

Code Details

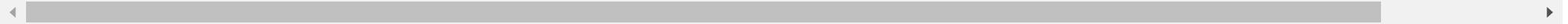
Author: Rory Angus

Created: 05FEB19

Version: 0.2

This code looks at the inSITE students data after it has been programically and manually cleaned. This code needs work to remove the identifying features of the students.

It is currently like this because it is being shared with the nominated coach, Pam Ryan, who has permission to look at the individual results.

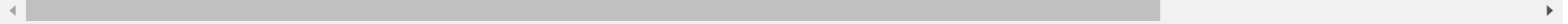


Package Importing + Variable Setting

Set display options



Define functions



Read Data

This reads a CSV file that was created using a combination of code and manual data cleansing



diagnose_ClaraResult1 diagnose_ClaraResult2 diagnose_ClaraResult3 diagnose_ClaraResult4 diagnose_ClaraResult5 diagnose_ClaraResult6 dia

	diagnose_ClaraResult1	diagnose_ClaraResult2	diagnose_ClaraResult3	diagnose_ClaraResult4	diagnose_ClaraResult5	diagnose_ClaraResult6	dia
0	0.8886	0.9044	0.7988	0.8686	1.0000	0.9332	
1	0.7016	0.9434	0.5760	0.7360	0.6334	0.9010	
2	0.7324	0.9660	0.5968	0.8618	0.8554	1.0000	
3	0.6540	0.8628	0.6412	0.7302	0.9594	0.7650	
4	0.6460	0.9458	0.7472	0.6930	0.9506	0.8998	

```
◀ ▶
diagnose_ClaraResult1
diagnose_ClaraResult2
diagnose_ClaraResult3
diagnose_ClaraResult4
diagnose_ClaraResult5
diagnose_ClaraResult6
diagnose_ClaraResult7
diagnose_ClaraResult8
diagnose_ClaraResultCompletedAt
diagnose_ClaraResultsCreatedAt
journeyCreatedAt
journeyGoal
journeyPurpose
journeyTitle
measure_ClaraResult1
measure_ClaraResult2
measure_ClaraResult3
measure_ClaraResult4
measure_ClaraResult5
measure_ClaraResult6
measure_ClaraResult7
measure_ClaraResult8
measure_ClaraResultCompletedAt
measure_ClaraResultsCreatedAt
userNameId
userPrimaryEmail
completedSecondSurvey
surveyOneDuration
surveyTwoDuration
surveyBetweenDuration
```

Define the colours

This needs to be here because it tuned to the length of the data that is loaded

```
◀ ▶
```

Clean The Data

Prepare the data for this notebook

A horizontal progress bar consisting of a grey rectangular bar with arrows at both ends, indicating the status of data preparation.

Create a number that allows anonymous use of the data

A horizontal progress bar consisting of a grey rectangular bar with arrows at both ends, indicating the status of creating an anonymous identifier.

Remove the domain part of the email address

The email address is being used to show the name (the name is buried in some JSON format and I don't want to waste time extracting it, so I will use the email address).

For example the following will be deleted @student.uts.edu.au and @uts.edu.au

A horizontal progress bar consisting of a grey rectangular bar with arrows at both ends, indicating the status of removing email domain components.

CLARA Mappings

The following define the mapping between the source database columns and the CLARA Learning Dimensions.

- claraScale1 Mindful Agency
 - claraScale2 Sense Making
 - claraScale3 Creativity
 - claraScale4 Curiosity
 - claraScale5 Belonging
 - claraScale6 Collaboration
 - claraScale7 Hope and Optimism
 - claraScale8 Orientation to Learning
- 

The CLARA values are too small

The original data that was used to generate the charts was in the format of 56.34 not .5634



Separate Orientation to Learning into Two New Columns

This is because the column is made of two parts :-

- Fragile Dependence
- Rigid Persistence

For further details see the interview transcript found here - [\(https://docs.google.com/document/d/17fkvhXQnuoHjJl6va-ng4nnbw25zbiKTm1ADcwiyyZ8/edit\)](https://docs.google.com/document/d/17fkvhXQnuoHjJl6va-ng4nnbw25zbiKTm1ADcwiyyZ8/edit) However, this is the formula that I am using A general formula is:

- Orientation to Learning = x
- Rigid Persistence = $100 - x$
- Fragile Dependence = x

Create a 2nd DataFrame that Only has Both Surveys Completed

Create New Columns for Delta's Between Surveys

Calculate Averages

For the records that have a second survey only calculate the summary stats so that they can be plotted later on.

