total	=sum(B10:B17)	

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CACULATING PERCENTAGES IN EXCEL

- Divide the total for each row by the overall total responses on the question to get the percentage for each category

7	**Calculating percentages**		
8			
9	Q2. Number of times participating	Tallies	Percentages
10	0	5	=B10/B18
11	1	2	
12	2	1	
13	3	1	
14	4	1	
15	5	1	
16	6	0	
17	7	1	
18	Total	12	

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CACULATING PERCENTAGES IN EXCEL

7	**Calculating percentages**		
8			
9	Q2. Number of times participating	Tallies	Percentages
10	0	5	0.416666667
11	1	2	
12	2	1	
13	3	1	
14	4	1	
15	5	1	
16	6	0	
17	7	1	
18	Total	12	

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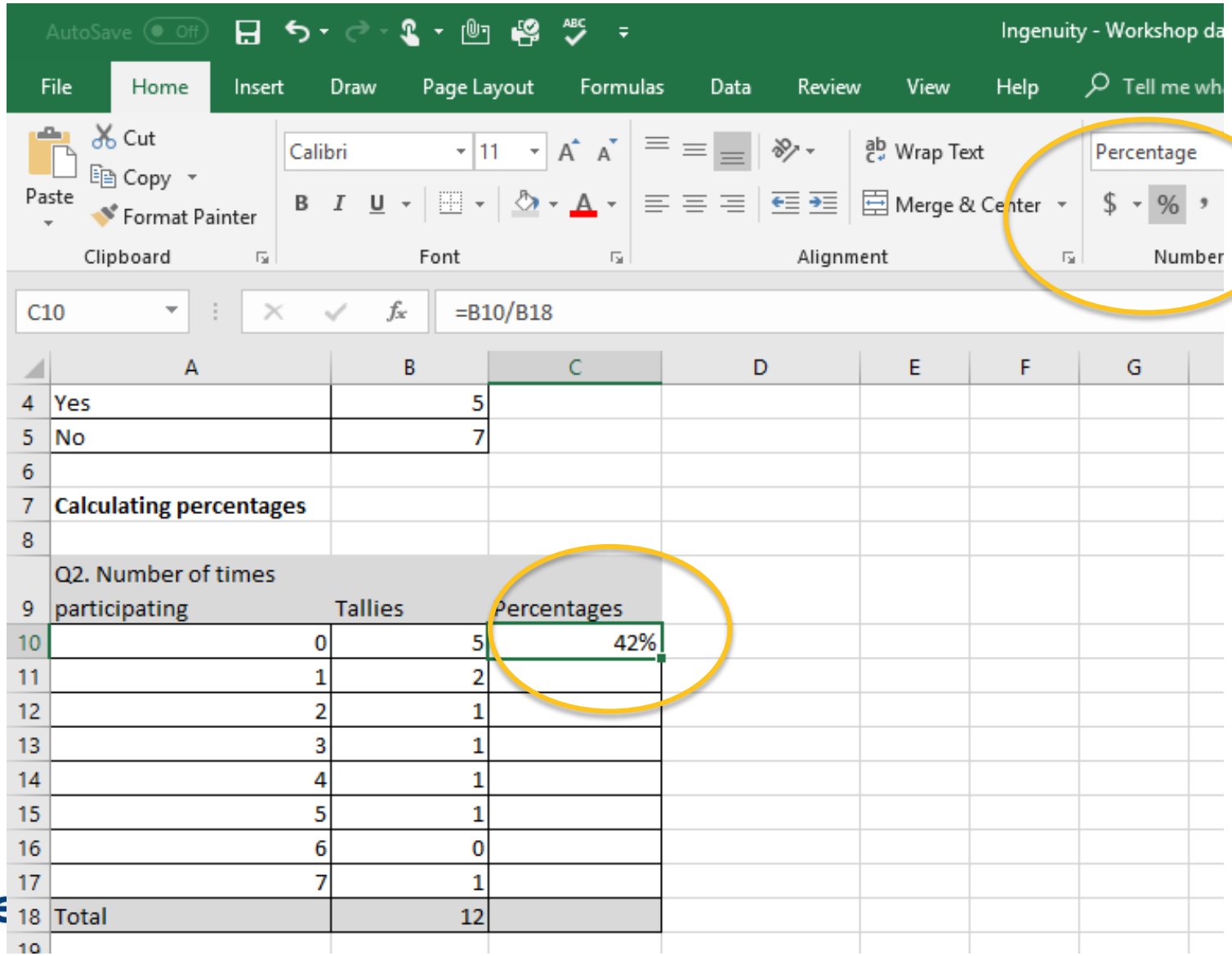
CACULATING PERCENTAGES IN EXCEL

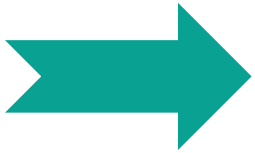


	A	B	C	D	E	F	G
4	Yes	5					
5	No	7					
6							
7	**Calculating percentages**						
8							
9	Q2. Number of times participating	Tallies	Percentages				
10	0	5	42%				
11	1	2					
12	2	1					
13	3	1					
14	4	1					
15	5	1					
16	6	0					
17	7	1					
18	Total	12					

USING YOUR TALLY TABLE TO GET PERCENTAGES

FOR YEAR-OVER-YEAR COMPARISON

Q1. Participated in the program before?	Number (2016)	Number (2017)
Yes	8	3
No	4	4



Q1. Participated in the program before?	Number (2016)	Number (2017)	Percentage (2016)	Percentage (2017)
Yes	8	3	72%	43%
No	3	4	28%	57%
TOTAL	11	7		

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WHAT IS MEAN AND WHAT IS IT USED FOR?

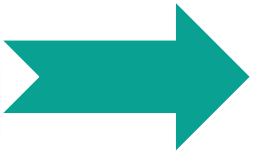
A mean (or average) is the central value of responses for a group

$$\text{average} = \frac{\text{sum of values}}{\text{number of values}}.$$

CACLULATING A MEAN FROM SURVEY DATA

We need a different question, as a mean on a yes/no doesn't *mean* anything

Respondent	Q2. How many times has the respondent participated in the program before?
1	1
2	2
3	0
4	0
5	0
6	4
7	0



Respondent	Q2. How many times has the respondent participated in the program before?
1	1
2	2
3	0
4	0
5	0
6	4
7	0
MEAN	1

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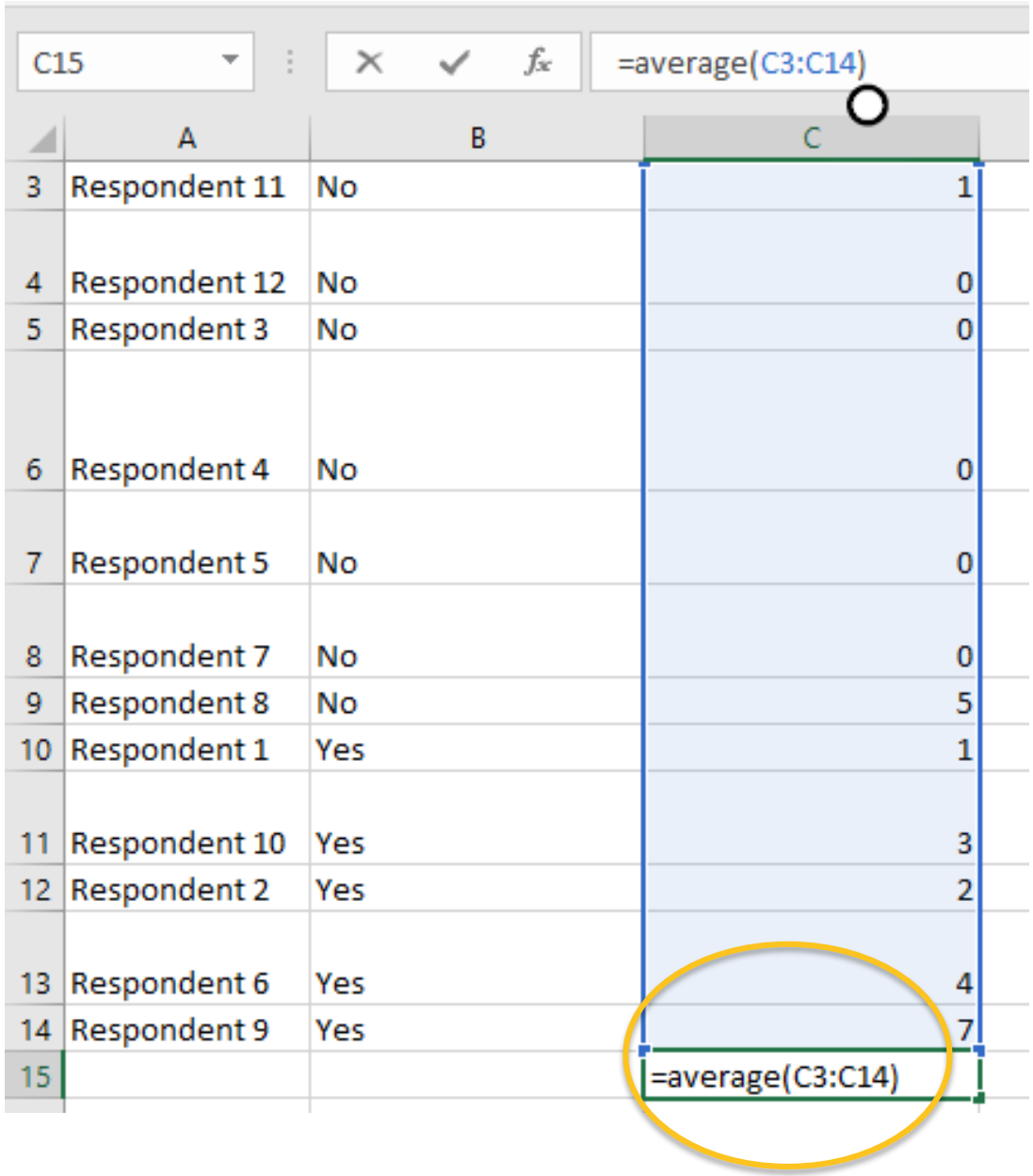
CACLULATING A MEAN FROM SURVEY DATA

Let's try a scale question

	Strongly Disagree 1	Disagree 2	Agree 3	Strongly Agree 4
I feel more connected to my school community.	❑	❑	❑	❑
I feel more confident in my ability to do something creative.	❑	❑	❑	❑
I am less likely to skip class on days when I have art instruction.	❑	❑	❑	❑

CACULATING MEANS IN EXCEL

- On a column of data, use the formula for “average”
- =average(range:range)



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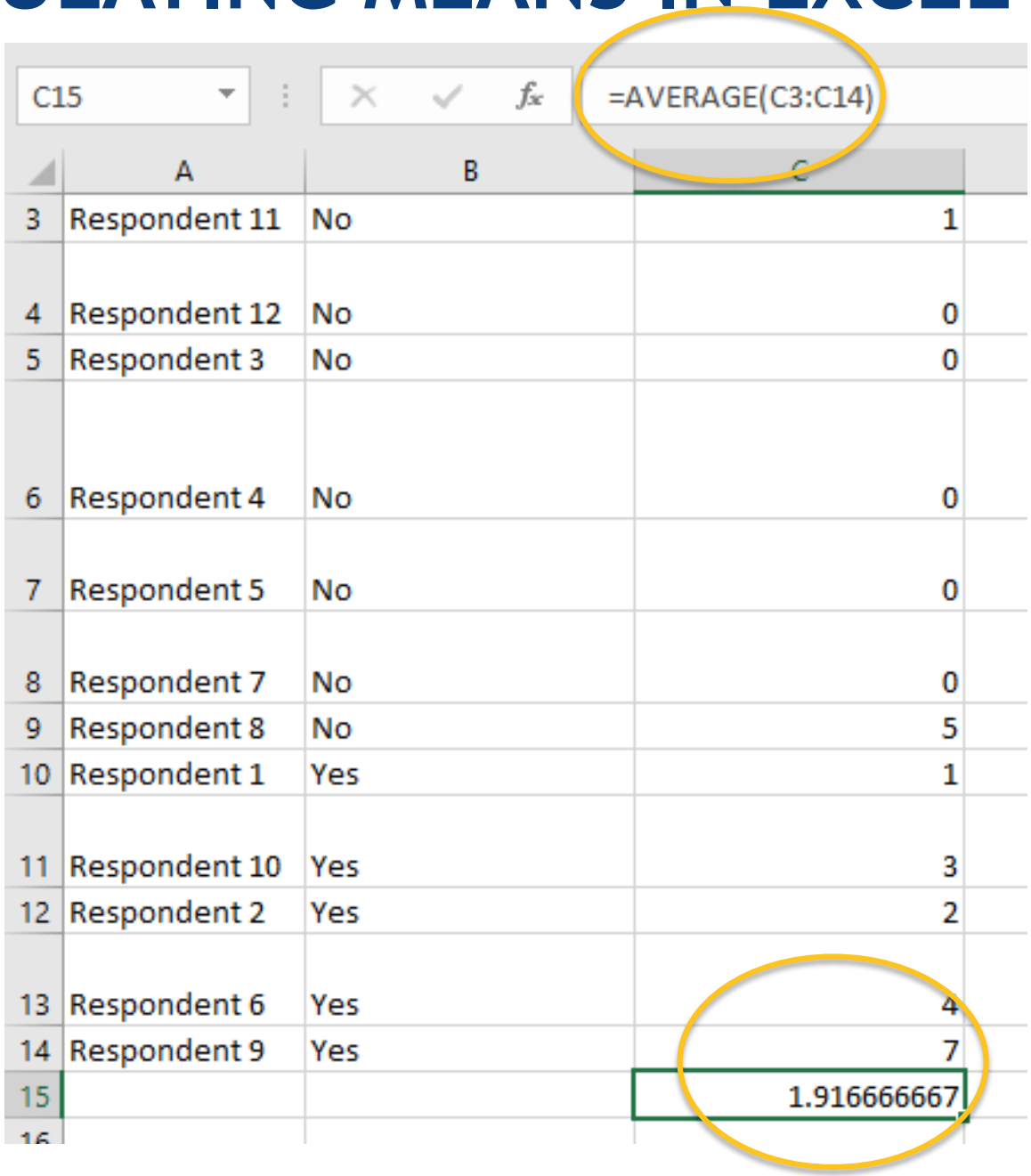
CACULATING MEANS IN EXCEL



	A	B	C
3	Respondent 11	No	1
4	Respondent 12	No	0
5	Respondent 3	No	0
6	Respondent 4	No	0
7	Respondent 5	No	0
8	Respondent 7	No	0
9	Respondent 8	No	5
10	Respondent 1	Yes	1
11	Respondent 10	Yes	3
12	Respondent 2	Yes	2
13	Respondent 6	Yes	4
14	Respondent 9	Yes	7
15			1.916666667

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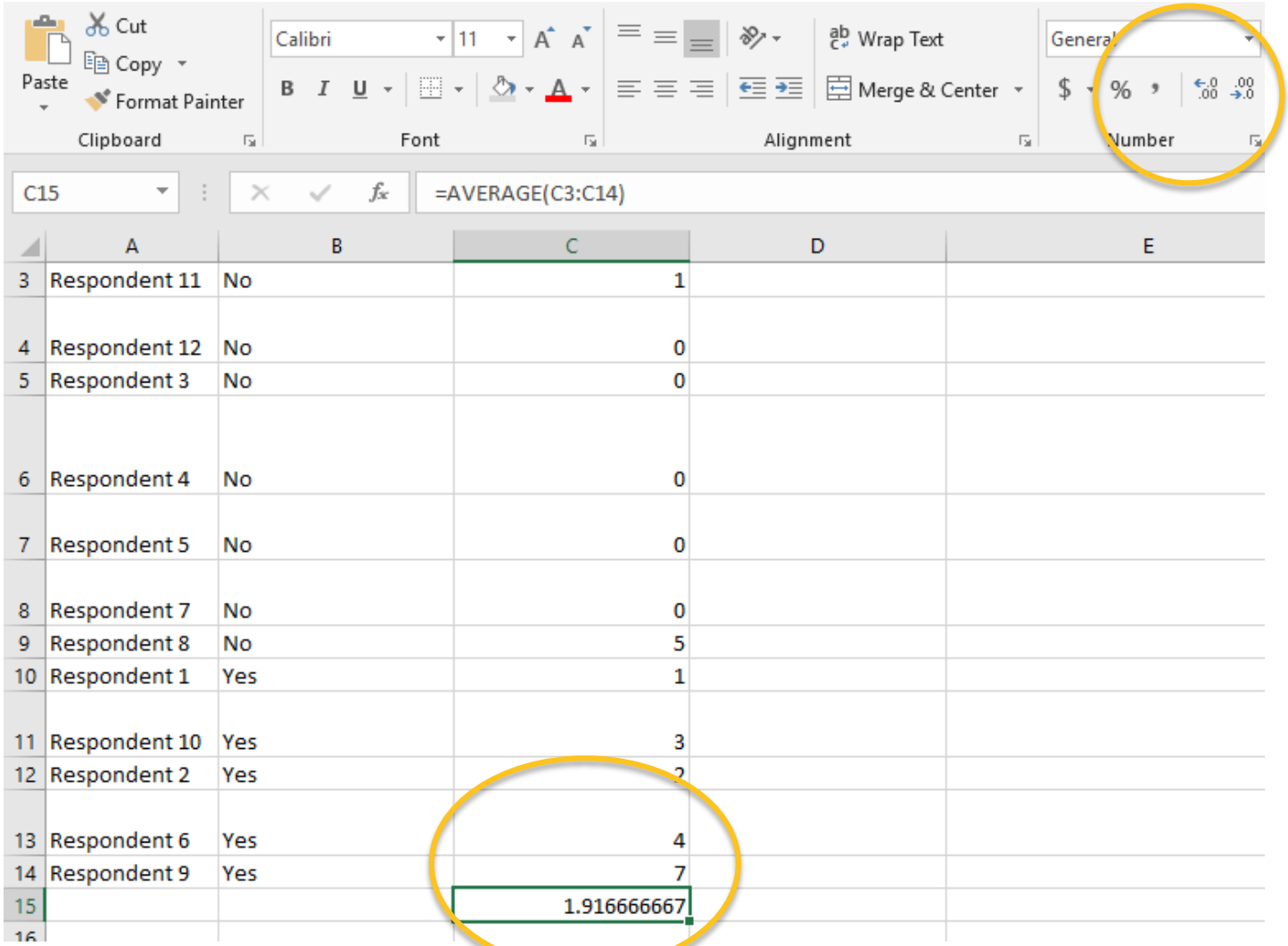
CACULATING MEANS IN EXCEL

