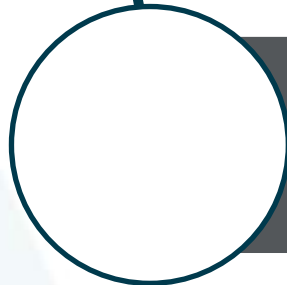# BREAKOUT:

VISUALIZING PRE/POST TEST DATA

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WALDEN UNIVERSITY

EDUCATION FOR GOOD™

WORKSHOP AGENDA

Types of Pre/Post Tests

Strategies for Visualization

Communication Considerations

TYPES OF PRE/POST TESTS

What is being compared? Groups or Individuals?

There are two primary approaches when examining ~~group~~ group scores:

1. Independent – The group who took the pre-test is NOT the same as the group who took the post-test.

2. Paired – The group who took the pre-test IS the same as the group who took the post-test.

MAY REQUIRE TESTS OF STATISTICAL SIGNIFICANCE

There are a variety of ways to approach reporting individual scores.

LIT Test

Sub scales for ... ...verall score.

177 complete... ...pre and post test.

QUESTIONS...

How do you s...

How do you show change in sub-scale scores from pre to post test.

	A	B	C	D	E	F	G	H	I
1	ID	LIT Pre-test score (Fall)	LIT Post-test score (Spring)	Pre-Listen	Pre-Imagination	Pre-Talent	Post-Listen	Post-Imagination	Post-Talent
2	123	42	37	0	5	4	19	14	17
3	57	47	40	1	18	9	18	13	16
4	137	35	42	2	20	8	17	14	1
5	3	53	57	4	7	12	19	19	20
6	27	43	44	4	16	12	18	9	18
7	181	39	28	5	11	10	19	12	5
8	136	42	58	1	6	7	14	16	10
9	134	67	56	0	6	15	13	18	10
10	144	38	45	3	14	7	15	19	20
11	113	48	49	6	0	19	18	10	3
12	97	48	39	1	6	4	13	11	18
13	130	33	51	1	4	6	12	15	14
14	126	40	49	6	7	19	17	15	12
15	11	55	57	1	14	14	12	7	4
16	152	46	48	8	6	15	19	2	7

HOW TO YOU SHOW CHANGE IN OVERALL SCORES FROM PRE TO POST TEST?

<u>Data Prep</u>: Create variable to indicate whether each individual participant took the Pre-test only, Post-test only, or Both.

Initial check to examine pre and post test group mean scores by creating pivot tables

Paired

Independent

Sketchy

PRE/POST ALTERNATIVE MEASURES

	K	L
	PrePostChange	**ChangeGroup**
	-5	1-5 Negative
	-7	6-10 Negative
	7	6-10 Positive
	4	1-5 Positive
	1	1-5 Positive
	-11	More than 10 Negative
	16	More than 10 Positive
	-11	More than 10 Negative
	7	6-10 Positive
	1	1-5 Positive
	-9	6-10 Negative