	Mindful Agency	Sense Making	Creativity	Curiosity	Belonging	Collaboration	Hope & Optimism	Orientation to Learning	Rigid Persistence	Fragile Dependence	Mindful Agency 2	Sen Maki
count	8.000000	8.000000	8.000000	8.000000	8.0000	8.000000	8.000000	8.000000	8.000000	8.000000	8.000000	8.000000
mean	65.422500	85.042500	58.932500	69.227500	83.2525	75.050000	83.712500	33.057500	66.942500	33.057500	72.440000	83.277
std	19.111966	11.189753	21.461279	27.908174	17.8582	24.832476	15.646191	12.058308	12.058308	12.058308	13.126514	13.694
min	24.240000	66.620000	10.000000	6.320000	52.7800	16.700000	53.300000	18.660000	47.480000	18.660000	54.180000	61.380
25%	62.875000	81.125000	57.045000	66.410000	70.4550	74.860000	74.570000	23.090000	58.950000	23.090000	62.640000	73.670
50%	65.000000	88.360000	63.610000	76.550000	89.8600	81.950000	88.420000	32.080000	67.920000	32.080000	71.990000	90.190
75%	76.185000	92.750000	69.305000	86.230000	96.9550	90.000000	95.280000	41.050000	76.910000	41.050000	81.860000	93.115
max	88.860000	95.900000	79.880000	94.480000	100.0000	93.320000	100.000000	52.520000	81.340000	52.520000	89.720000	95.960

	Mindful Agency	Sense Making	Creativity	Curiosity	Belonging	Collaboration	Hope & Optimism	Orientation to Learning	Rigid Persistence	Fragile Dependence	Summary
0	65.4225	85.0425	58.9325	69.2275	83.2525	75.05	83.7125	33.0575	66.9425	33.0575	Diagnose Survey (1st)
1	72.4400	83.2775	70.1000	78.4325	88.6825	87.45	89.6050	44.0975	55.9025	44.0975	Measure Survey (2nd)

Boxplot Dataframe Construction



	Mindful Agency	Sense Making	Creativity	Curiosity	Belonging	Collaboration	Hope & Optimism	Orientation to Learning	Rigid Persistence	Fragile Dependence	Student Index	userPrimaryEmail
#												
0	88.86	90.44	79.88	86.86	100.00	93.32	100.00	18.66	81.34	18.66	348	george.b.sacco
1	70.16	94.34	57.60	73.60	63.34	90.10	86.70	35.86	64.14	35.86	116	colleen.j.ribbon
2	73.24	96.60	59.68	86.18	85.54	100.00	93.28	62.06	37.94	62.06	396	chun-ni.fu
3	65.40	86.28	64.12	73.02	95.94	76.50	90.94	36.98	63.02	36.98	804	katherine.a.delaney
4	64.60	94.58	74.72	69.30	95.06	89.98	94.96	40.18	59.82	40.18	812	vicki.coss
5	63.84	93.18	72.36	52.36	74.70	96.66	100.00	77.56	22.44	77.56	644	ghazal.ighani
6	24.24	92.14	10.00	6.32	100.00	16.70	74.96	27.18	72.82	27.18	356	wai.p.lau
7	62.56	66.62	54.12	57.74	52.78	83.74	53.30	43.66	56.34	43.66	212	jialu.lu
8	75.00	69.32	67.50	86.02	72.12	80.16	85.90	21.74	78.26	21.74	908	ian.c.smith-1
9	79.74	95.90	63.10	94.48	65.46	69.94	73.40	23.54	76.46	23.54	228	saichungjimmy.ting
10	66.12	87.26	40.30	65.74	87.82	90.10	72.60	39.06	60.94	39.06	316	larissa.b.hannan