- Adjust the number of decimals



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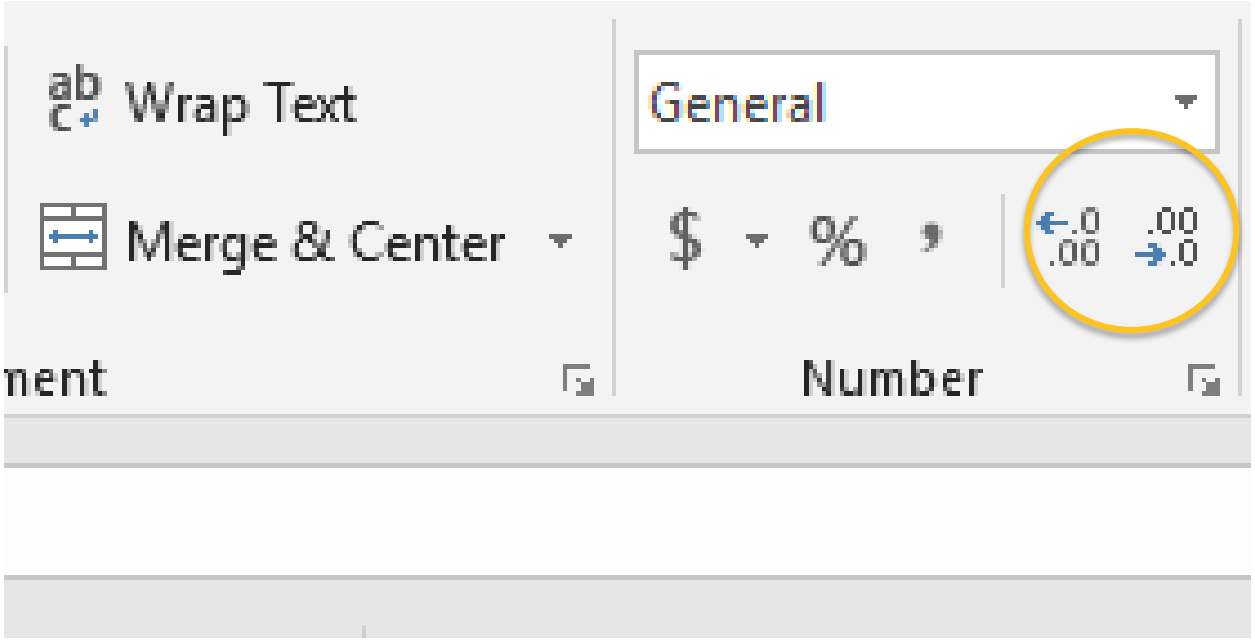
CACULATING MEANS IN EXCEL

- Adjust the number of decimals



CACULATING MEANS IN EXCEL

- Add responses to your means table

20	**Calculating means**			
21				
22		Q3a. more connected to my school community.	Q3b. more confident in my ability to do something creative.	Q3c. less likely to skip class on days when I have art instruction.
23	Means	2.1	3.1	3.0

CACLULATING A MEAN FROM SURVEY DATA

Let’s try a scale question

On a 4 point scale:

	Mean response
I feel more connected to my school community.	2.1
I feel more confident in my ability to do something creative.	3.1
I am less likely to skip class on days when I have art instruction.	3.0

ANALYZING A SCALE QUESTION

However, if you wanted to know more about what is driving that average, you might look across the scale responses

	Strongly Disagree	Disagree	Agree	Strongly Agree	Total
I feel more connected to my school community.	4	4	3	1	12

Tallied responses

CACULATING PERCENTAGES FOR COMPARISON

And calculate the average percent responses for each point on the scale

	Strongly Disagree	Disagree	Agree	Strongly Agree	Total	Mean response
I feel more connected to my school community.	33%	33%	25%	8%	12	2.1

Percent calculated

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BREAK

MORE ADVANCED ANALYSIS METHODS

Comparing a score across questions

- Gap analysis – often used for comparing means
- Crosstabs – often used for comparing percentages

WHAT IS A CROSSTAB AND WHAT IS IT USED FOR?

- To look at responses in your data across subsets or groups of respondents
- To understand if responses differ based on being in a particular group, (e.g. we could look at how confidence and participation are connected):
  - Hypothesis: people who have low levels of confidence are more likely to be **return participants** than those with high confidence
- Usually used to COMPARE PERCENTAGES

COMPARING PERCENTAGES ON ONE QUESTION BY CATEGORIES OF ANOTHER QUESTION

CROSSTABS

- This can be helpful in answering questions about whether or not groups vary on another variable

- For example, you might cross attendance history with confidence in their ability to be creative

HOW TO CACULATE CROSSTABS IN EXCEL

- Identify the two variables you'd like to look across (e.g. of the returning students in Q1 and confidence)

	Q1. Have you ever participated in this program before?	Q2b. I feel more confident in my ability to do something creative.
	Yes = 1, No = 2	Strongly Disagree = 1, Disagree = 2, Agree = 3, Strongly Agree = 4
Respondent 11	No	4
		2

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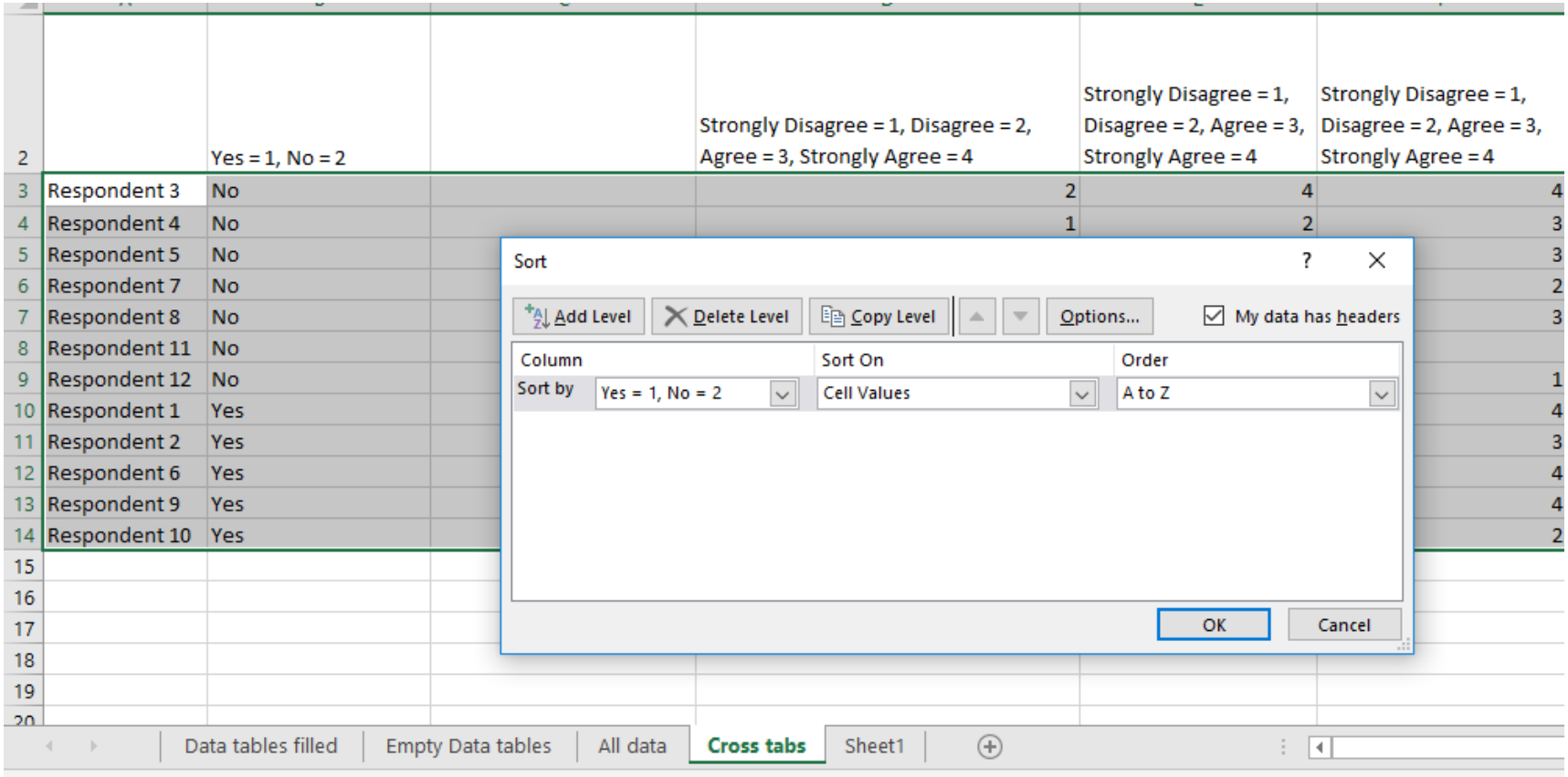
HOW TO CACULATE CROSSTABS IN EXCEL

- Sort the data file by Q1 to group all returning students in one area and all new students in another



2		Yes = 1, No = 2		Strongly Disagree = 1, Disagree = 2, Agree = 3, Strongly Agree = 4	Strongly Disagree = 1, Disagree = 2, Agree = 3, Strongly Agree = 4	Strongly Disagree = 1, Disagree = 2, Agree = 3, Strongly Agree = 4
3	Respondent 3	No		2	4	4
4	Respondent 4	No		1	2	3
5	Respondent 5	No				3
6	Respondent 7	No				2
7	Respondent 8	No				3
8	Respondent 11	No				
9	Respondent 12	No				1
10	Respondent 1	Yes				4
11	Respondent 2	Yes				3
12	Respondent 6	Yes				4
13	Respondent 9	Yes				4
14	Respondent 10	Yes				2
15						
16						
17						
18						
19						
20						

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HOW TO CACULATE CROSSTABS IN EXCEL

- Add blank lines between those the returning students and new

		Q1. Have you ever participated in this program before?	much you disagree or agree with each statement.	Q2a. I feel more connected to my school community.	confident in my ability to do something creative.	Q2c. I am less likely to skip class on days when have art instruction.
2		Yes = 1, No = 2		Strongly Disagree = 1, Disagree = 2, Agree = 3, Strongly Agree = 4	Strongly Disagree = 1, Disagree = 2, Agree = 3, Strongly Agree = 4	Strongly Disagree = 1, Disagree = 2, Agree = 3, Strongly Agree = 4
3	Respondent 3	No		2	4	
4	Respondent 4	No		1	2	
5	Respondent 5	No		3	2	
6	Respondent 7	No		1	4	
7	Respondent 8	No		2		
8	Respondent 11	No		1	4	
9	Respondent 12	No		3	4	
10	Respondent 1	Yes		1	1	
11	Respondent 2	Yes		3	4	
12	Respondent 6	Yes		2	3	
13	Respondent 9	Yes		2	3	
14	Respondent 10	Yes		4	3	

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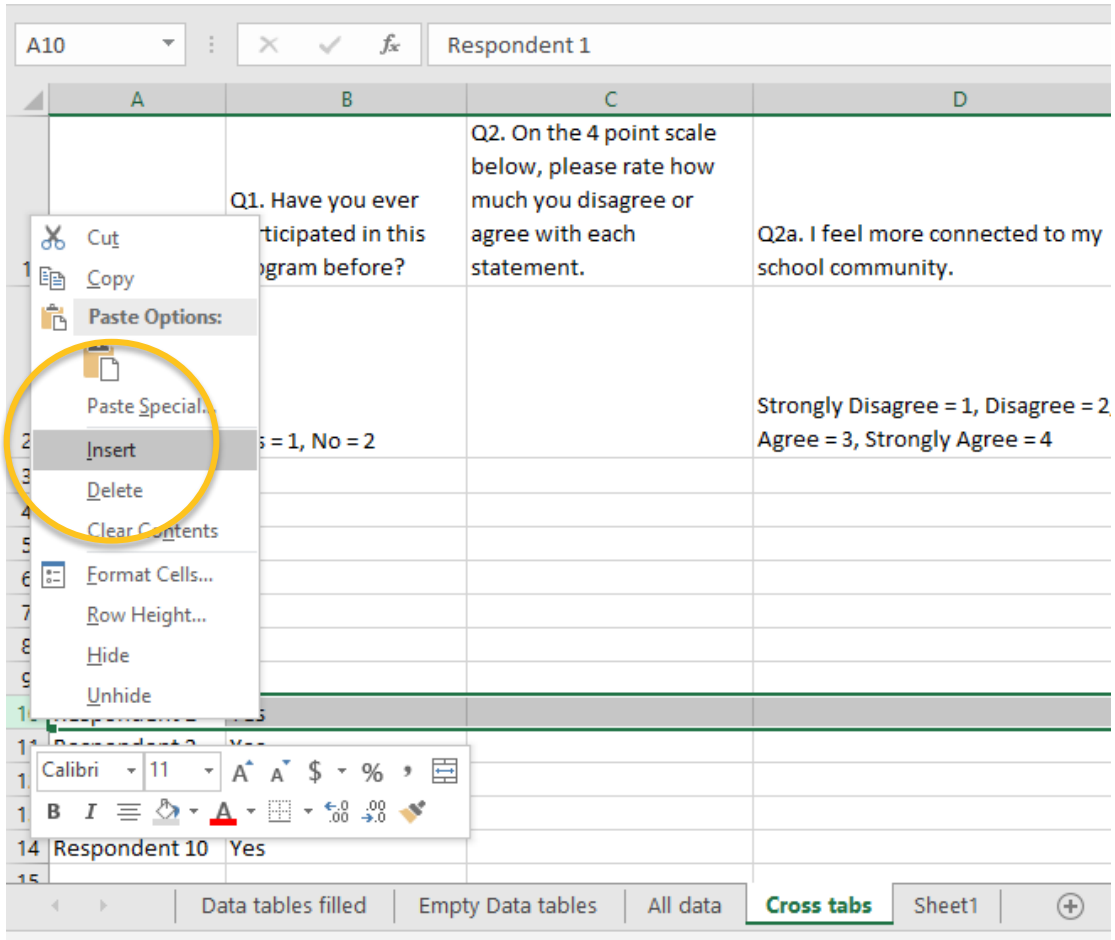
HOW TO CACULATE CROSSTABS IN EXCEL

- Add blank lines between those the returning students and new



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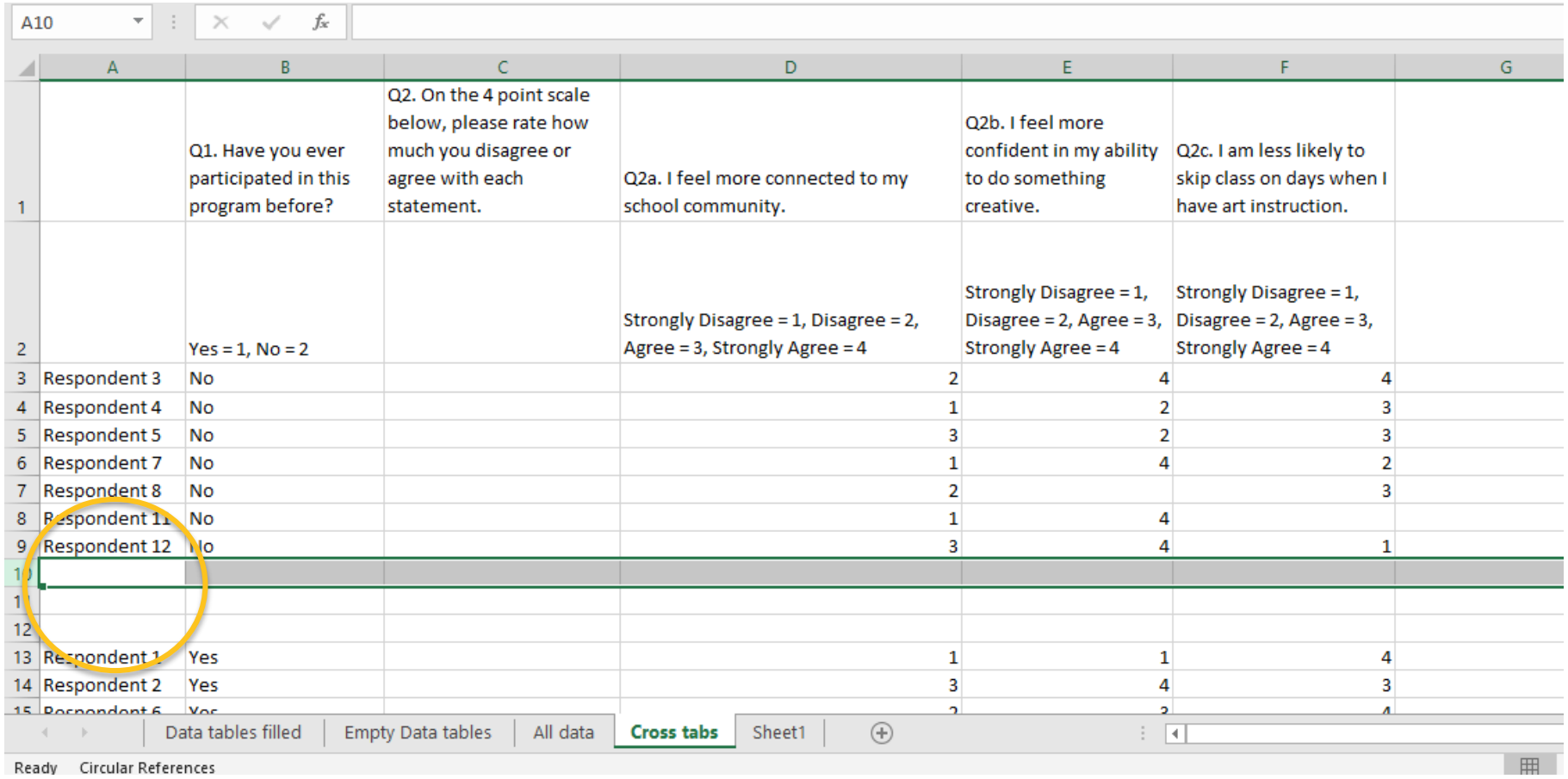
HOW TO CACULATE CROSSTABS IN EXCEL



	A	B	C	D	E	F	G
1		Q1. Have you ever participated in this program before?	Q2. On the 4 point scale below, please rate how much you disagree or agree with each statement.	Q2a. I feel more connected to my school community.	Q2b. I feel more confident in my ability to do something creative.	Q2c. I am less likely to skip class on days when I have art instruction.	
2		Yes = 1, No = 2		Strongly Disagree = 1, Disagree = 2, Agree = 3, Strongly Agree = 4	Strongly Disagree = 1, Disagree = 2, Agree = 3, Strongly Agree = 4	Strongly Disagree = 1, Disagree = 2, Agree = 3, Strongly Agree = 4	
3	Respondent 3	No		2	4	4	
4	Respondent 4	No		1	2	3	
5	Respondent 5	No		3	2	3	
6	Respondent 7	No		1	4	2	
7	Respondent 8	No		2		3	
8	Respondent 11	No		1	4		
9	Respondent 12	No		3	4	1	
10							
11							
12							
13	Respondent 1	Yes		1	1	4	
14	Respondent 2	Yes		3	4	3	
15	Respondent 6	Yes		2	3	4	