✓ Percentage of individuals with improved scores

Data Prep: Add column that calculates the change in score from pre to post test group change in score.
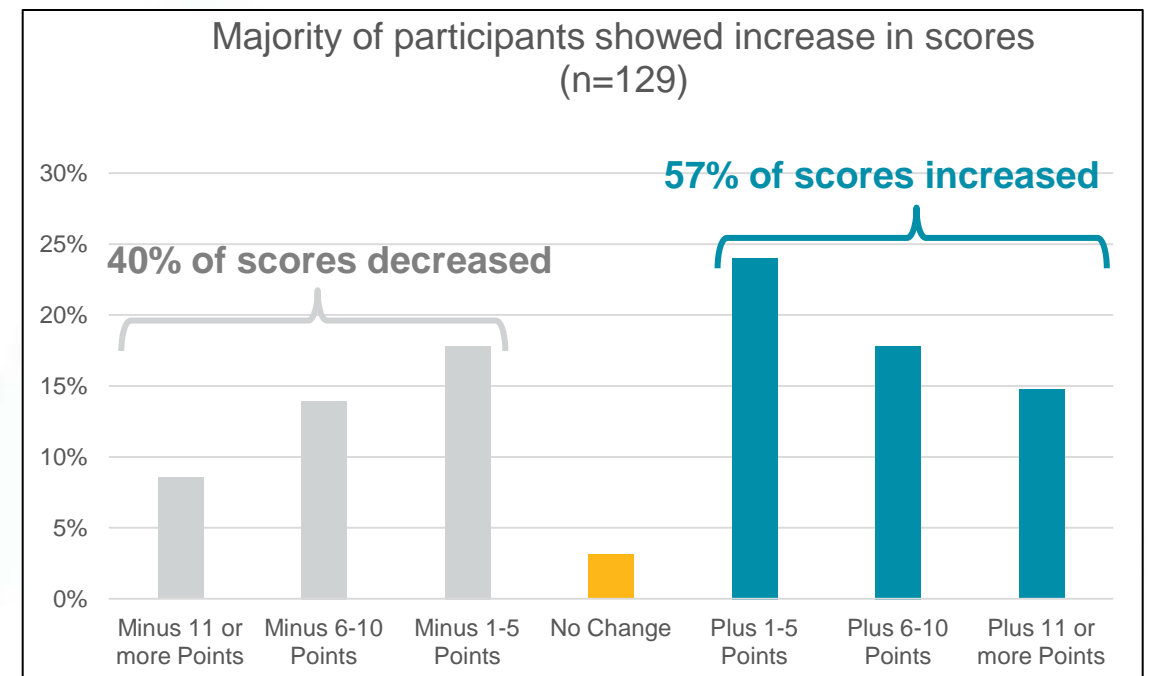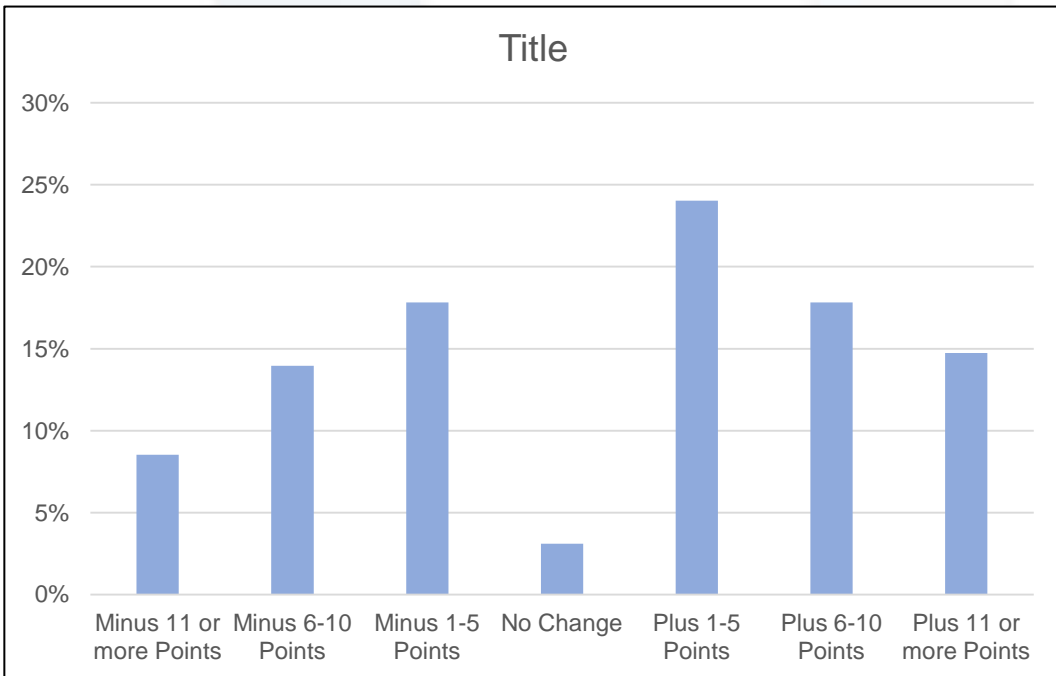
PRE/POST ALTERNATIVE MEASURES

	P	Q	R	S	T	U
	Pre-Listen15	**Post-Listen15**	**Pre-Imagination15**	**Post-Imagination15**	**Pre-Talent15**	**Post-Talent15**
	No	Yes	No	No	No	Yes
	No	Yes	Yes	No	No	Yes
	No	Yes	Yes	No	No	No
	No	Yes	No	Yes	No	Yes
	No	Yes	Yes	No	No	Yes
	No	Yes	No	No	No	No
	No	No	No	Yes	No	No
	No	No	No	Yes	Yes	No
	No	Yes	No	Yes	No	Yes
	No	Yes	No	No	Yes	No
	No	No	No	No	No	Yes