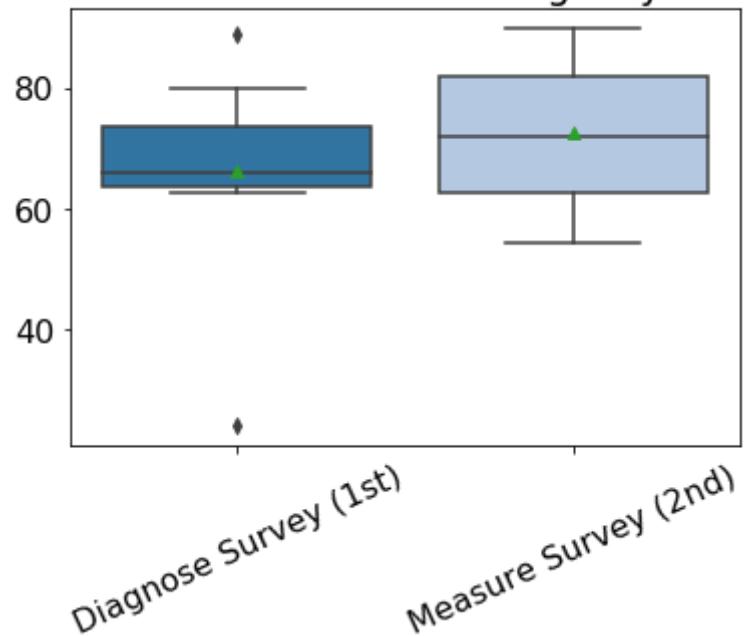
	Mindful Agency	Sense Making	Creativity	Curiosity	Belonging	Collaboration	Hope & Optimism	Orientation to Learning	Rigid Persistence	Fragile Dependence	Student Index	userPrimaryEmail
11	62.98	85.06	58.02	80.08	84.66	90.06	96.24	52.52	47.48	52.52	540	gemma.e.roberts
12	88.34	92.84	85.04	82.76	95.94	86.48	97.06	47.54	52.46	47.54	348	george.b.sacco
13	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	116	colleen.j.ribbonbs
14	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	396	chun-ni.fu
15	67.74	76.48	77.62	80.84	76.54	90.10	91.74	60.24	39.76	60.24	804	katherine.a.delaney
16	60.12	90.48	77.90	66.66	95.94	86.44	89.66	65.18	34.82	65.18	812	vicki.coss
17	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	644	ghazal.ighani
18	63.48	65.24	55.32	57.78	74.46	69.94	68.00	40.10	59.90	40.10	356	wai.p.lau
19	54.18	61.38	39.42	67.72	70.64	89.94	77.10	71.28	28.72	71.28	212	jialu.lu
20	89.72	89.90	81.72	94.14	100.00	96.78	96.24	10.14	89.86	10.14	908	ian.c.smith-1
21	79.70	93.94	82.58	92.14	95.94	86.60	97.04	18.98	81.02	18.98	228	saichungjimmy.ting
22	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	316	larissa.b.hannan

Mindful Agency	Sense Making	Creativity	Curiosity	Belonging	Collaboration	Hope & Optimism	Orientation to Learning	Rigid Persistence	Fragile Dependence	Student Index	userPrimaryEmail
23	76.24	95.96	61.20	85.42	100.00	93.32	100.00	39.32	60.68	39.32	540 gemma.e.roberts