Data tables filled | Empty Data tables | All data | Cross tabs | Sheet1

Ready Circular References

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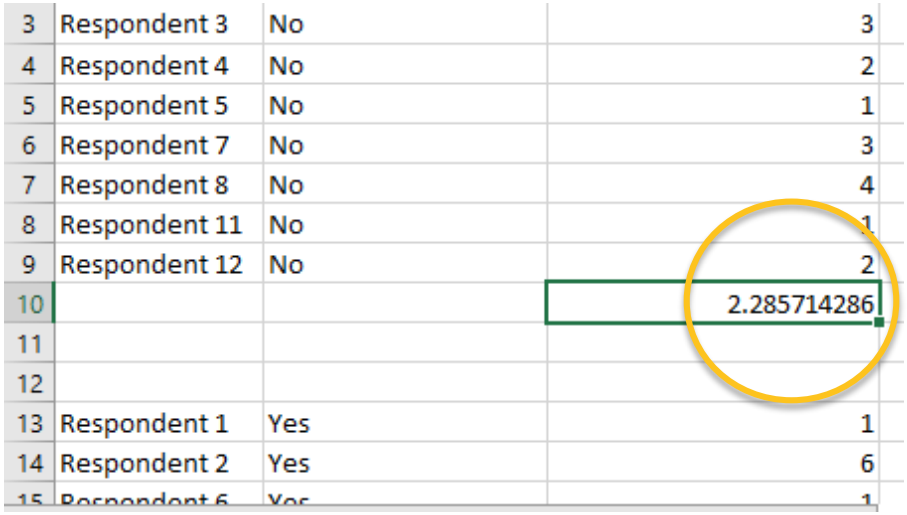
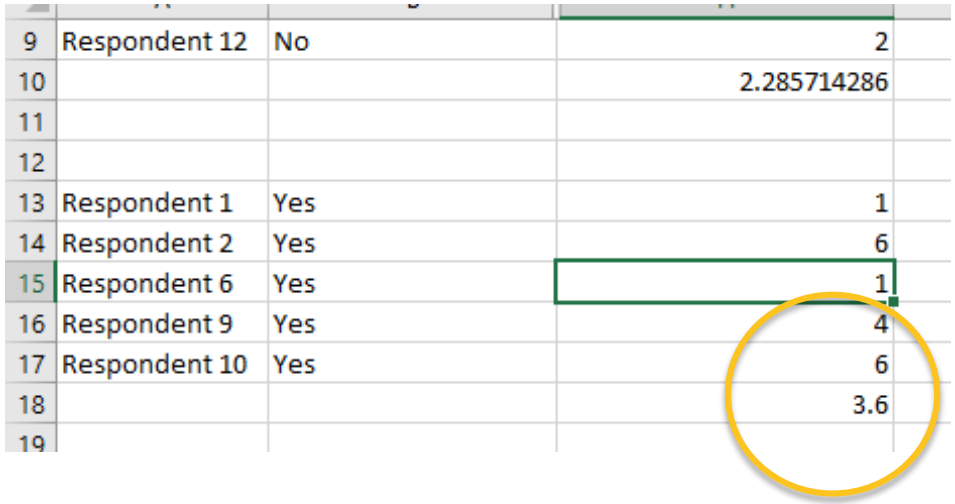
HOW TO CACULATE CROSSTABS IN EXCEL

- Average the responses to Q3 for the returning students and new students



3	Respondent 3	No	3
4	Respondent 4	No	2
5	Respondent 5	No	1
6	Respondent 7	No	3
7	Respondent 8	No	4
8	Respondent 11	No	1
9	Respondent 12	No	2
10			2.285714286
11			
12			
13	Respondent 1	Yes	1
14	Respondent 2	Yes	6
15	Respondent 6	Yes	1



9	Respondent 12	No	2
10			2.285714286
11			
12			
13	Respondent 1	Yes	1
14	Respondent 2	Yes	6
15	Respondent 6	Yes	1
16	Respondent 9	Yes	4
17	Respondent 10	Yes	6
18			3.6
19			

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HOW TO CACULATE CROSSTABS IN EXCEL

- Compare responses

20	**Comparing means**	
21		
22		Q3b. more confident in my ability to do something creative. (means)
23	First time participant	2.8
24	Return participant	3.3
25		

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GAP ANALYSIS WHAT IS IT?

- The comparison between two related variables to understand the difference (or gap) between them
- Usually measured on a scale
- Often used to understand:
  - pre/post responses
  - the relationship between “importance” of the presence of one variable and the level of “satisfaction” it provides
- We usually use gap analysis to COMPARE MEANS

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GAP ANALYSIS
HOW TO DO IT

- Identify two corresponding scale prompts
  Pre: I am confident that I can write poetry.
  Post: I am confident that I can write poetry.
- Calculate the mean score for each
- Subtract the mean score for “post” from the mean score for “pre”
  - Formula “=(post mean score-pre mean score=GAP)”
- Note whether or not the score has gone up or down

COMPARING QUESTIONS THROUGH GAP ANALYSIS

Compare responses to 2 questions that make sense in relation to one another

Tip: create surveys using the same wording for questions where you may want to do gap analysis

	Pre (on a 7 point scale)	Post (on a 7 point scale)	Gap
I feel confident in my ability to write poetry	6.5	5.4	-1.1
I feel more confident in my ability to do something creative.	5.9	6.1	+0.2

Mean post – mean pre = GAP

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MOST COMMONLY USED FORMULAS IN EXCEL (SUMMARY)

- For tally's: to count words or multiple numbers in a column
  - =countif(range, range, "variable being counted")
- For sums (of number or percentages:
  - =sum(range: range)
- For division to calculate percentages
  - =numerator/denominator (e.g. = number of survey participants/number of people who attended the event)
- For subtraction (often used in gap analysis)
  - =number – number (or =post score – prescore)

Next up
Qualitative data

Today, we'll focusing on qualitative data from surveys

THE MAIN TYPES OF QUALITATIVE SURVEY QUESTIONS

Open-ended questions: respondents are prompted to provide in-depth, written feedback

Lists: respondents are prompted to generate and write original, short, or one-word responses to a prompt in list form

Giving respondents flexibility through an "other" option: paired with a quantitative question, respondents can write in another, additional answer

TYPES OF QUALITATIVE SURVEY ANALYSIS

Open-ended question → coding for themes

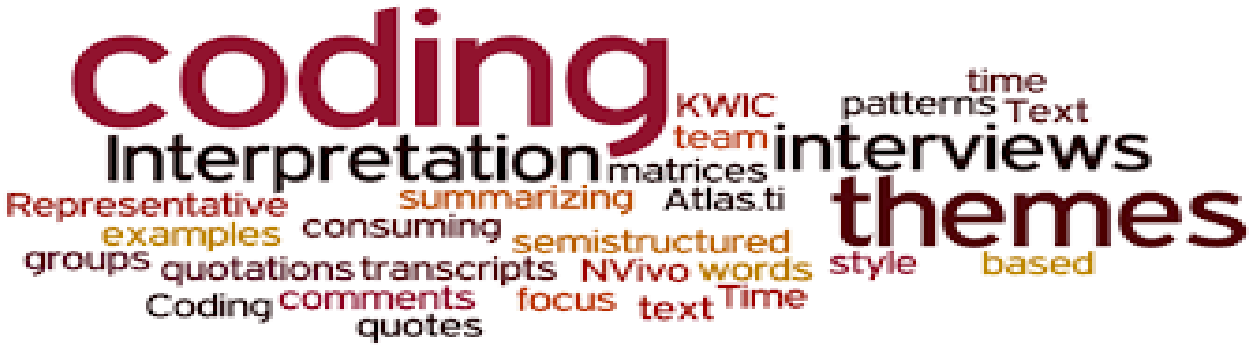
Lists → coding and counting

Giving respondents flexibility through an "other" → coding to better understand a survey question

CODING: A POWERFUL TOOL FOR QUALITATIVE SURVEY DATA

"A code in qualitative inquiry is most often a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribution for a portion of language-based-or visual data"

(Saldaña's, 2013)



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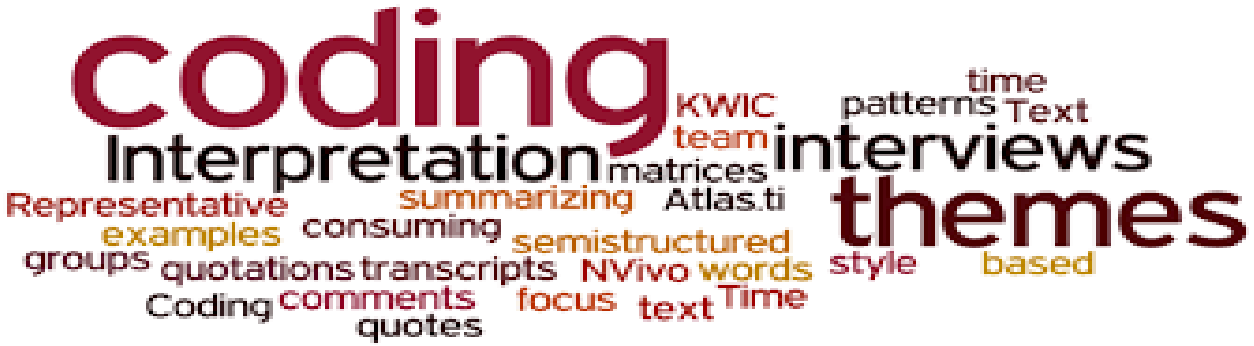
CODING: A POWERFUL TOOL FOR QUALITATIVE SURVEY DATA

Coding – taking open-ended response and translating them to more concise words or phrases

- A priori – coding based on a set of words/phrases already created
- Emergent – identifying and creating a set of codes based on what's in the data



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CODING QUALITATIVE DATA: OPEN-ENDED QUESTIONS

- Assign a word or phrase to a set of data to represent a concept being discussed
  - "This experience has allowed me to experiment with new art forms"
  - "I've never felt comfortable experimenting with music like this."

  } *"Experiment"*

- The phrases in a code don't always have to agree
  - "I needed to sit quietly with the art work to really absorb it."
  - "I prefer to experience art in conversation with others."

  } *Experience of art*

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CODING QUALITATIVE DATA: LISTS

- Read through responses and look for instances where people say something that aligns with your codes

A priori themes
Gain experience drawing
Develop teamwork skills
Increased self-efficacy

CODING QUALITATIVE DATA: LISTS

- Read through responses and look for instances where people say something similar with different words
- For lists – look to see which of the codes appear most frequently

Please list three things you learned during this class:		A priori themes
Respondent 1:	**How to draw a bug**	Gain experience drawing
	Sharing is important	Develop teamwork skills
	I am really good at drawing!	Increased self-efficacy
Respondent 2:	**Drawing**	Gain experience drawing
	I love my team in class!	Develop teamwork skills
	I did something I didn't think I could do	Increased self-efficacy

TURN YOUR CODE TO QUALITATIVE DATA!

- Using the coding worksheet, apply the *a priori* codes where indicated
- Identify *emergent* codes
- Feel free to work as a team or individually

STEPS FOR DATA INTERPRETATION: QUAL and QUANT

What's Involved?

- **Summarize your data**
  - What's the big picture?
- **Interpret your data**
  - What does it mean?
  - What's important? What's noise?

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TOOLS FOR INTERPRETING QUALITATIVE SURVEY DATA

- **Interpret the data – Debrief!**
- **Reflect and discuss**
  - Compare codes from multiple coders
  - Create categories (next step up from a code)

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TOOLS FOR INTERPRETING QUALITATIVE SURVEY DATA

Looking For Patterns Across Codes

Looking across emergent codes, what "categories" or next level codes emerge

- Look for what similar or different across a set of responses to create a category

Open-ended responses	Emergent code
When I go to a big art museum, it makes me feel small.	Emotional impact of museums
Art museums make me feel empowered.	Emotional impact of museums
I needed to sit quietly with the art work to really absorb it.	Preferred ways of experiencing art
I prefer to experience art in conversation with others.	Preferred ways of experiencing art

TOOLS FOR INTERPRETING QUANTITATIVE DATA

1. Focus on research questions & hypotheses
2. Where to focus your attention
3. How to tell if differences are meaningful
4. Commonly misused terms

TOOLS FOR INTERPRETING QUANTITATIVE DATA

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WHERE TO FOCUS YOUR ANALYSIS ATTENTION?

- Comparisons and context are key
  - What kind of program/event is it?
  - What are the goals for the program?

- Look for differences
  - Across categories
  - Across questions
  - Across years
  - Etc.

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MAKING MEANING
Context is Key

- Is this a program where repeated attendance is good? (e.g. building art skills over the course of several programs)
- Or, is it one where repeat attendance is *not* the goal? (e.g. rehabilitation program)

Q1. Participated in the program before?	Number (2016)	Number (2017)	Percentage (2016)	Percentage (2017)	
Yes	8	3	72%	43%	↓
No	3	4	28%	57%	↑
TOTAL	11	7			

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INTERPRETING DATA

How to know if a difference between groups is meaningful?

- Does it seem like a large difference?
- Is it part of a larger pattern?
- Does it "make sense" in light of what you know or suspect?
  - i.e., can you explain why?
- Does it suggest something important re: your organization's goals?
- Is it statistically significant? (optional)

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MAKING MEANING

In context with your other data

- In a pre to post, how do you know if it's changed *enough?*

	Pre (on a 7 point scale)	Post (on a 7 point scale)	Gap
I feel confident in my ability to write poetry.	3.2	3.8	+0.6
I feel more confident in my ability to do something creative.	5.9	6.1	+0.2
I feel confident reading out loud.	4.2	4.5	+0.3
I feel confident when showing people my poems.	5.2	5.3	+0.1

MAKING MEANING
Comparing Across Response Items

We looked at one scale question earlier, but what does in mean in comparison to other data points?

	Mean response
I feel more connected to my school community.	2.1
I feel more confident in my ability to do something creative.	3.1
I am less likely to skip class on days when I have art instruction.	3.0

MAKING MEANING

Circle Back to Hypotheses

- Hypothesis 1: Of all outcomes measured, participants will rate a connection to their school community highest
- Hypothesis 2: Of all outcomes measured, participants rate an increase in confidence lowest

MAKING MEANING
Visualizing Differences

Visually call out the highest and lowest responses per prompt

	Strongly Disagree 1	Disagree 2	Agree 3	Strongly Agree 4	Total
I feel more connected to my school community.	33%	33%	25%	8%	12
I feel more confident in my ability to do something creative.	9%	18%	27%	45%	11
I am less likely to skip class on days when I have art instruction.	9%	18%	36%	36%	11

MAKING MEANING OUT OF DATA
An Example

What does it mean?

Potential comparisons:

- According to the 12 participants who completed the survey, participants “strongly agree” with an increase in confidence doing “something creative” with more frequency than other potential outcomes

- Additionally, a small number of participants (8%) strongly agreed that the program helped them to feel more connected to their school community

MAKING MEANING
Recode into Meaningful Categories

- Looking at the “top two”/ “bottom two” responses for more clarity
- What combined percent “agreed” and “disagreed”

	Strongly Disagree 1	Disagree 2	Agree 3	Strongly Agree 4	Top two	Bottom two
I feel more connected to my school community.	33%	33%	25%	8%	33%	66%
I feel more confident in my ability to do something creative.	9%	18%	27%	45%	73%	27%
I am less likely to skip class on days when I have art instruction.	9%	18%	36%	36%	73%	27%

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MAKING MEANING
Recode into Meaningful Categories

What does it mean?

Top two/bottom two can help simplify and focus on how many people fell on either side of the scale

Potential interpretations

- The majority of participants (73%) agreed (with a 3 or 4 on a 4-point scale) that this program helped them to feel more confident in their ability to do something creative

- The majority of participants (73%) agreed that they are less likely to skip class on days when they have art instruction.

- However, the majority (66%) did not agree that the program made them feel more connected to their school community.

MAKING MEANING OUT OF UNEXPECTED OR "NEGATIVE" RESULTS

What can you do with "negative" results?

- Use them as guides for program development
- Do follow-up research
- Don't shy away from sharing this with funders and team members
    - Communicate the findings *and* the plan to do or learn more as a result of the data
- Make changes and evaluation it again later to see the impact

WHERE ON THE CYCLE OF EVALUATION ARE WE FOCUSING?

Data driven evaluation design cycle

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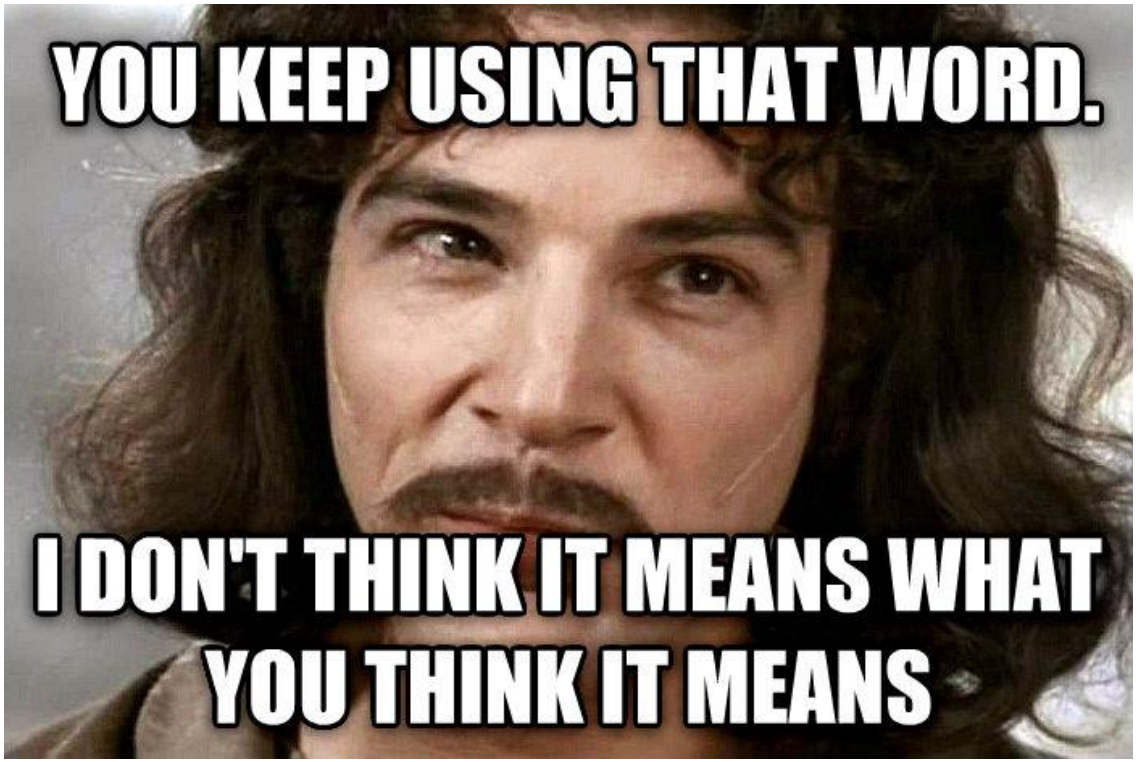
FINAL TIPS FOR INTERPRETATION AND MEANING MAKING

- Don’t shy away from “negative” results, that’s where we grow
- Avoid fishing for data or cherry picking results
- We’re not trying to “prove” anything, just make more data-informed decisions

COMMONLY USED RESEARCH TERMINOLOGY



- Significant
- Reliable/valid
- Correlated with
- Prove

Thank You!