✓ Examine sub-scale scores

Assumption: Target score for participants on sub-scales is 15 out of 2

Data Prep:

-add columns that indicates yes/no if score was 15 or higher for pre and post scores for

all three sub-scales

-create table that shows the percentages of "yes" for each

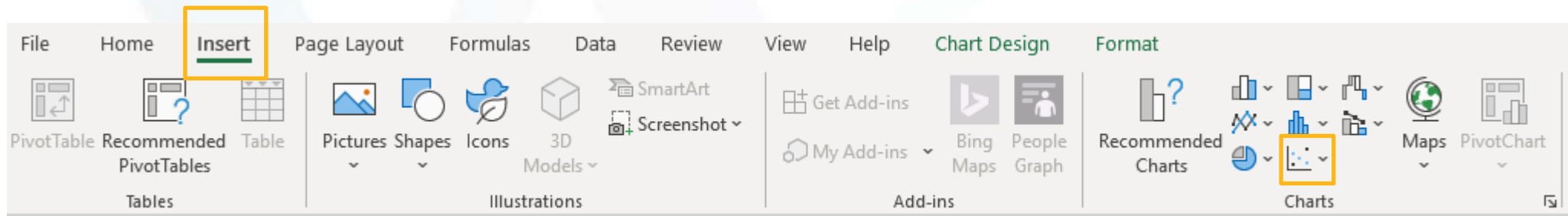|	% Scoring 15 or Higher	
	Pre	Post
Listen	60%	53%
Imagination	22%	56%
Talent	44%	40%

DOT PLOT – STEP BY STEP

Sort data from smallest to largest based on "Pre" column.

Add new column, call it "DOT SPACING", enter values of 3, 2, 1.

	% Scoring 15 or Higher		
	Pre	Post	DOT SPACING
Imagination	22%	56%	3
Talent	44%	40%	2
Listen	60%	53%	1

Highlight "Pre" and the values in the column. Press control key and highlight DOT SPACING and it's values. Insert a scatterplot.
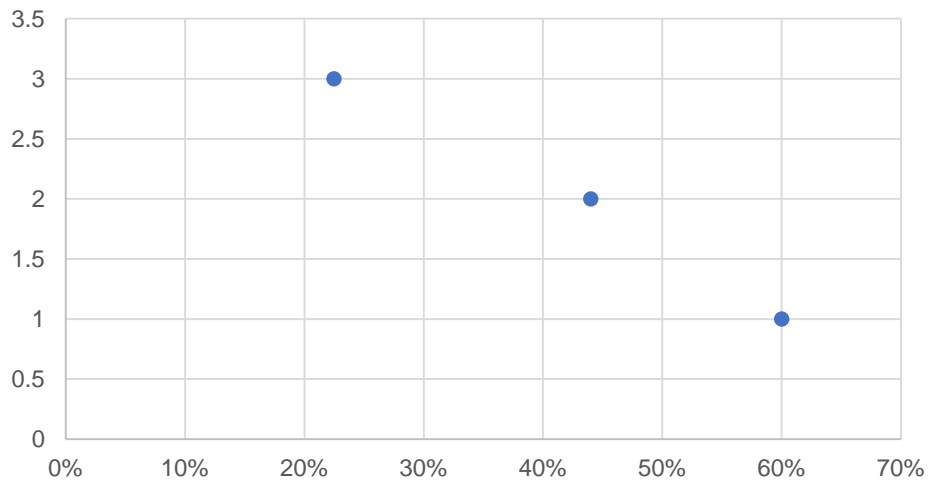
Insert scatterplot by going to "Insert" in top ribbon, select the scatterplot.

Detailed dot plot guidance also available in Stephanie Evergreen's book: Effective Data Visualization

DOT PLOT – STEP BY STEP

DOT SPACING

Right click the chart, "Select Data", edit series name to "Pre".