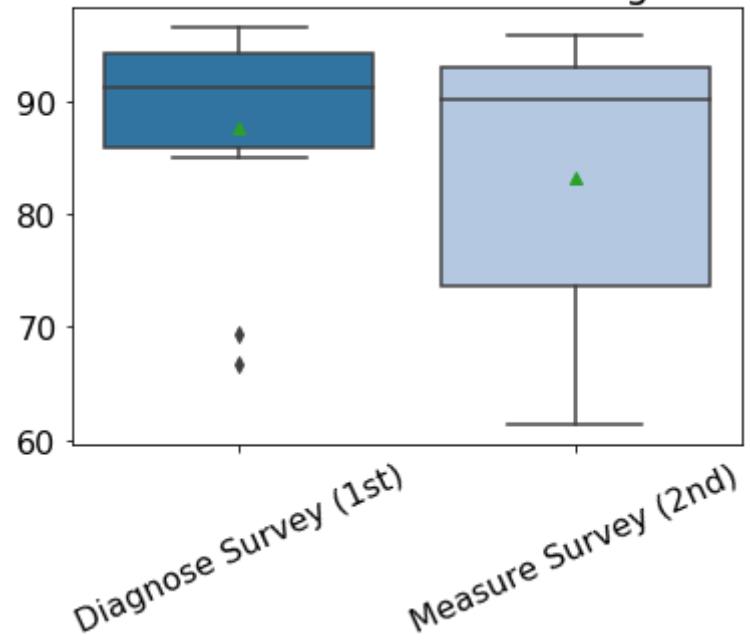
Create Charts

Comparison Boxplots

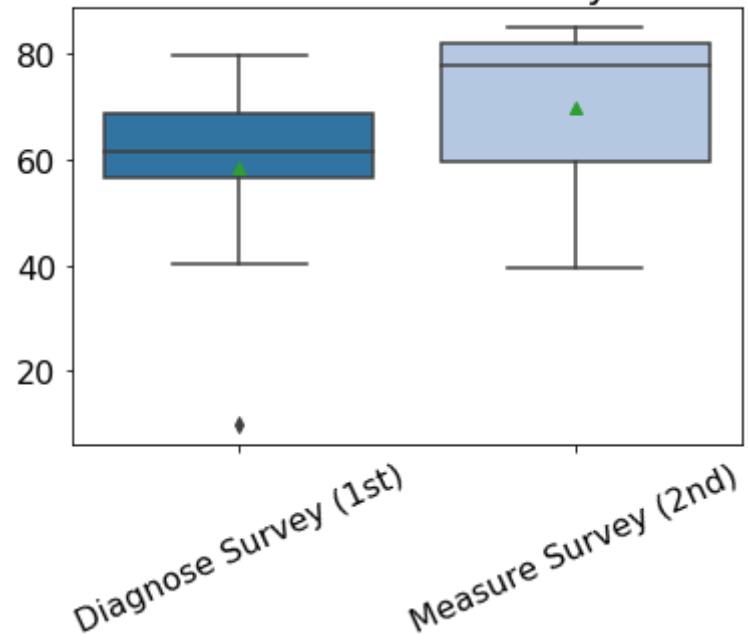
Box Plot of Mindful Agency