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BREAK

Reflecting and Revising Quality 301:

Telling Your Story through Data

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Katherine Gean
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HOUSEKEEPING

- Restrooms
- Snacks and Breaks
- Wi-fi
  - CHAGUEST
  - guest
  - chawireless

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TODAY'S PLAN

Our hopes for today's session: build your skills in creating and consuming data stories

We'll be covering:

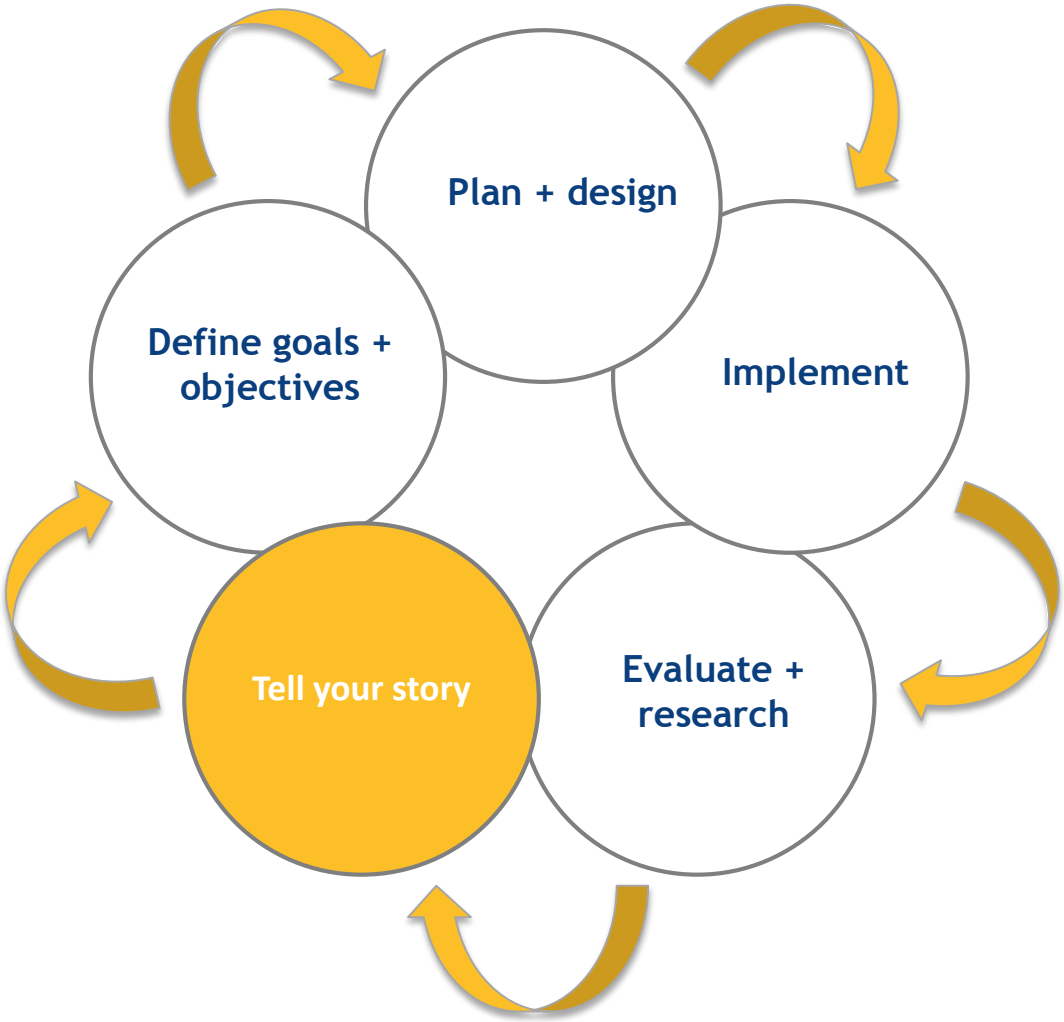
1. Identifying your audience & their needs
2. Structuring your story
3. Tools to support your story visually
4. Reflection on your logic model

INTRODUCTIONS

- Name
- Role

THE CYCLE OF EVALUATION

Today's focus



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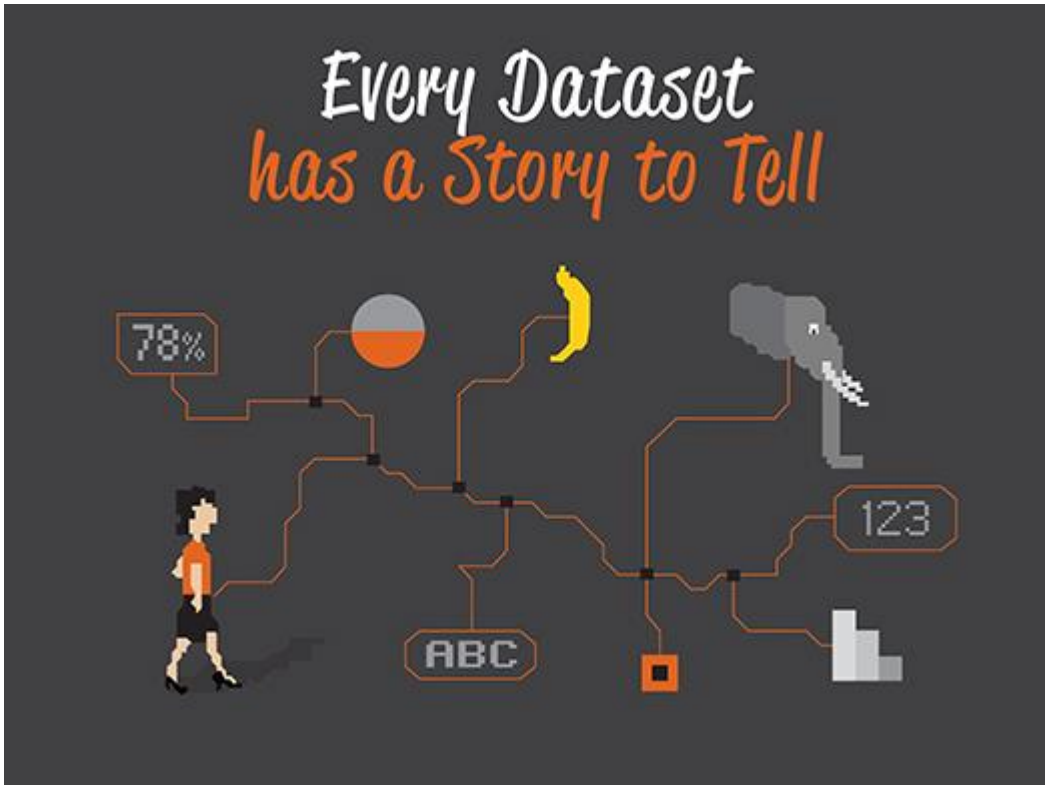
STORYTELLING COMPONENTS

- **Who** are we telling our stories to?
- **Why** are we sharing our stories? With what purpose in mind?
- **How** do we frame our stories?
- **What** should we include?
  - **Where and When** you gathered data



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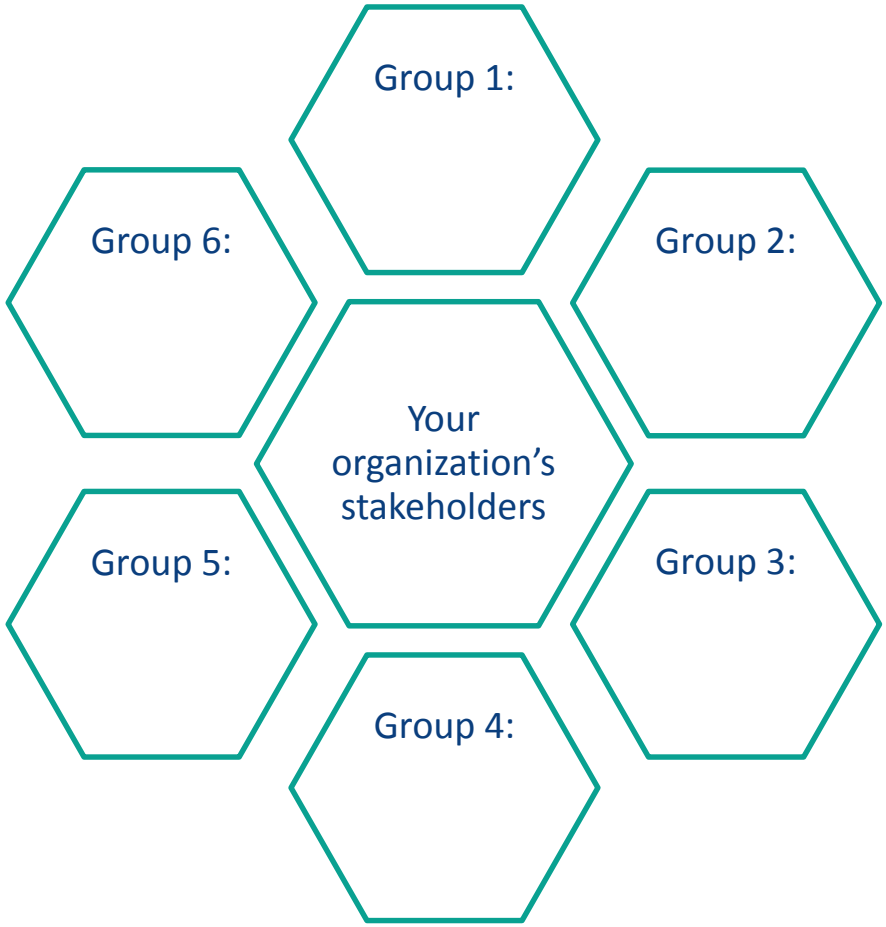
WHAT DATA IS AVAILABLE?

- What kinds of data does your organization already collect?
  - One-time data collection
  - Tracking measures across time
  - Panel data with the same participants over time

- What are the barriers to data collection in your organization?

STAKEHOLDER EXERCISE

Who do you want to share your stories with?



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STAKEHOLDER EXERCISE

Discussion

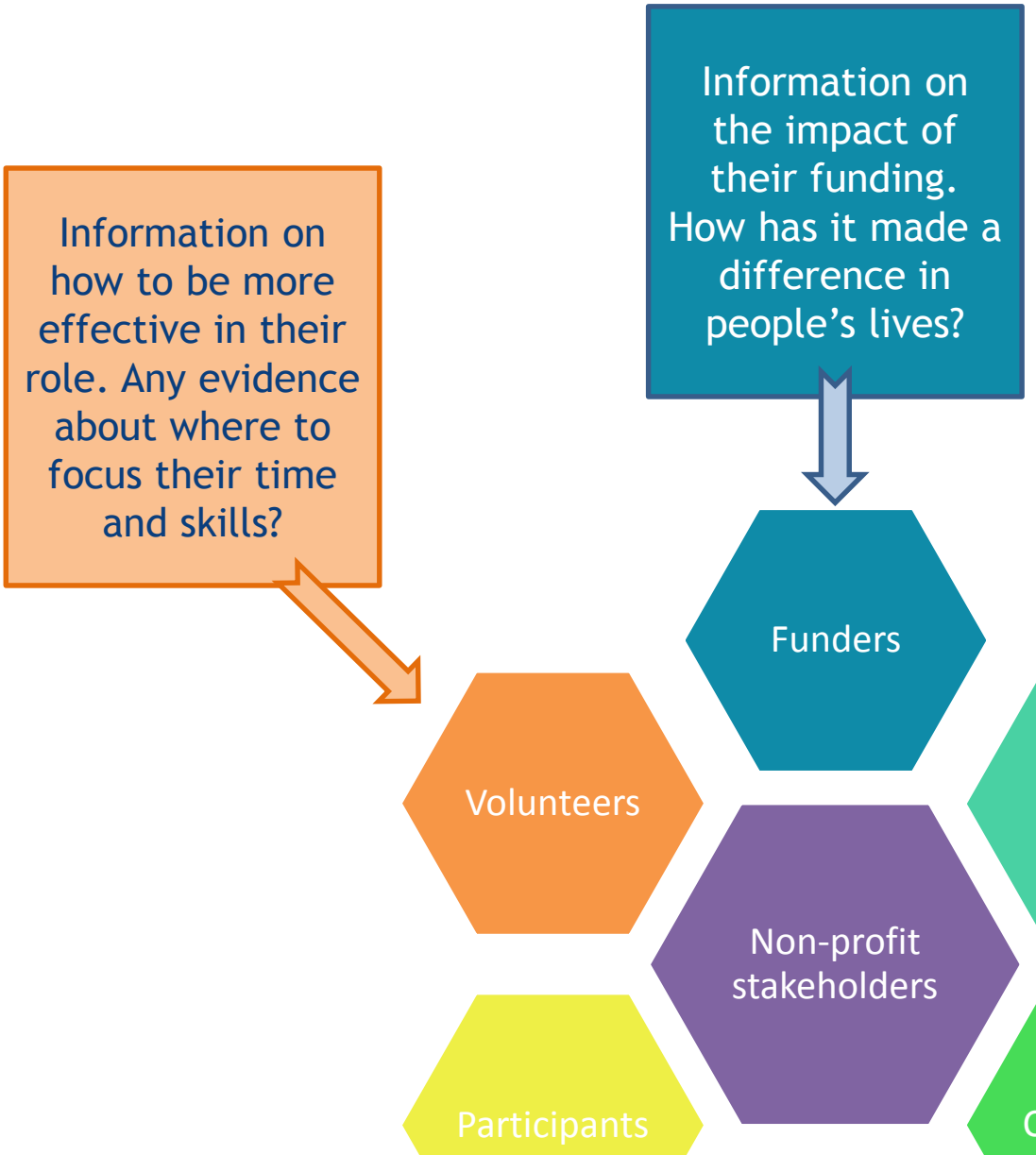
What stakeholders did you include?

- Internal
- External

EXAMPLE OF A STAKEHOLDER MAP

Why do you want to share your stories with these groups?

Put yourself in their shoes: What info do they need from you?



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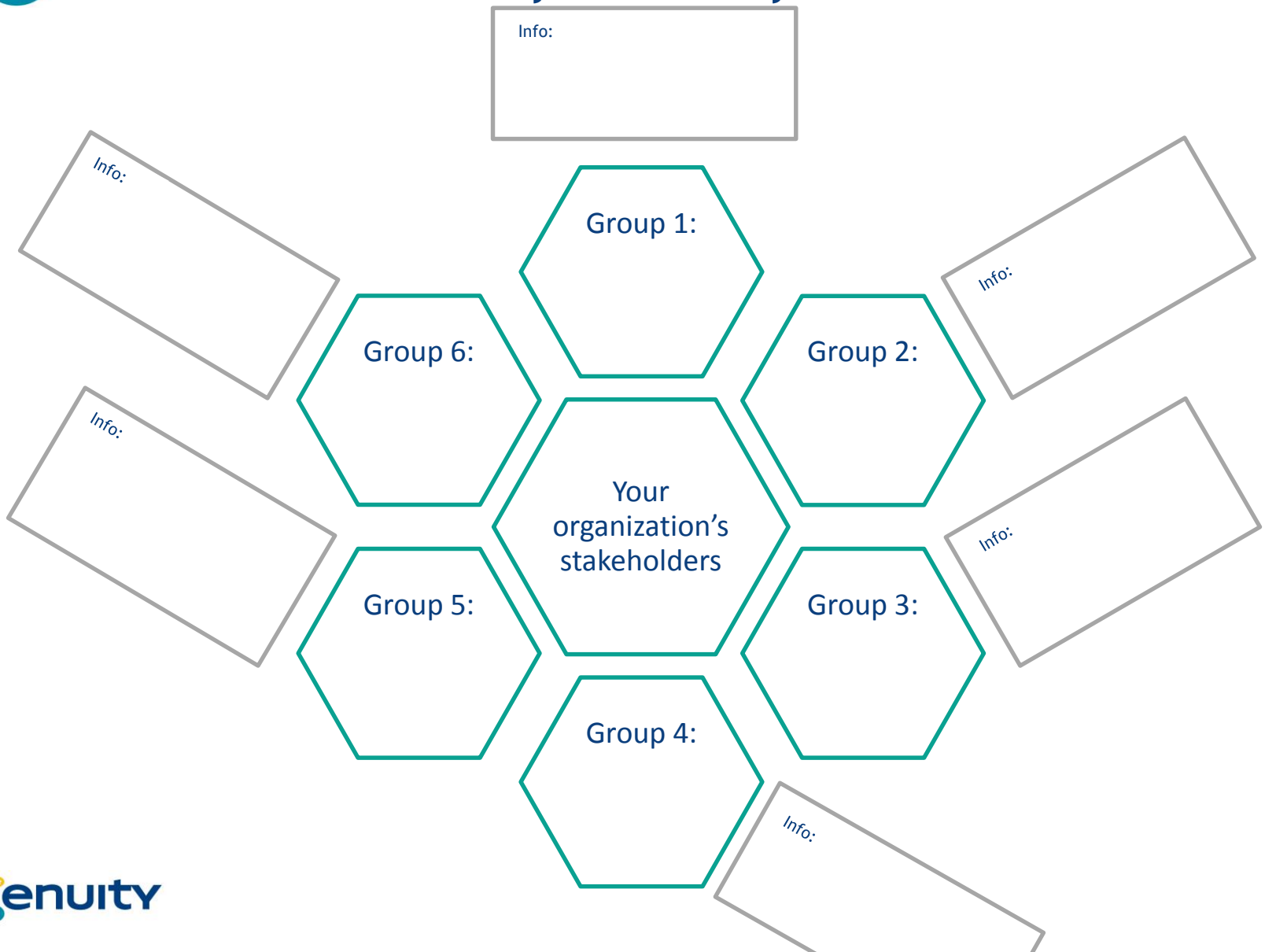
STAKEHOLDER EXERCISE

What information do they need from you?



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STAKEHOLDER EXERCISE

Discussion

What kinds of information do your stakeholders need?

- For internal stakeholders?
- For external stakeholders?

Are there actions you're hoping they'll take based on your results?