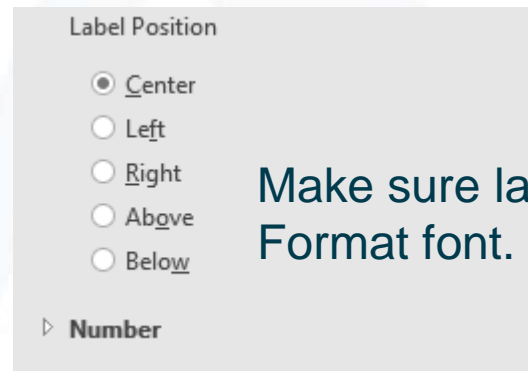Add series for "Post"
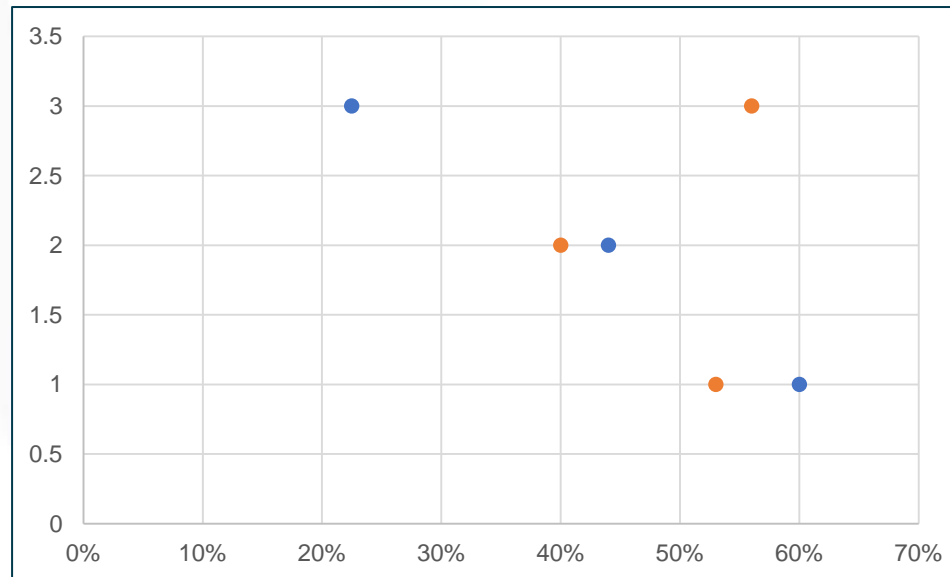
DOT PLOT – STEP BY STEP

Mostly formatting from here to get the chart in shape.

Right click on blue dot, select "format data series", make dot larger. Do same thing for orange dot.
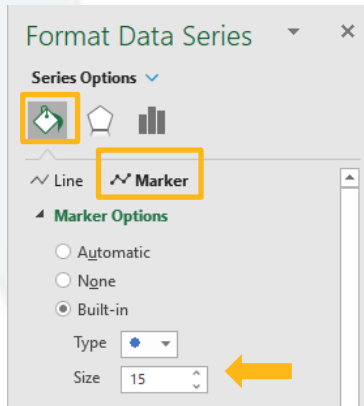
Right click on blue dot, select "add data labels". Right click on data labels, select "format data labels". Check "X Value" under label options, then uncheck "Y Value". Do same for orange dot.
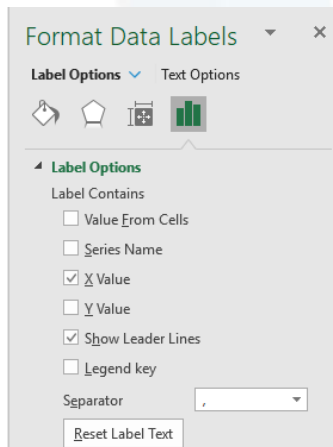
Make sure label position is "center". Format font.