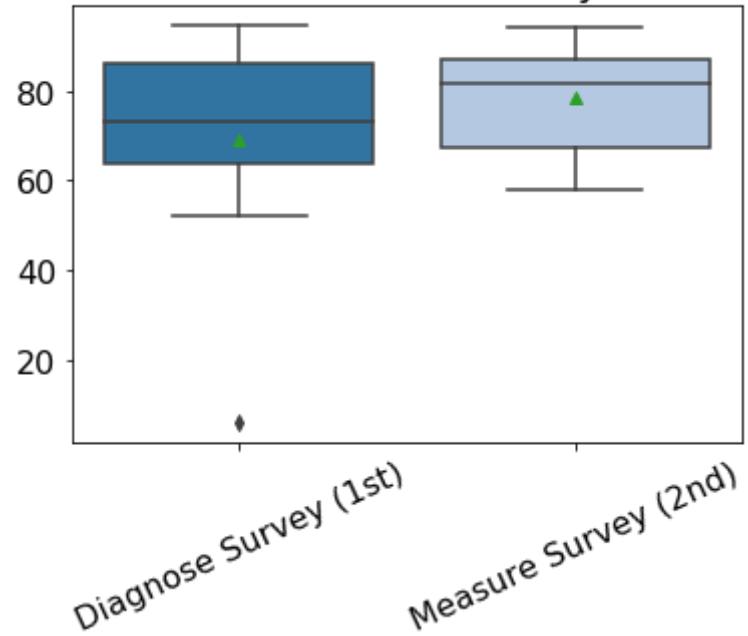
Box Plot of Sense Making



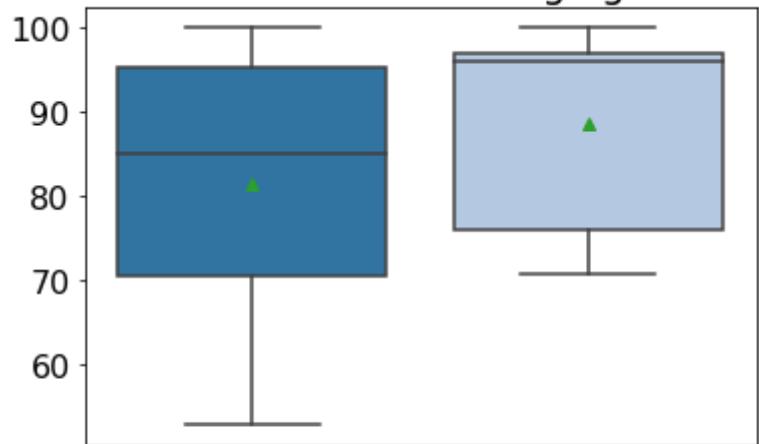
Box Plot of Creativity



Box Plot of Curiosity

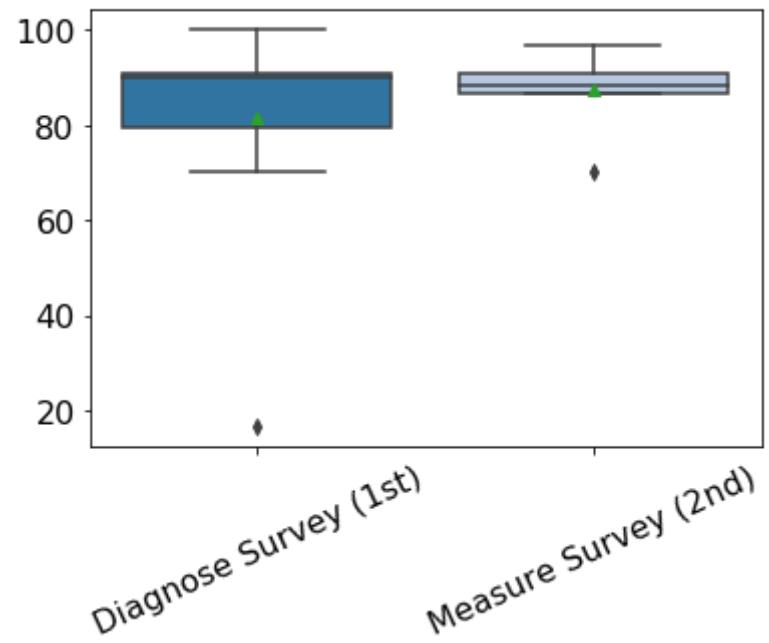