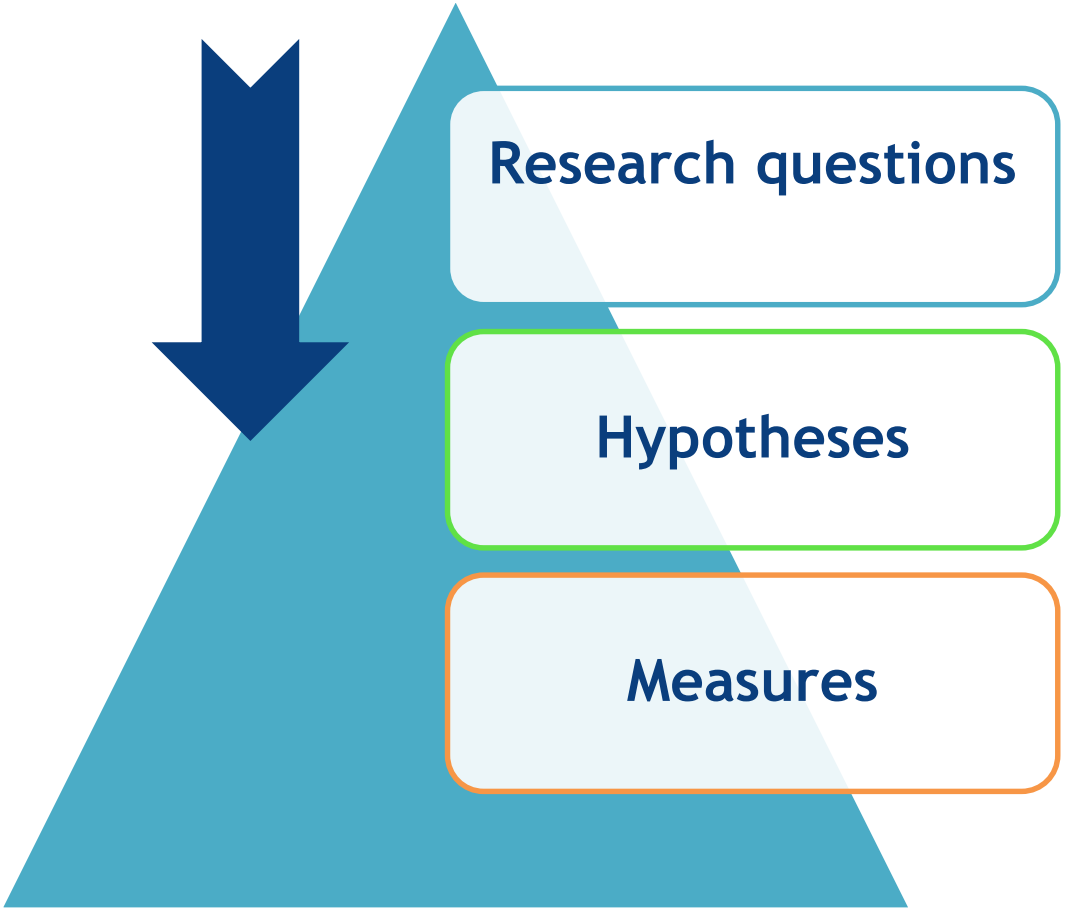
OTHER THINGS TO CONSIDER FOR STAKEHOLDERS

Consider:

- your stakeholders' literacy
- numeric literacy
- depth of knowledge needed
- what data they need to take action

HOW SHOULD I FRAME MY STORY? A HIERARACHY OF INFORMATION

When planning, work from the top down



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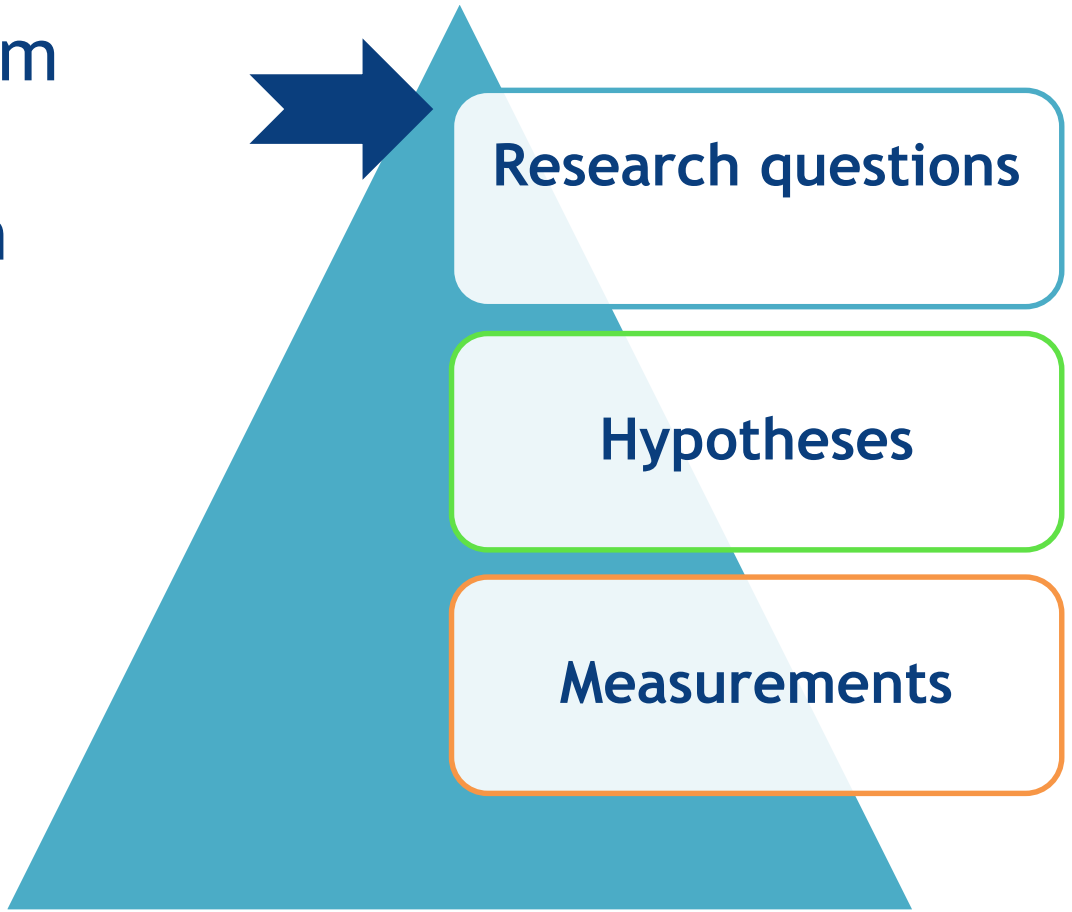
HOW SHOULD I FRAME MY DATA STORY? A PROGRAM EVALUATION EXAMPLE

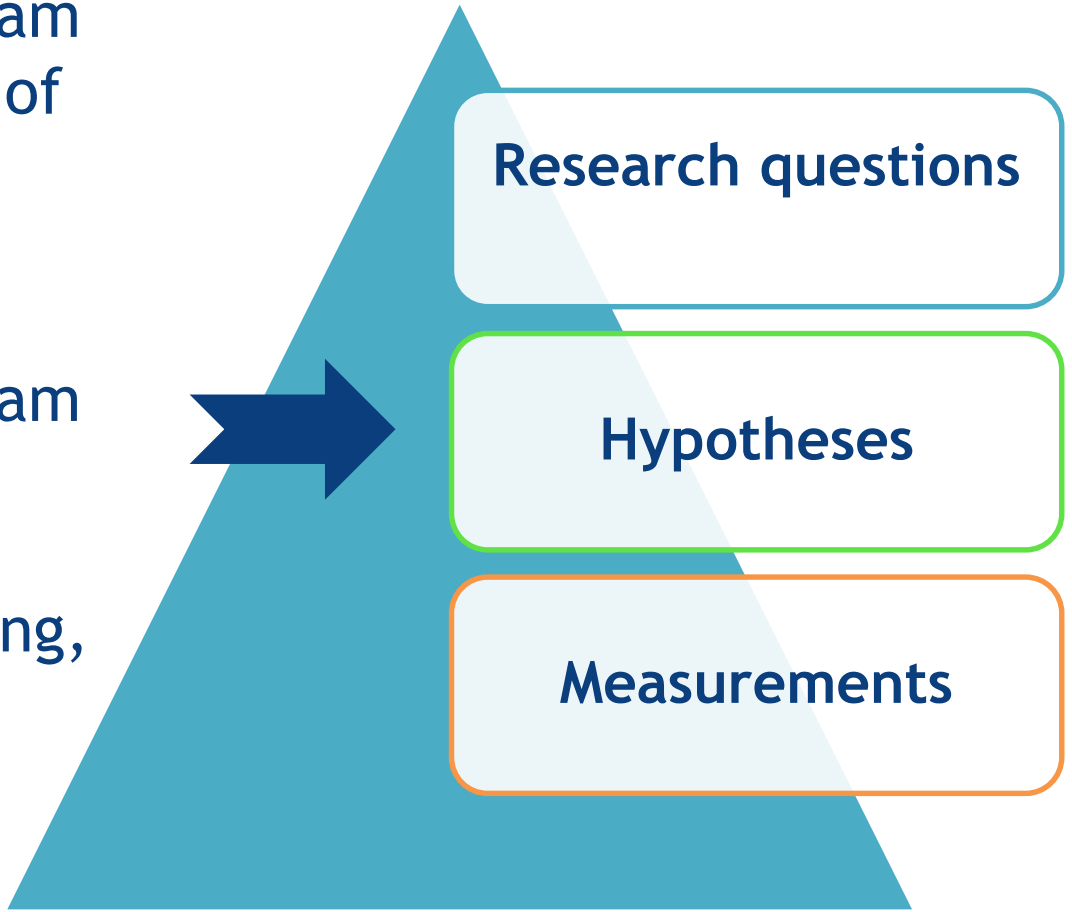
Does the program affect critical thinking skills in participants?



HOW SHOULD I FRAME MY DATA STORY? A PROGRAM EVALUATION EXAMPLE

Hypothesis 1: The program will increase four types of critical-thinking skills in participants.

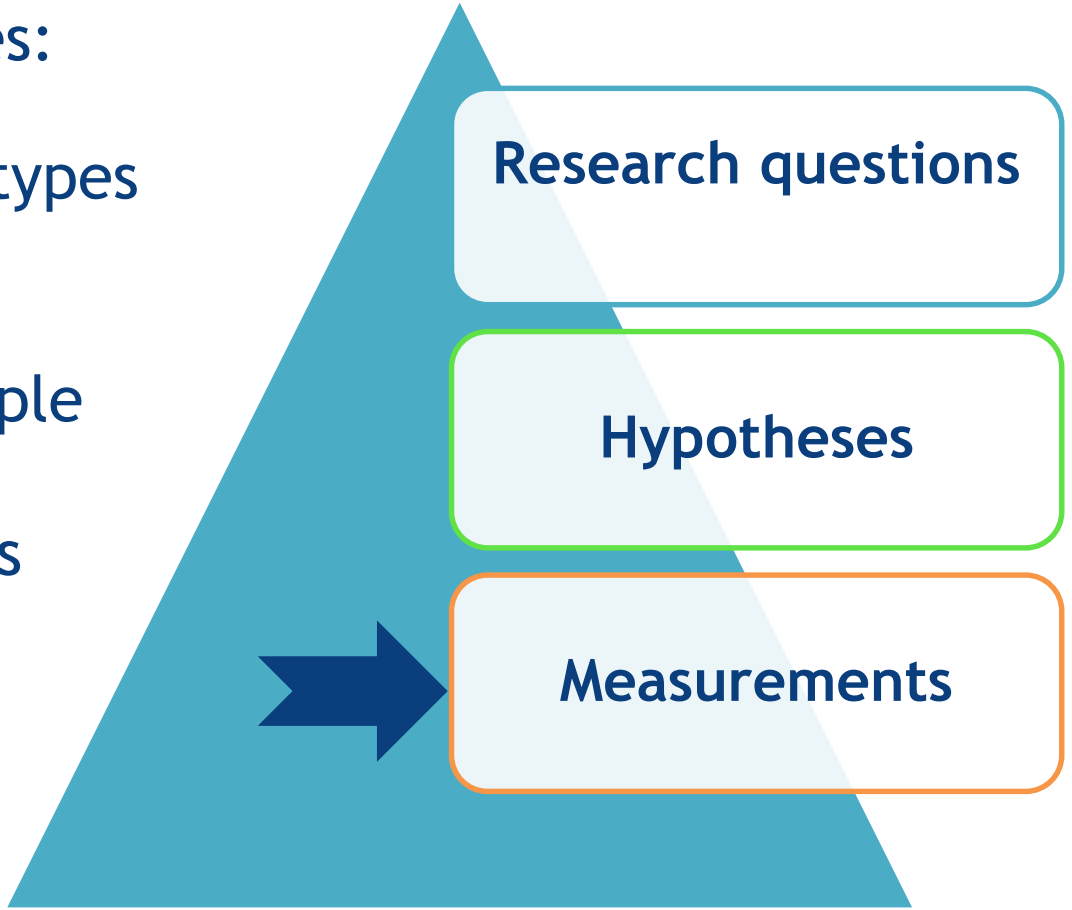
Hypothesis 2: The program focuses mainly on considering multiple options in problem solving, so we expect to see the biggest leaps there.



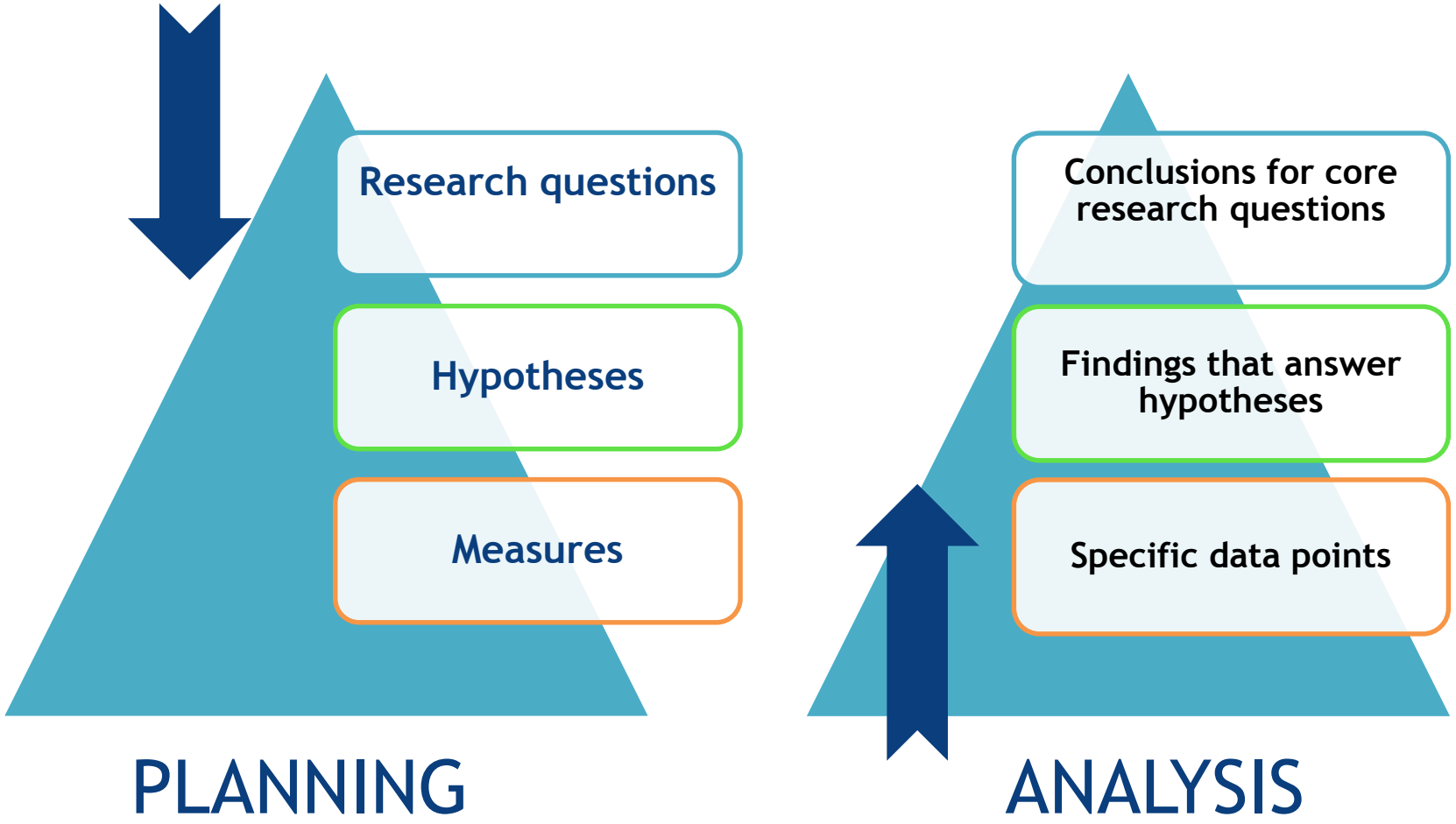
HOW SHOULD I FRAME MY DATA STORY? A PROGRAM EVALUATION EXAMPLE

Method & measures: pre/post test observations four types of critical thinking skills we teach:

1. Consider multiple options
2. Look to experts
3. Distinguish evidence and interpretation
4. Ask questions



SHIFTING FROM TOP-DOWN PLANNING TO BOTTOM-UP ANALYSIS



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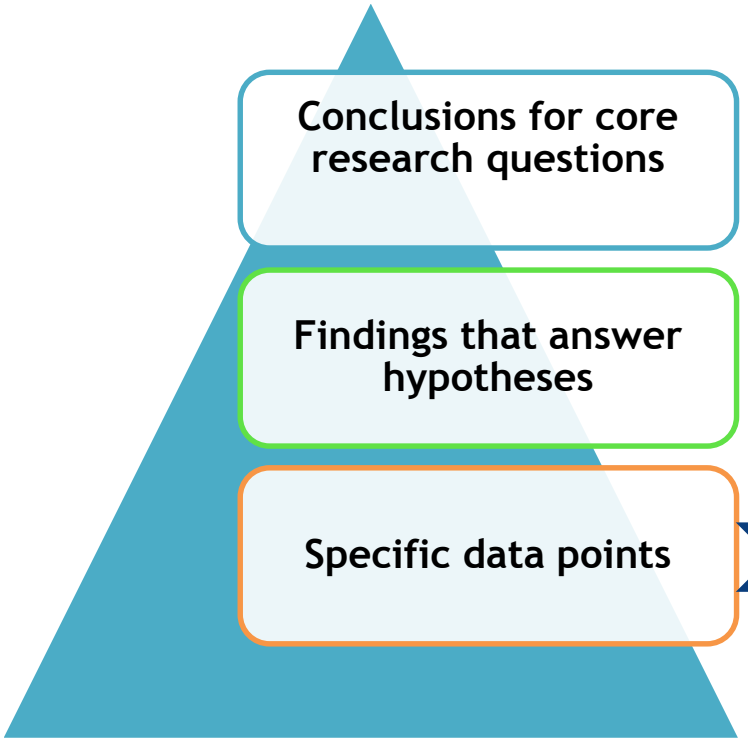
HOW SHOULD I FRAME MY DATA STORY EXAMPLE? DATA POINTS.