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DOT PLOT – STEP BY STEP

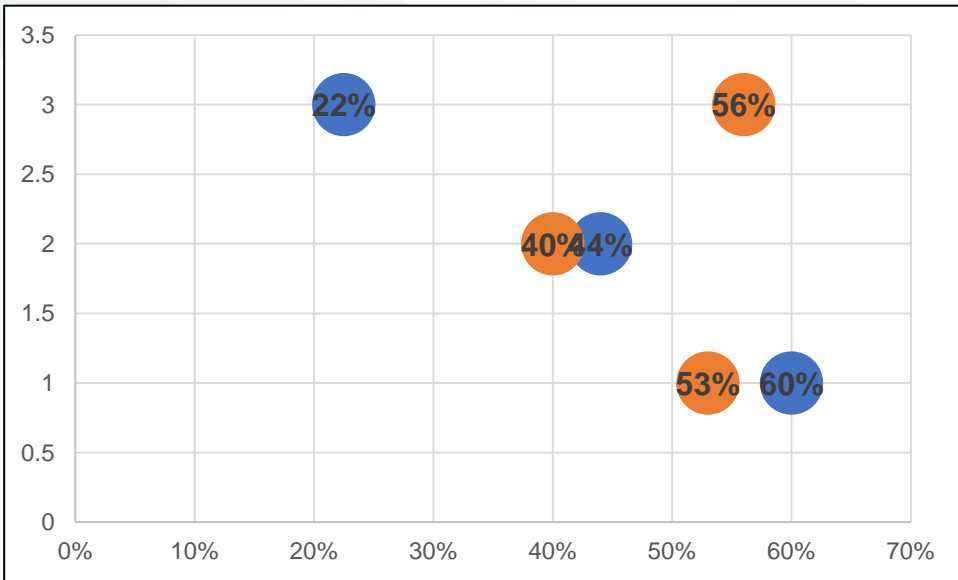Right click on Y axis, "format axis". Change axis options so that maximum is 3 (since we have 3 "dot spacers"), and major unit is 1.
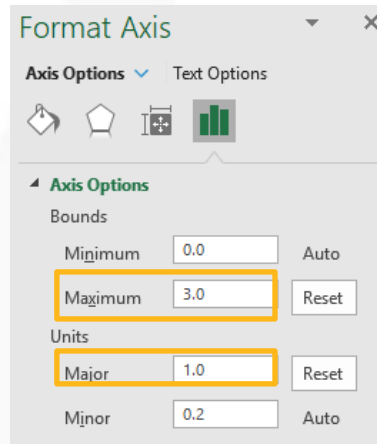
Click on Y axis, delete.
Adjust X axis to have maximum of 1, and major unit of 1.

Change colors of dots and font.
Add labels by inserting text box.