Box Plot of Belonging

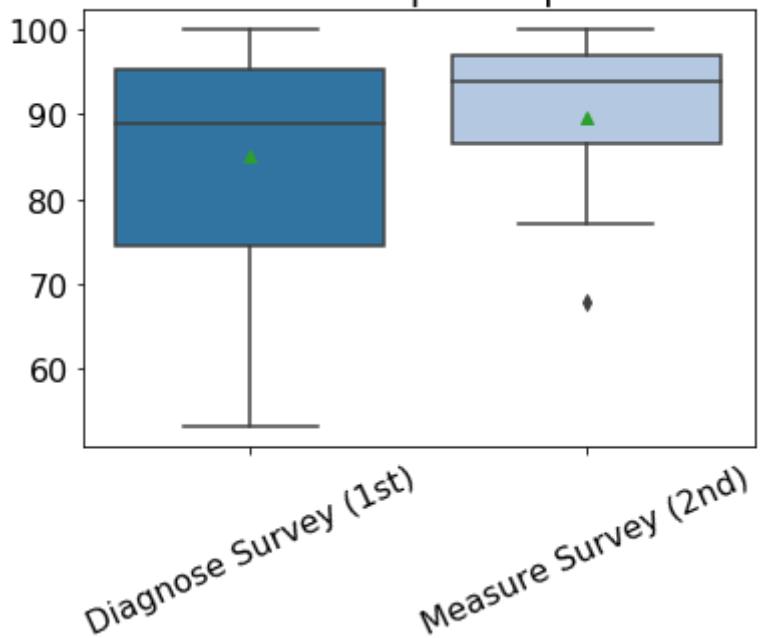


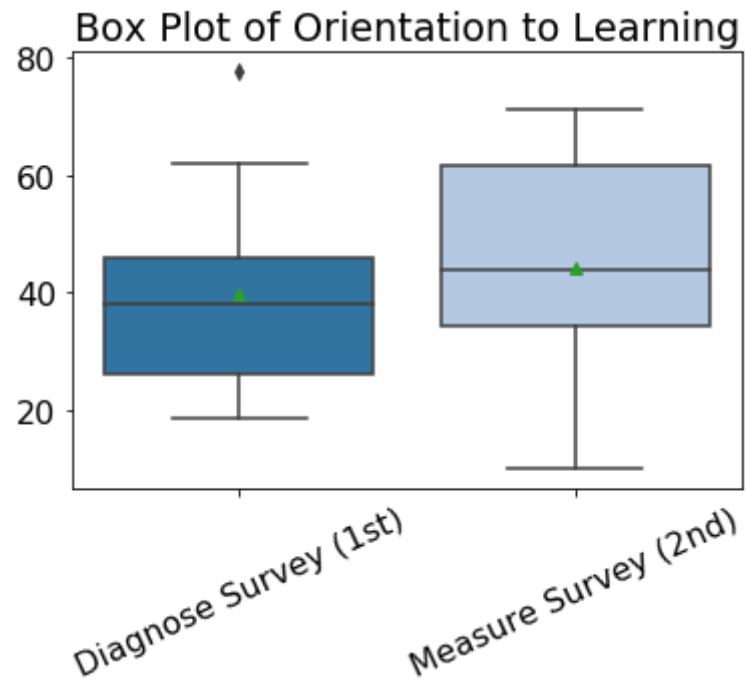
Diagnose Survey (1st)
Measure Survey (2nd)