Critical-thinking skills measures	Pre-test	Post-test
Skill 1: Considering multiple options when problem solving	2.2	4.1
Skill 2: Looking for expert knowledge	4	3.9
Skill 3: Distinguishing between evidence and interpretation	1.8	3.9
Skill 4: Asking clarifying questions	2.2	3.5
Overall means	2.55	3.85

HOW SHOULD I FRAME MY DATA STORY EXAMPLE? DATA POINTS
(WHAT TO PAY ATTENTION TO)

- First, answer hypotheses
- Also look at differences
  - Between categories
  - Between pre/post
  - Between years
- And look at changes
  - Biggest
  - Smallest

Critical-thinking skills measures	Pre-test	Post-test	Change
Skill 1: Considering multiple options when problem solving	2.2	4.1	+1.9
Skill 2: Looking for expert knowledge	4	3.9	-.1
Skill 3: Distinguishing between evidence and interpretation	1.8	3.9	+1.1
Skill 4: Asking clarifying questions	2.2	3.5	+1.3
Overall means	**2.55**	**3.85**	**+1.3**

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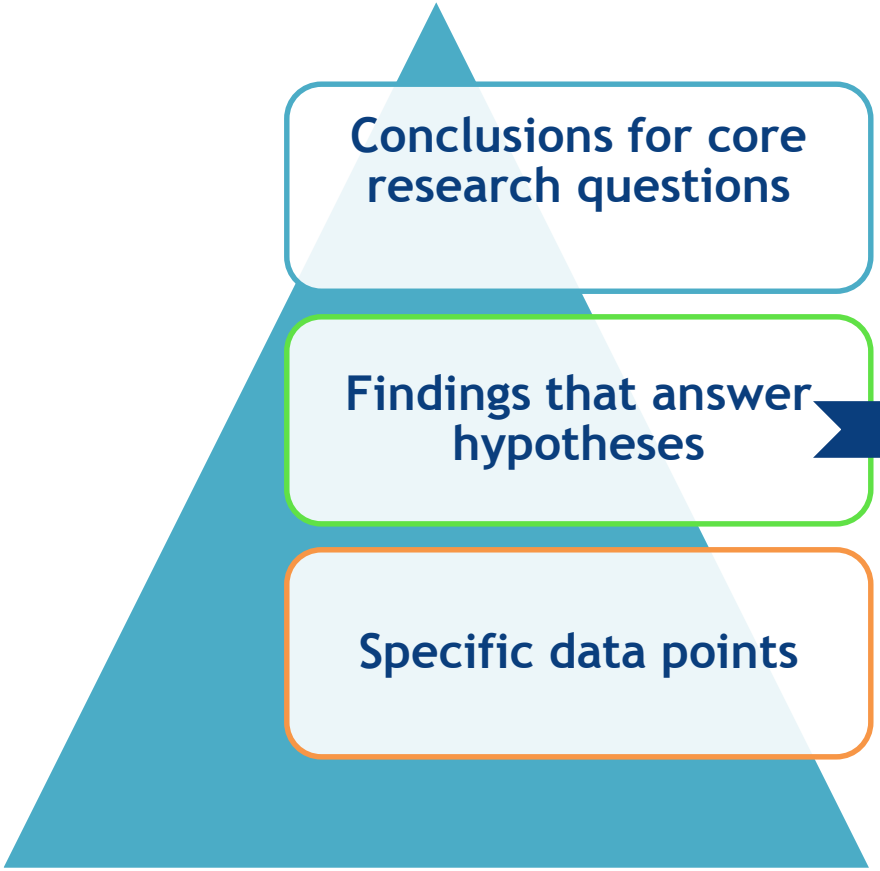
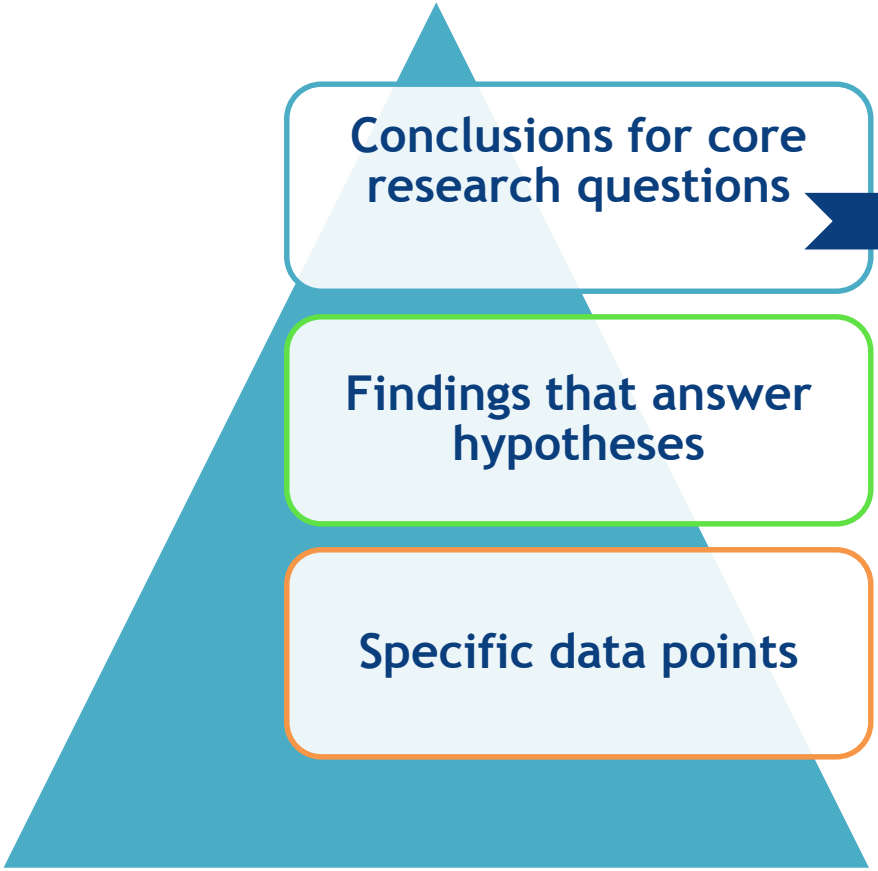
HOW SHOULD I FRAME MY DATA STORY? ANSWERING HYPOTHESES



Hypothesis 1: The program will increase ALL FOUR types of problem-solving skills in participants. NOT SUPPORTED

Hypothesis 2: The program focuses mainly on considering multiple options when problem solving, so we expect to see the biggest leaps there. SUPPORTED

HOW SHOULD I FRAME MY DATA STORY? CONCLUSIONS



- The arts program is **improving multiple critical thinking skills** in participating students.
- The program is **boosting three core critical-thinking skills**: considering alternate options, identifying evidence, and asking questions.
- On **one measure, looking for expert knowledge, students did not show the gains we expected to see**. Based on interviews, we believe this is due to X, and we **plan to try Y** during the next program.

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WHAT TO INCLUDE IN YOUR STORY

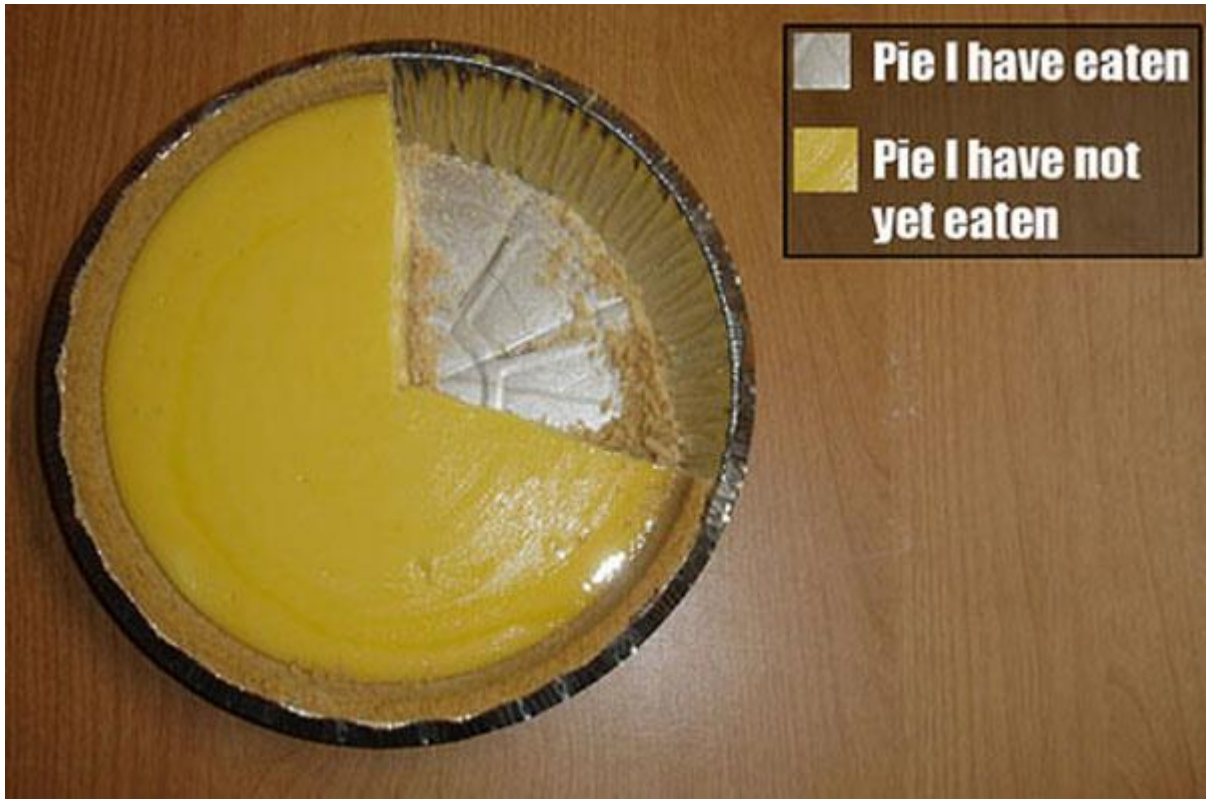
- Mix of kinds of evidence
- Be objective & offer balance
  - In text AND graphics
- Rightsizing your story

BREAK

TOOLS TO SUPPORT YOUR STORY

- Data visualization
- Provide a human connection through quotes and pictures
- One-page summaries with visuals

WHAT IS DATA VISUALIZATION?



"The techniques used to communicate data or information by encoding it as visual objects in graphics."

HOW TO CHOOSE A TYPE OF DATA VIZ?

1. What's the most important thing you're trying to communicate through the data?
    - Change over time
    - How groups differ
    - Totals across groups

2. What kind of data (survey question) do you have?

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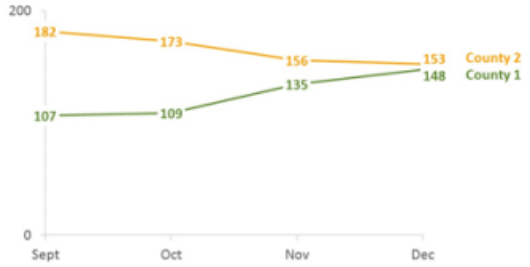
YOUR TYPE OF VISUAL DEPENDS ON YOUR DESIRED MESSAGE

Households served

County	Sept	Oct	Nov	Dec
County 1	107	109	135	148
County 2	182	173	156	153
Total	289	282	291	301

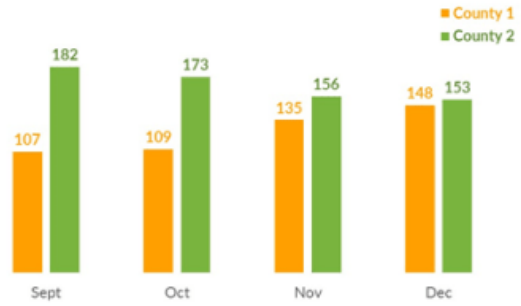
Households served

We provided services to **fewer households in County 2** (182 families in September vs. 153 by December) and **more households in County 1** (107 in September vs. 148 by December).



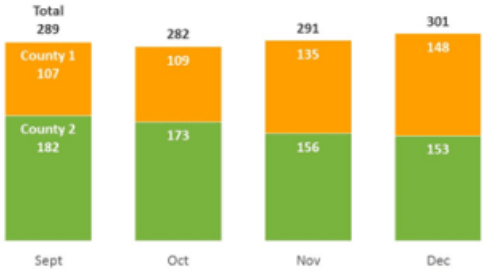
Households served

In September, we were serving more families in **County 2** than in **County 1** (182 vs. 107 households By December, that gap had shrunk.



Households served

The proportion of families served in **County 1 increased** while the proportion of families served in **County 2 decreased**. The total number of households increased slightly, from 289 in September to 301 in December.

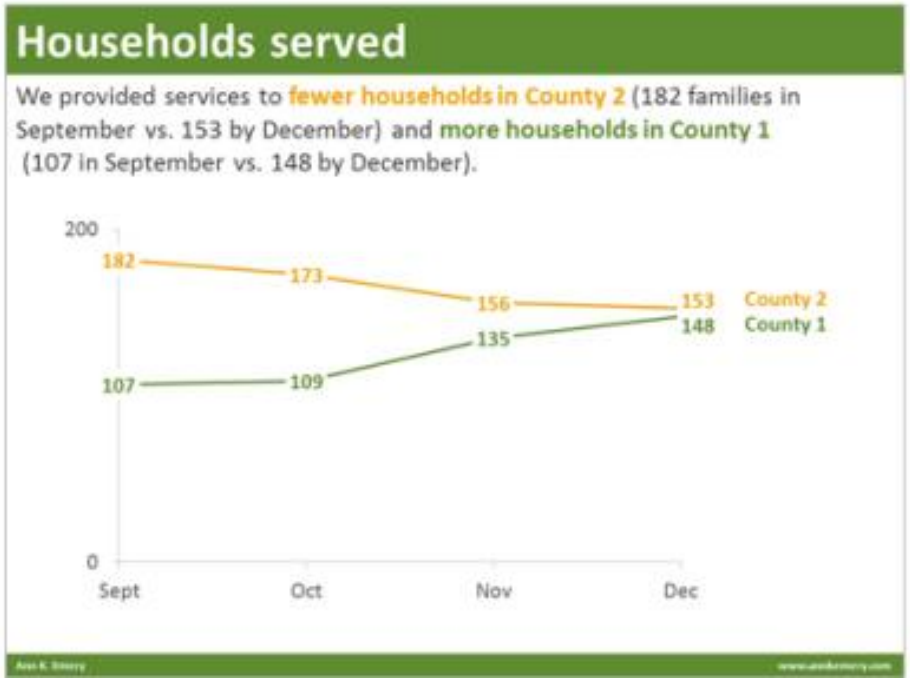


This example was created by Ann K. Emery www.annkemery.com

LINE CHART

Four Ways of Showing the Same Data

Line chart:
Focus: Highlights trends over time by showing lines that go up, go down, or hold steady



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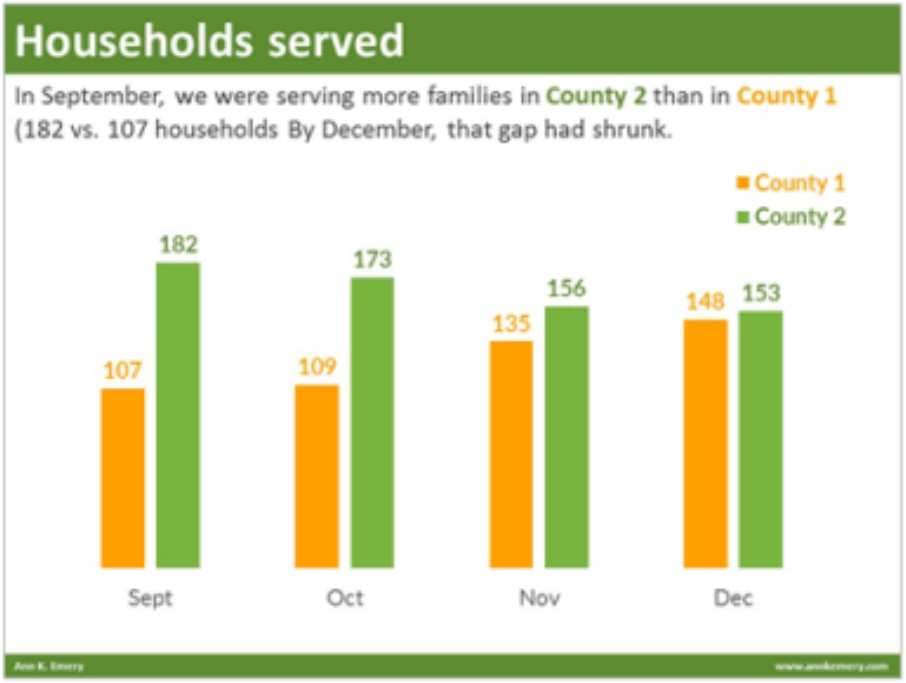
CULSTERED COLUMN CHART

Four Ways of Showing the Same Data

Clustered column chart:

Focus: Direct comparison between the two columns; best when you want to <u>focus on differences</u>



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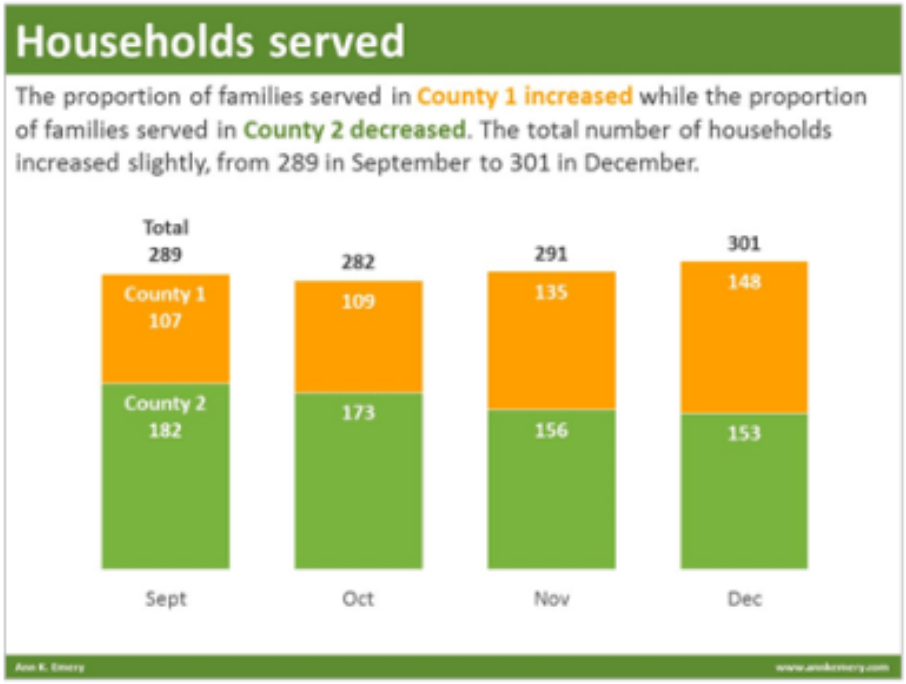
STACKED BAR CHART

Four Ways of Showing the Same Data

Stacked bar chart:
Focus: Focus is on the total of the two segments within all services offered



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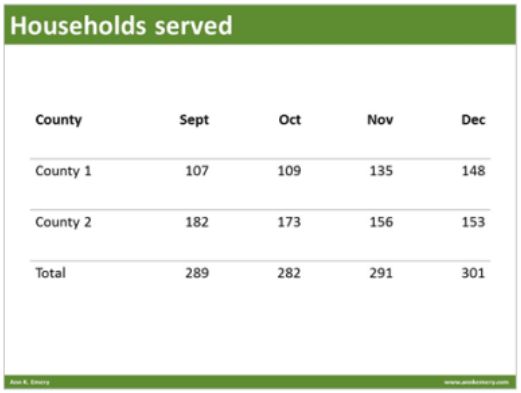
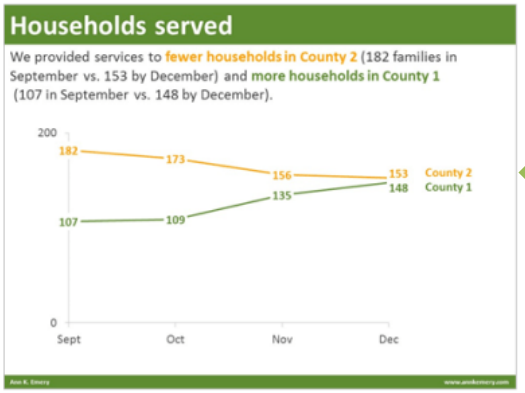
FOUR DIFFERENT MAIN MESSAGES

All Are True!

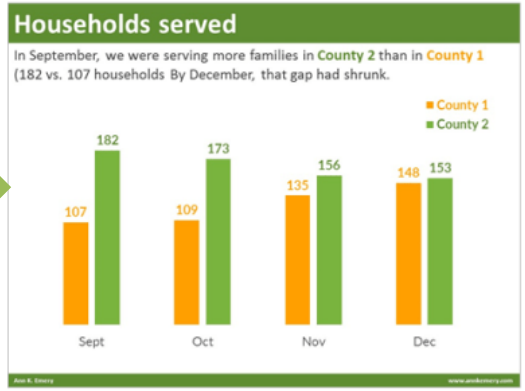
Overall, we're serving about the same number of people now as in the past.

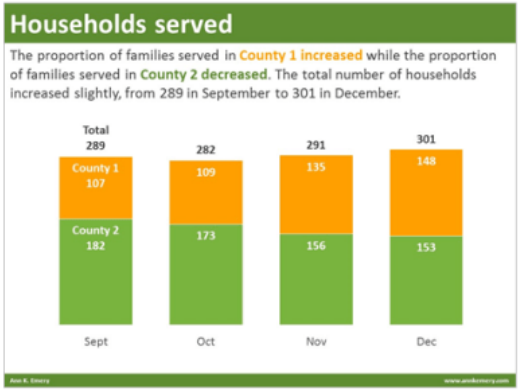




Across the two counties, our services are more equally distributed now than in the past.
NOTE THE COUNTIES' COLORING

There were significant differences between the service rate in the two counties.





Overall, we're serving about the same number of people now as in the past.