Add chart title…

DOT PLOT – STEP BY STEP

Significant growth in imagination from Pre to Post

PRE | POST

Imagination — 22% → 56%

Talent — 40% 44%

Listen — 53% 60%

0%   100%
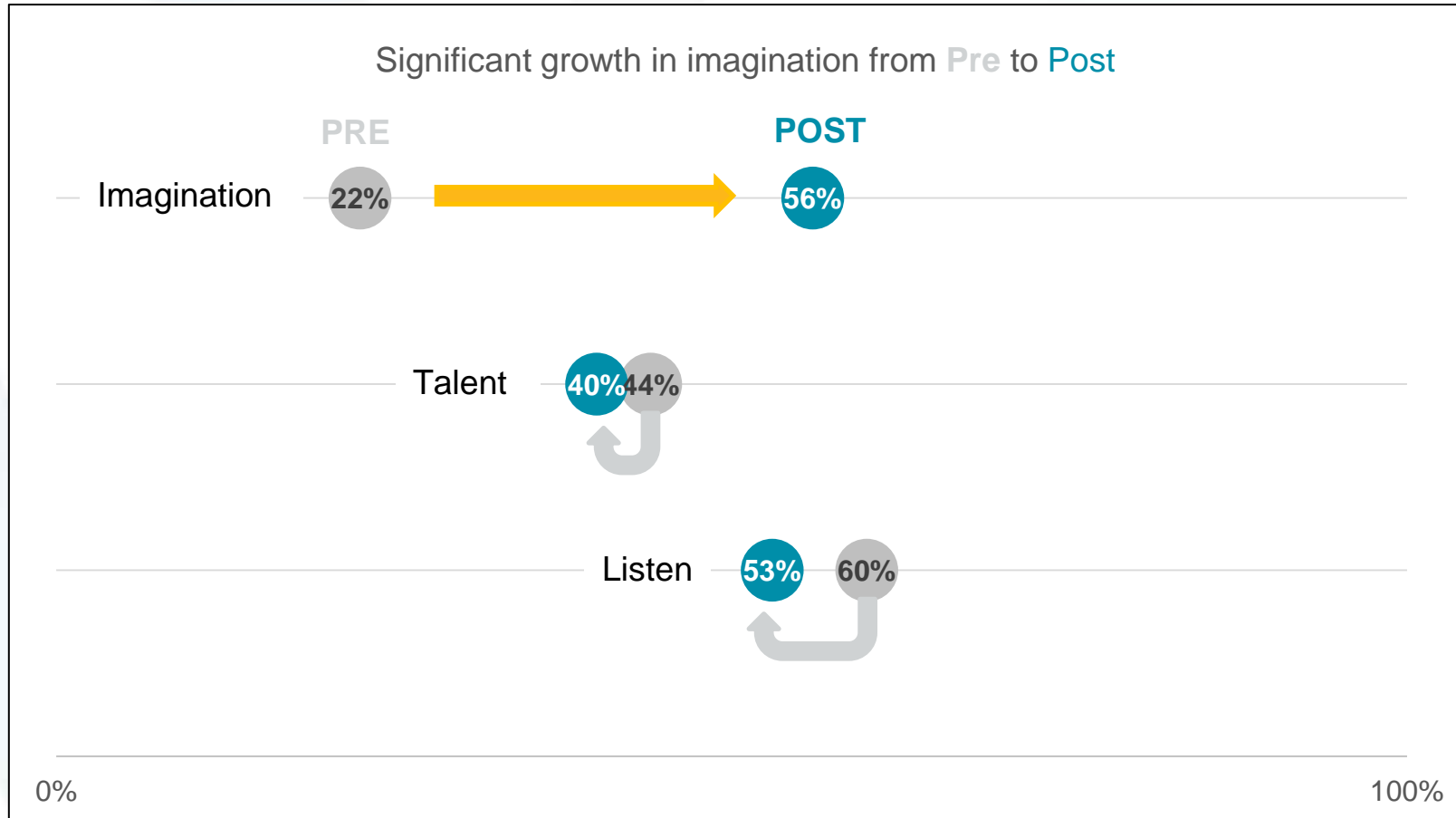
NOTE: The 129 participants who had both a Pre and Post test were included. There were 48 participants who only took the Pre test and 45 who only took the Post test that were not included.