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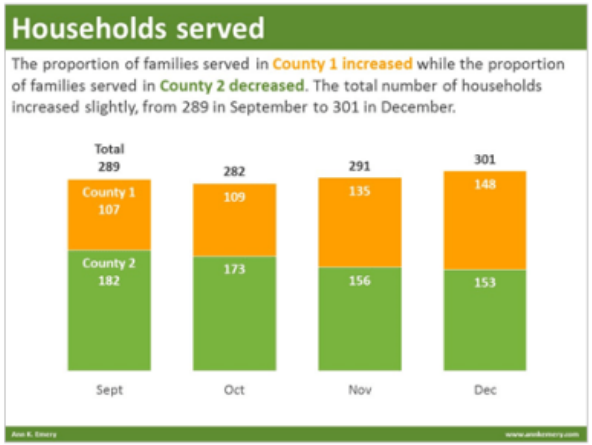
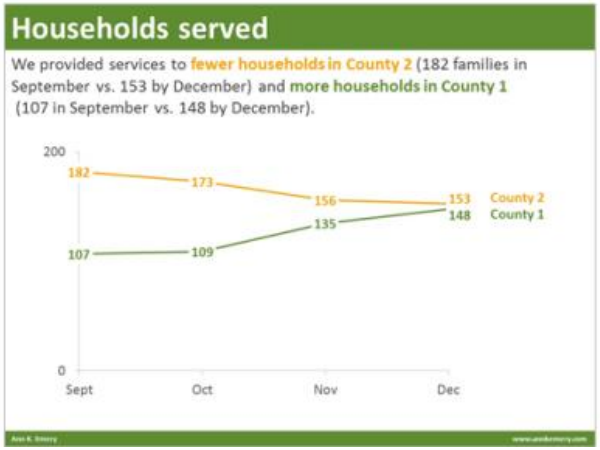
STACKED BAR CHART

Four Ways of Showing the Same Data

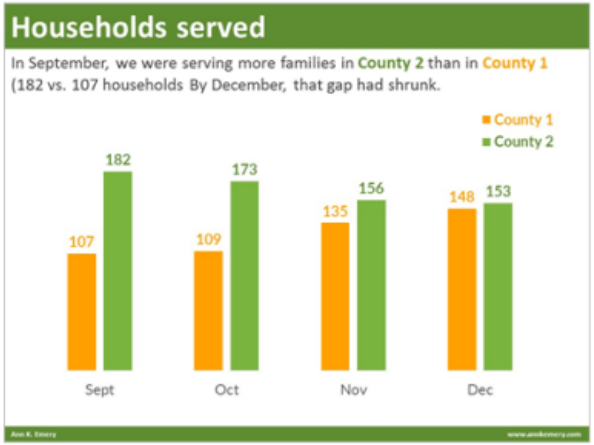
Stacked bar chart: Focus is on the total





Line chart: Focus is on trends over time

Clustered column chart: Focus is on differences



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GROUP EXERCISE

Choosing Charts for Data

We'll all use this one tally table and we'll design different charts depending on what we're trying to highlight about the story.

Category of school	# students served 2012	# students served 2017
One: Excelling	200	100
Two: Strong	100	100
Three: Developing	50	200
4: Emerging	50	300

YOUR CHOICE OF DATA VIZ ALSO…

Depend on the Type if Survey Question Your Representing

Three main types of quantitative data

- Single-select questions (e.g., yes/no)
- Select all that apply questions (e.g., race/ethnicity)
- Scales (e.g., satisfaction on a 7-point scale)

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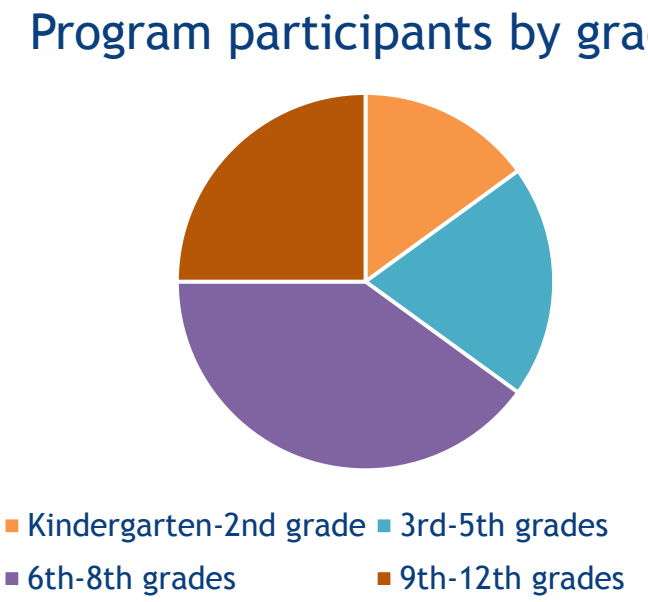
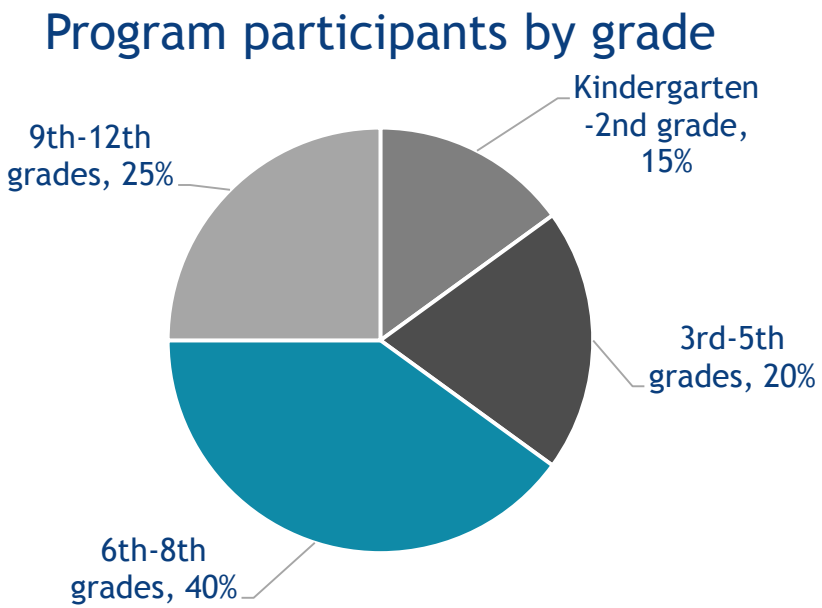
DATA VIZ FOR SINGLE-SELECT QUESTIONS

Pie chart works when you have categories that are exclusive (e.g., yes or no) because the categories sum to 100%





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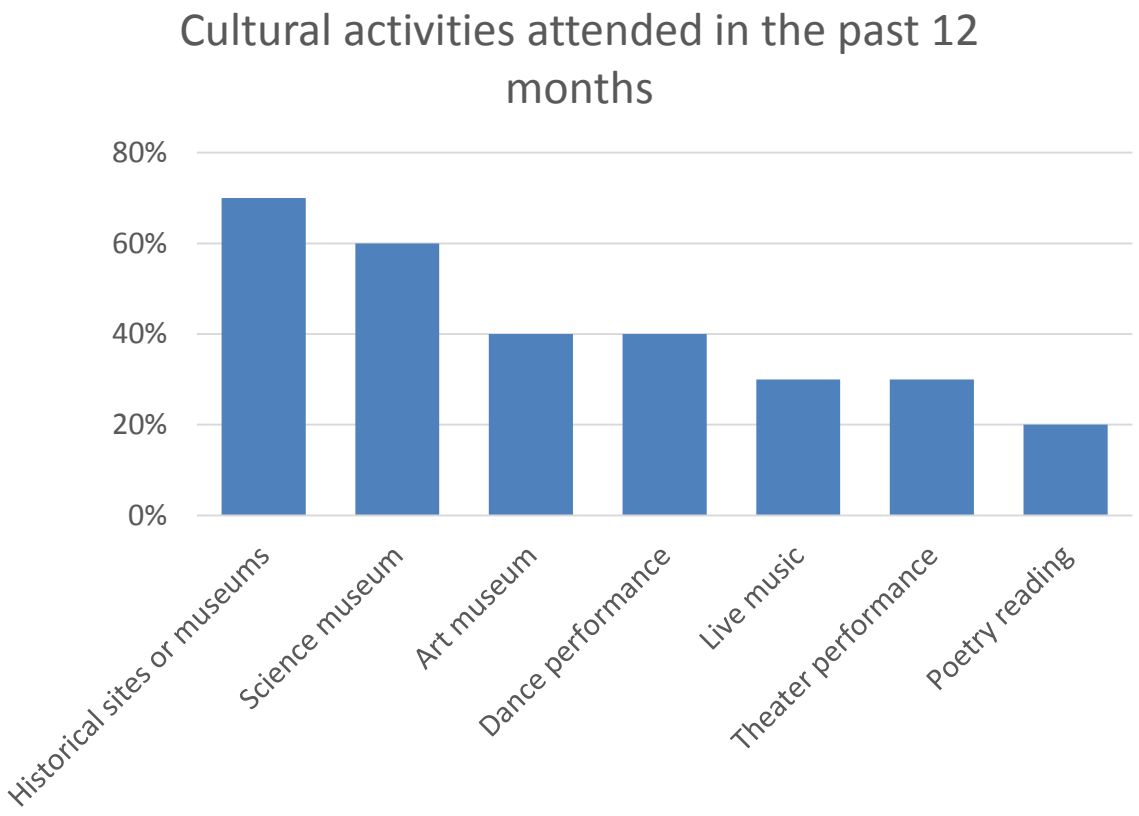
DATA VIZ FOR SELECT-ALL-THAT-APPLY QUESTIONS

When respondents can select multiple answer options, a vertical bar chart works well by showing how categories compare to each other



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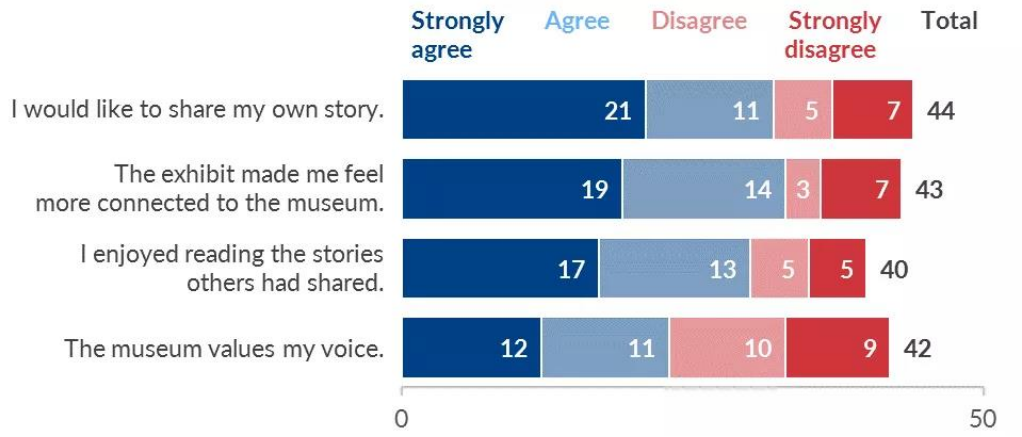
DATA VIZ FOR SCALES

A stacked bar chart works well to display the range of responses on a scale question like satisfaction or agreement

What are the impacts of a visit?



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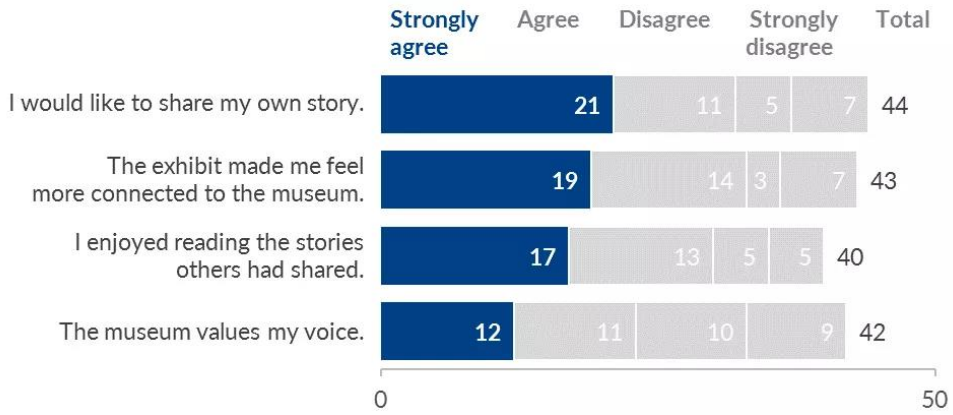
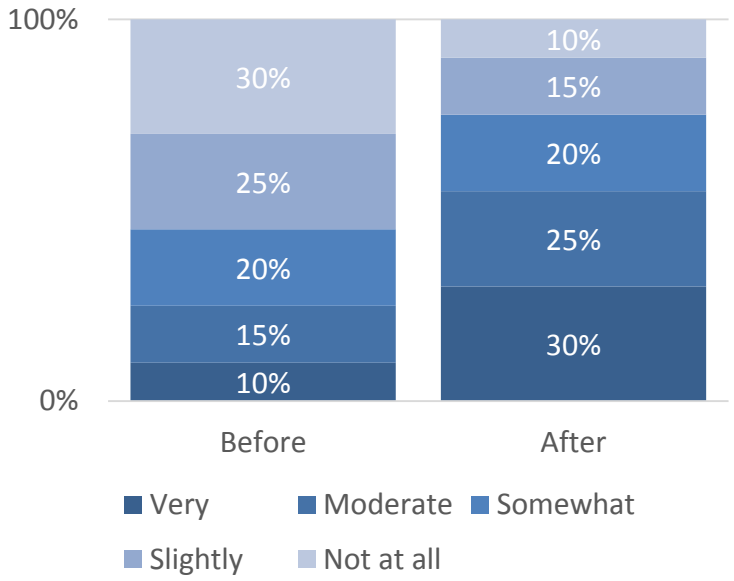
What are the impacts of a visit?

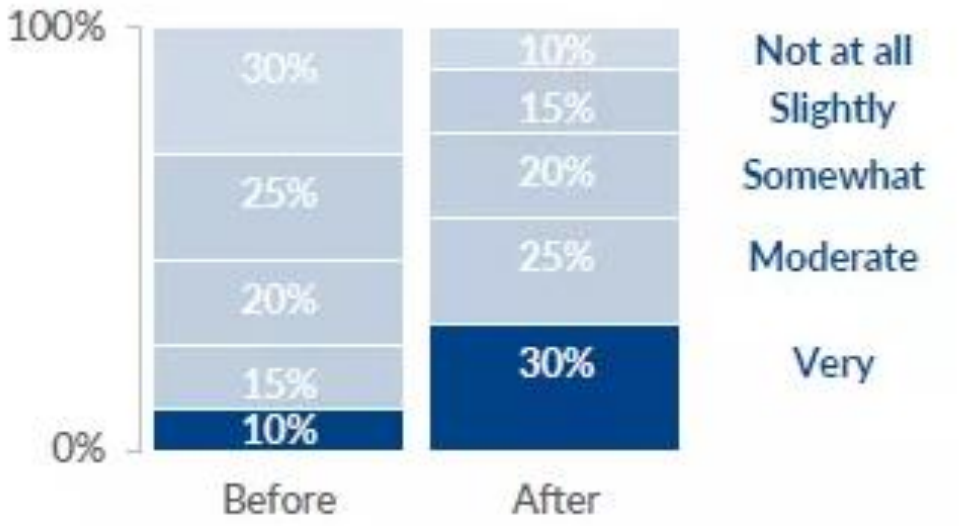


DATA VIZ FOR COMPARING SCALES

A stacked bar chart can also be paired with another stacked bar chart to show pre/post test differences

How do self-rated critical thinking skills change before and after the program?





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HIGHLIGHT THE HUMAN ELEMENT

Incorporate quotes and pictures to help connect the reader to your participants

Quotes that share the "whys" of participation…

Quotes that tell the program's impact on a participant…

Quotes that bring richness or context to your data…

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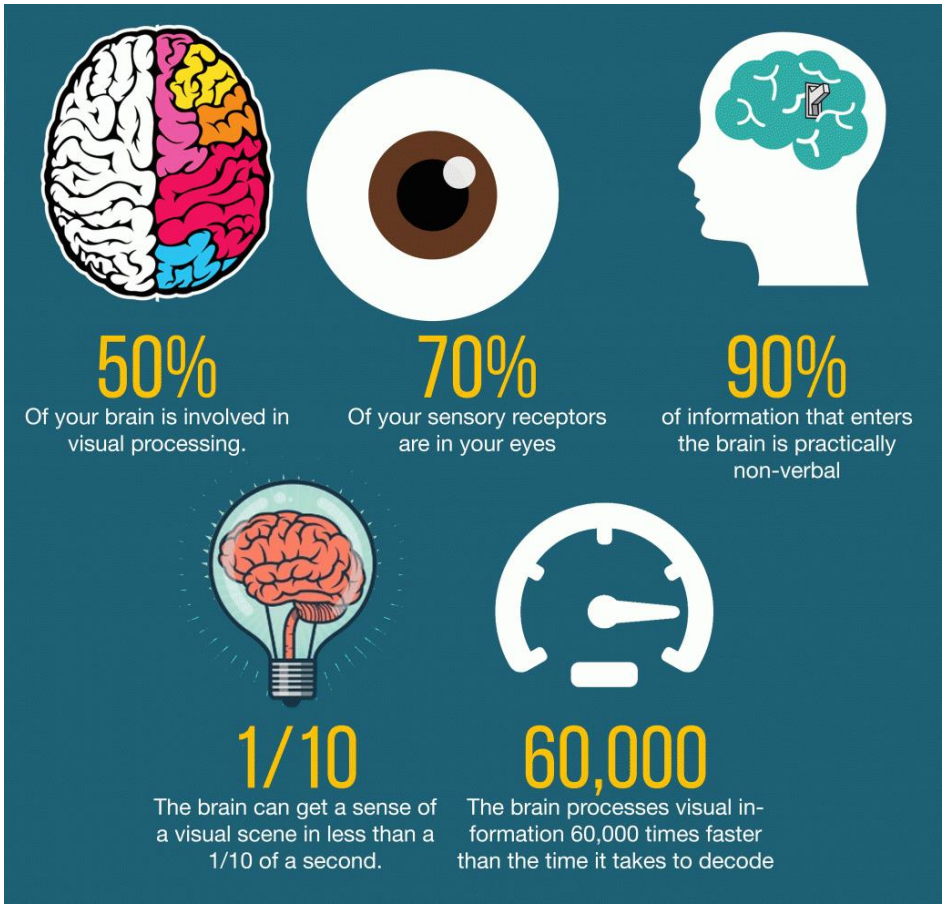
ONE-PAGERS

Highly Effective Tools for Communicating a Snippet of Your Story

Often include:

- Charts
- Statistics
- Icons
- Quotes
- Pictures



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ONE-PAGER DESIGN PRINCIPLES

1. Make the **overall story clear** – what are you trying to convince the audience of?

2. Bring the reader along by pointing out your **support/evidence clearly**

3. Make sure visuals are **useful (not misleading) and aesthetic**

4. Make your visualization **right-sized** by including multiple points of information, but not too much. LESS IS MORE.

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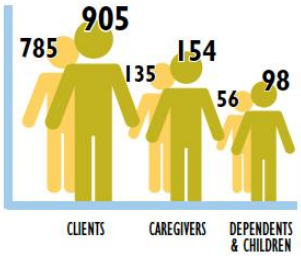
OPEN ARMS CLIENTS

CLIENTS WE SERVE

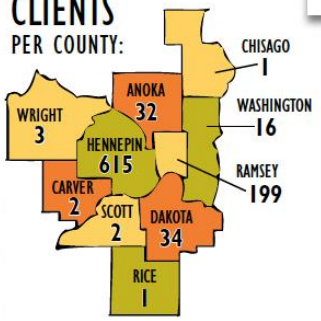
2009 2010



3 OUT OF 4 CLIENTS EARN LESS THAN $20,000 A YEAR

ZIP CODES DELIVERED TO: 107

CLIENTS PER COUNTY:



"ANOTHER YEAR OF UNBELIEVABLY GREAT FOOD AND SERVICE. I'M CONTINUOUSLY OVERWHELMED BY [WHAT YOU DO] FOR MY BODY AND MIND. THANK YOU SO MUCH!" — MARY, CLIENT

Joseph (R) receives his weekly meal delivery from volunteer, Ali (L).

ORGANIZATIONAL HIGHLIGHTS — CLIENTS

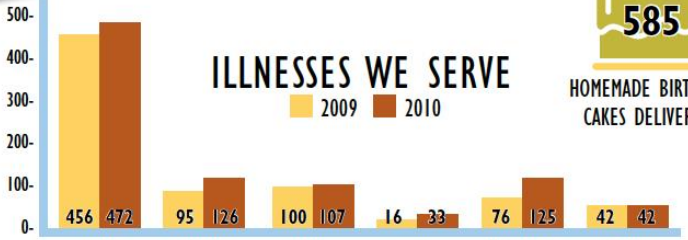
1. We helped our clients celebrate Thanksgiving with 280 organic turkeys and 290 fresh, homemade holiday meals.
2. We received referrals for 414 new clients from 74 clinics, government agencies, and nonprofit organizations throughout the metro area.

NATIONAL STATISTICS

1. In 2009, there were 42,959 new diagnoses of HIV in the U.S.
2. In 2010, 1.5 million new cancer cases were diagnosed in the U.S.

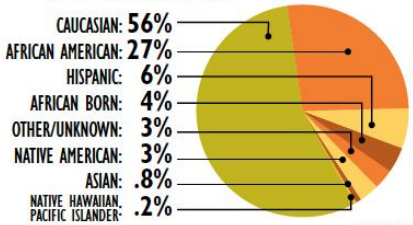
ILLNESSES WE SERVE

2009 2010

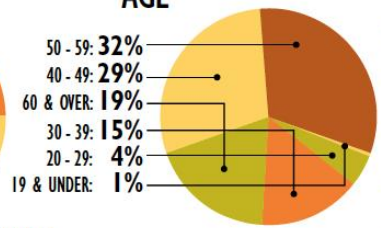


585 HOMEMADE BIRTHDAY CAKES DELIVERED

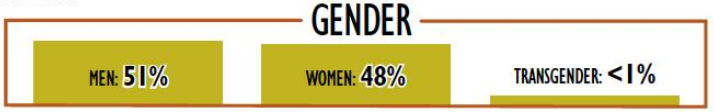
RACE/ETHNICITY



AGE



GENDER



SOUTH AFRICA:

HOT LUNCHES SERVED: 10,904

1 OUT OF 4 PEOPLE IN GUGULETU ARE HIV+

2 OUT OF 4 PEOPLE IN GUGULETU ARE UNEMPLOYED

What's the overall story? Is the support/evidence for that story clear?

Are infographics useful and aesthetic? Is this right-sized?

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ONE-PAGE SUMMARY EXAMPLE - 2

What's the overall story? Is the support/evidence for that story clear?
Are infographics useful and aesthetic? Is this right-sized?

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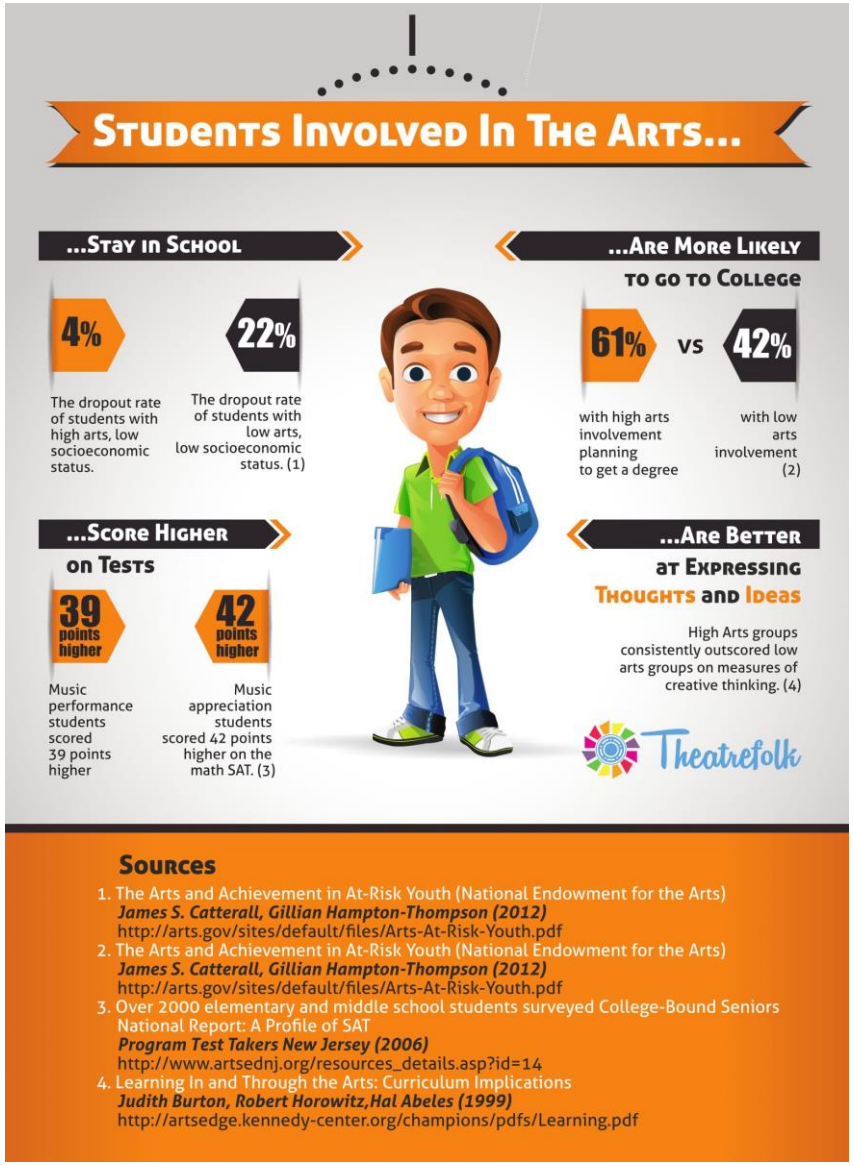
ONE-PAGE SUMMARY EXAMPLE - 3



What's the overall story?

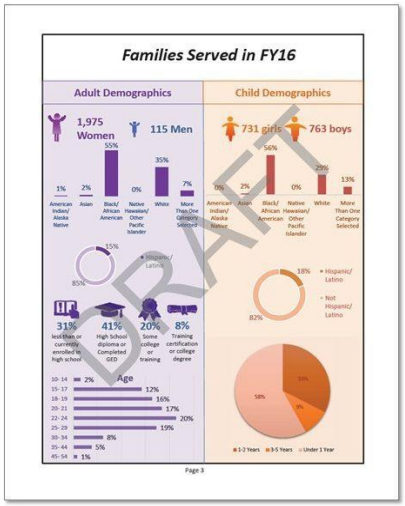
Is the support/evidence for that story clear?

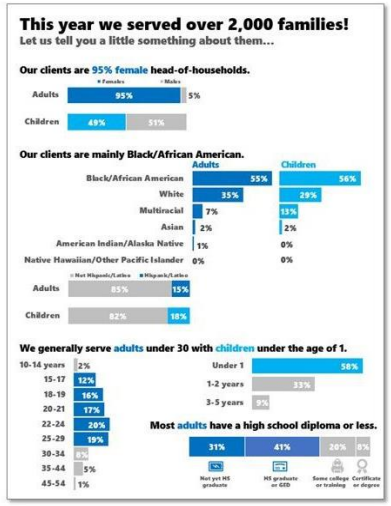
Are infographics useful and aesthetic?

Is this right-sized?

EXERCISE: ONE-PAGERS

- You'll receive two examples of one-pagers with the same data: an early draft and a mid-stream draft
- <u>In your groups:</u>
  1. Identify what the main differences are between the two versions
  2. How might those differences contribute to our goal of quickly providing clear information?





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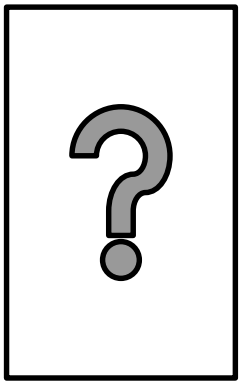
EXERCISE: ONE-PAGERS

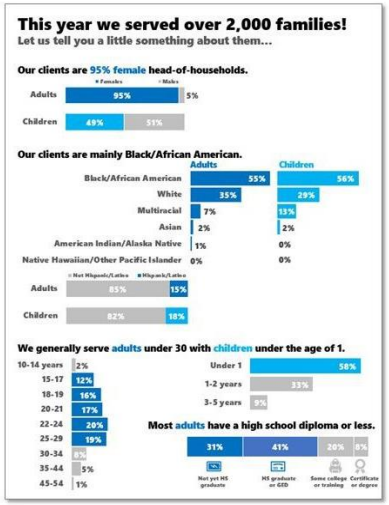
Make your own!

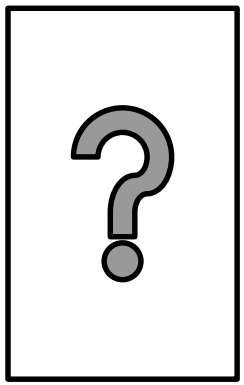
- Using **your context**, choose a stakeholder & design a one-pager that meets their needs.
  - What would you show?
  - How might you show it?



OR…

- How would you **improve this** one-pager?
  - Would you add quotes, pictures, or change charts to icons?
  - What would you remove?





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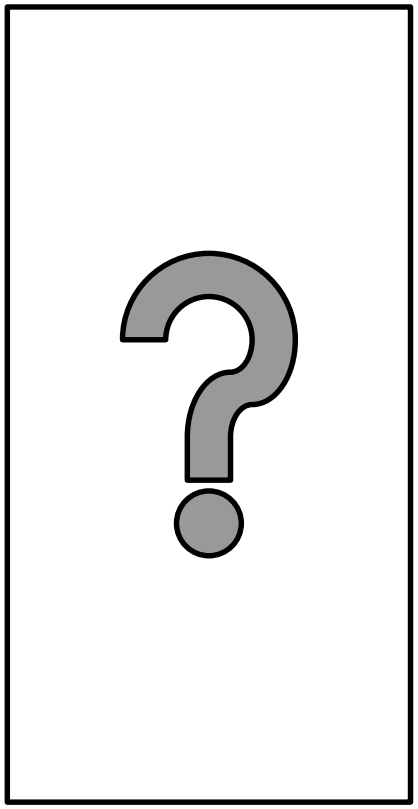
EXERCISE: ONE-PAGERS

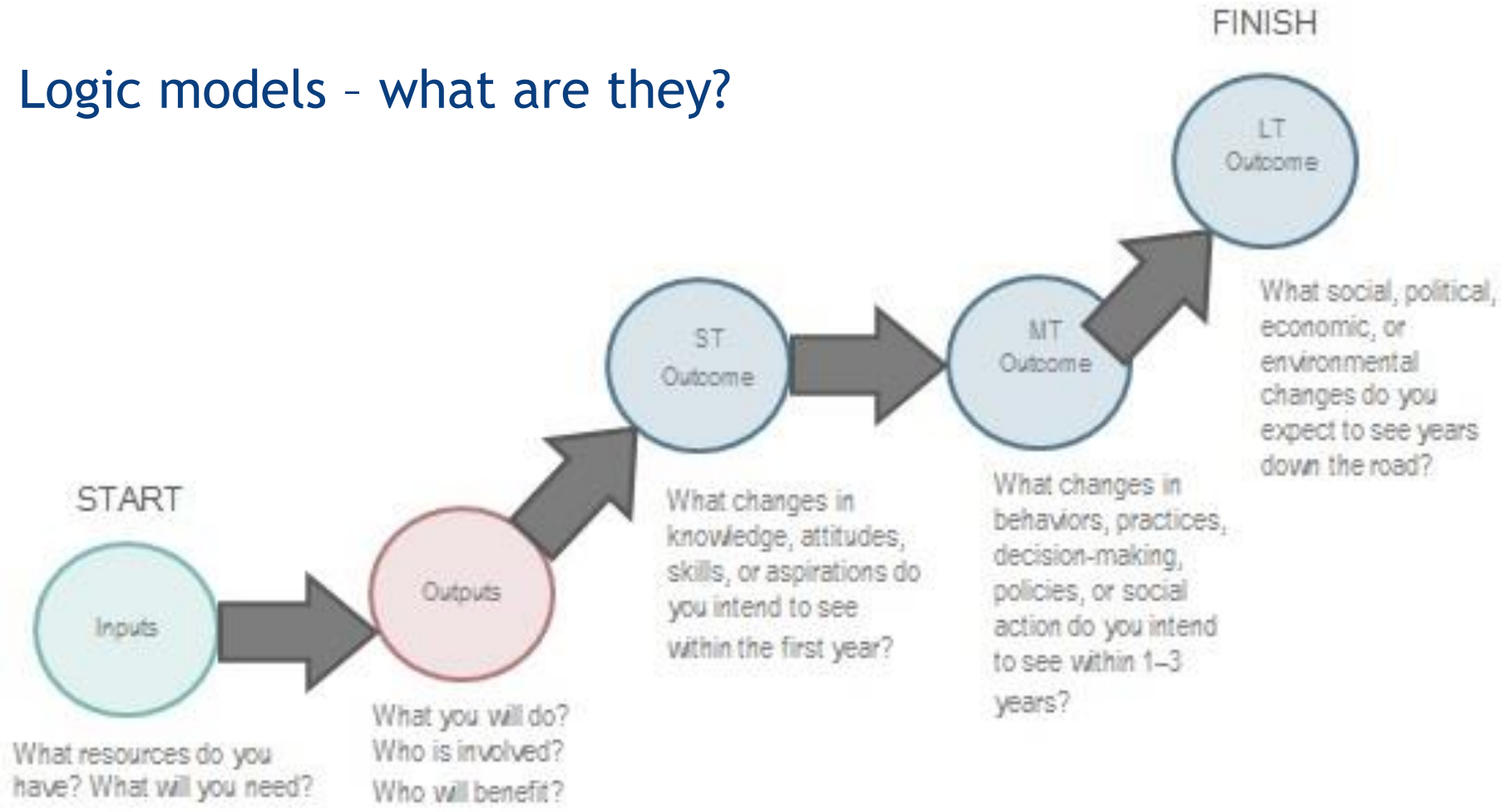
Share out

- What did you create?
- What was challenging?
- What worked well?
- Did you want additional data that you don't have access to?



INTEGRATING RESEARCH INTO YOUR ORGANIZATION

- Logic models – what are they?



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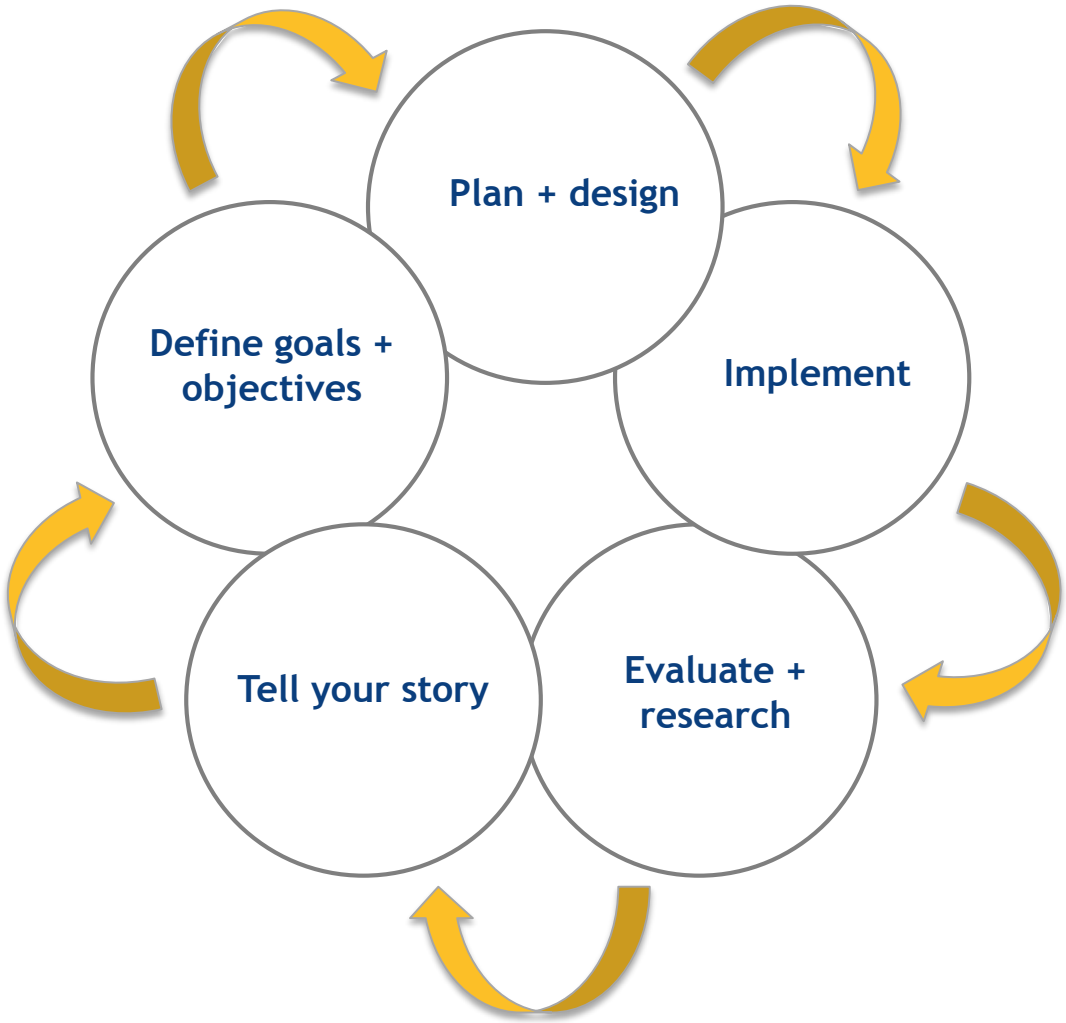
INTERNAL REFLECTION

- Does your organization have a logic model?
- If so, is it helpful?

- How can data inform your logic model?
  - Do your findings change your assumptions?
  - What new questions have arisen?
- Has your organization ever changed its logic model?

INTERNAL REFLECTION

- What experiments (even small ones) can we try based on what we've learned?
  - How will we know if these experiments are successful?



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Thank You!

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FREE DESIGN RESOURCES

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- www.ablebits.com/office-addins-blog/2017/06/14/basic-excel-formulas-functions-examples - tips for using Excel formulas
- https://www.medcalc.org/calc/test_one_proportion.php – calculator for testing statistical significance