OTHER EXAMPLE

Think about your first term courses during the past year.
During the first few weeks of each term, what percentage of your students demonstrate:

Chart displays mean percentage

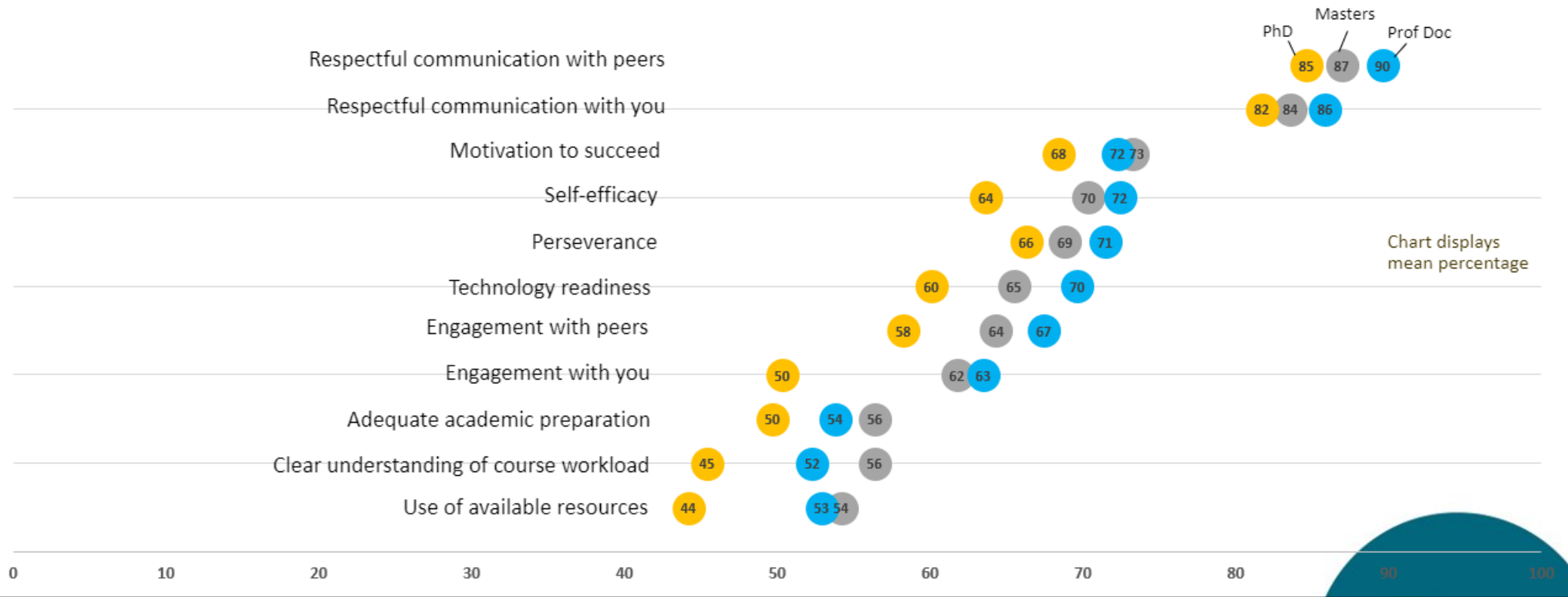PhD Masters Prof Doc

Category	PhD	Masters	Prof Doc
Respectful communication with peers	85	87	90
Respectful communication with you	82	84	86
Motivation to succeed	68	73	72
Self-efficacy	64	70	72
Perseverance	66	69	71
Technology readiness	60	65	70
Engagement with peers	58	64	67
Engagement with you	50	62	63
Adequate academic preparation	50	56	54
Clear understanding of course workload	45	56	52
Use of available resources	44	54	53

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COMMUNICATION CONSIDERATIONS

➢ Is it appropriate to attribute pre/post score changes to the program, or may have there been other influences?

➢ Is the measure taken at one point in time?

➢ Is there other data that would help tell the story and give more weight to the program impact? (number of days attended, for example)

➢ Environmental factors? (COVID, Protests)

IF TIME REMAINS, PRACTICE
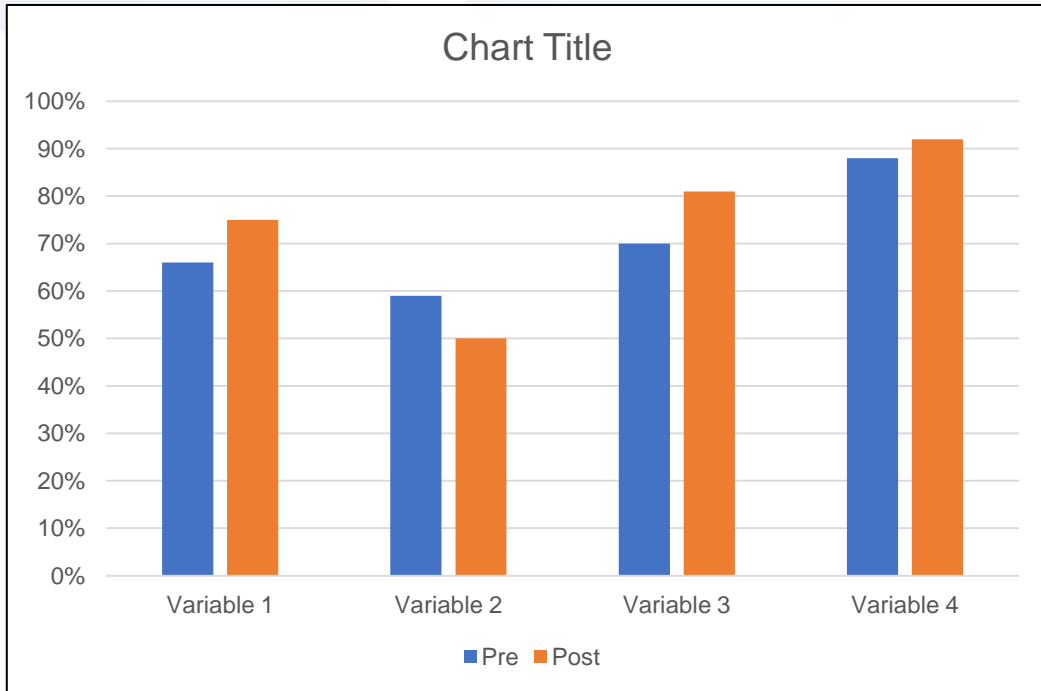
Side by side bar chart is appropriate to show change as well.

This chart needs help.

What could be done to improve this chart?

	Pre	Post
Variable 1	66%	75%
Variable 2	59%	50%
Variable 3	70%	81%
Variable 4	88%	92%

QUESTIONS

Contact: jim.lenio@mail.waldenu.edu