Box Plot of Collaboration

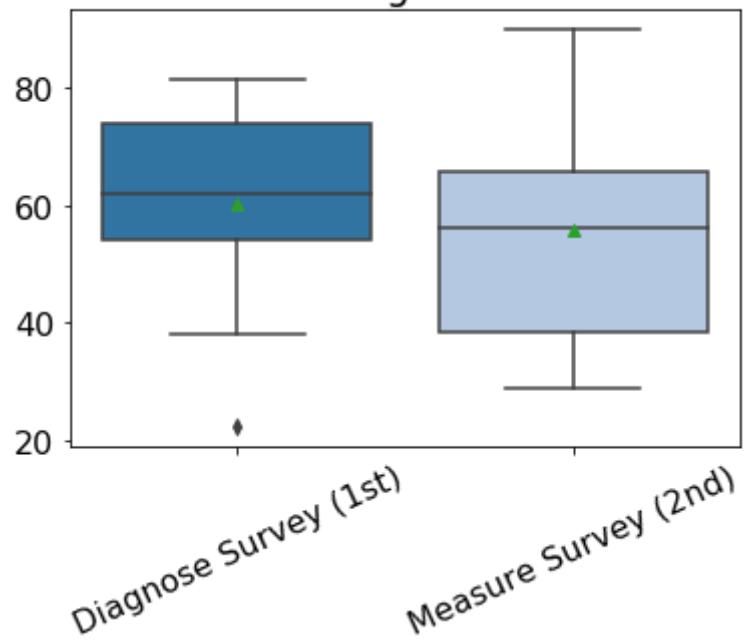


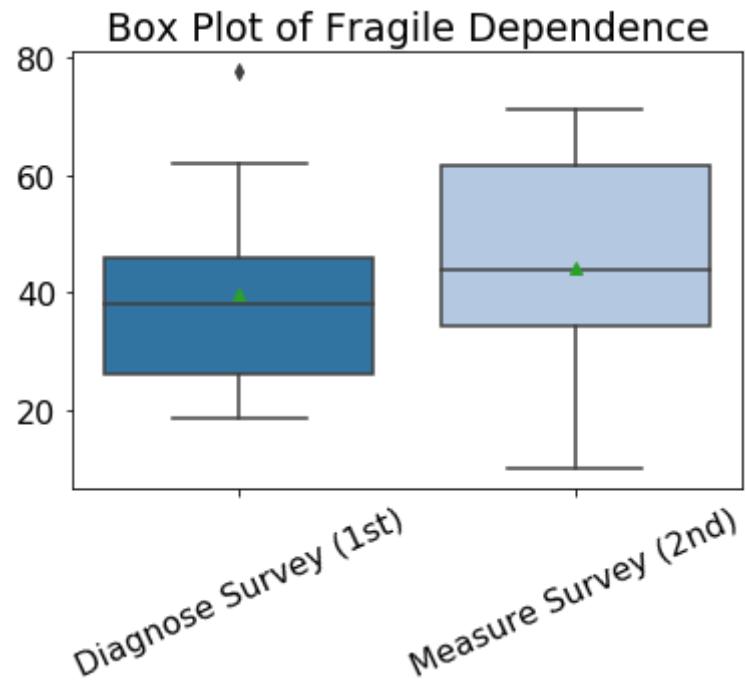
Box Plot of Hope & Optimism





Box Plot of Rigid Persistence





Diagnose Survey (1st)

	Mindful Agency	Sense Making	Creativity	Curiosity	Belonging	\
0	88.86	90.44	79.88	86.86	100.00	
1	70.16	94.34	57.60	73.60	63.34	
2	73.24	96.60	59.68	86.18	85.54	
3	65.40	86.28	64.12	73.02	95.94	
4	64.60	94.58	74.72	69.30	95.06	
5	63.84	93.18	72.36	52.36	74.70	
6	24.24	92.14	10.00	6.32	100.00	
7	62.56	66.62	54.12	57.74	52.78	
8	75.00	69.32	67.50	86.02	72.12	
9	79.74	95.90	63.10	94.48	65.46	
10	66.12	87.26	40.30	65.74	87.82	
11	62.98	85.06	58.02	80.08	84.66	

	Collaboration	Hope & Optimism	Orientation to Learning	\
0	93.32	100.00	18.66	
1	90.10	86.70	35.86	
2	100.00	93.28	62.06	
3	76.50	90.94	36.98	
4	89.98	94.96	40.18	
5	96.66	100.00	77.56	
6	16.70	74.96	27.18	
7	83.74	53.30	43.66	
8	80.16	85.90	21.74	
9	69.94	73.40	23.54	
10	90.10	72.60	39.06	
11	90.06	96.24	52.52	

Summary

- 0 Diagnose Survey (1st)
- 1 Diagnose Survey (1st)
- 2 Diagnose Survey (1st)
- 3 Diagnose Survey (1st)
- 4 Diagnose Survey (1st)
- 5 Diagnose Survey (1st)
- 6 Diagnose Survey (1st)
- 7 Diagnose Survey (1st)
- 8 Diagnose Survey (1st)
- 9 Diagnose Survey (1st)
- 10 Diagnose Survey (1st)

11 Diagnose Survey (1st)

Measure Survey (2nd)

	Mindful Agency	Sense Making	Creativity	Curiosity	Belonging	\
12	88.34	92.84	85.04	82.76	95.94	
13	NaN	NaN	NaN	NaN	NaN	
14	NaN	NaN	NaN	NaN	NaN	
15	67.74	76.48	77.62	80.84	76.54	
16	60.12	90.48	77.90	66.66	95.94	
17	NaN	NaN	NaN	NaN	NaN	
18	63.48	65.24	55.32	57.78	74.46	
19	54.18	61.38	39.42	67.72	70.64	
20	89.72	89.90	81.72	94.14	100.00	
21	79.70	93.94	82.58	92.14	95.94	
22	NaN	NaN	NaN	NaN	NaN	
23	76.24	95.96	61.20	85.42	100.00	

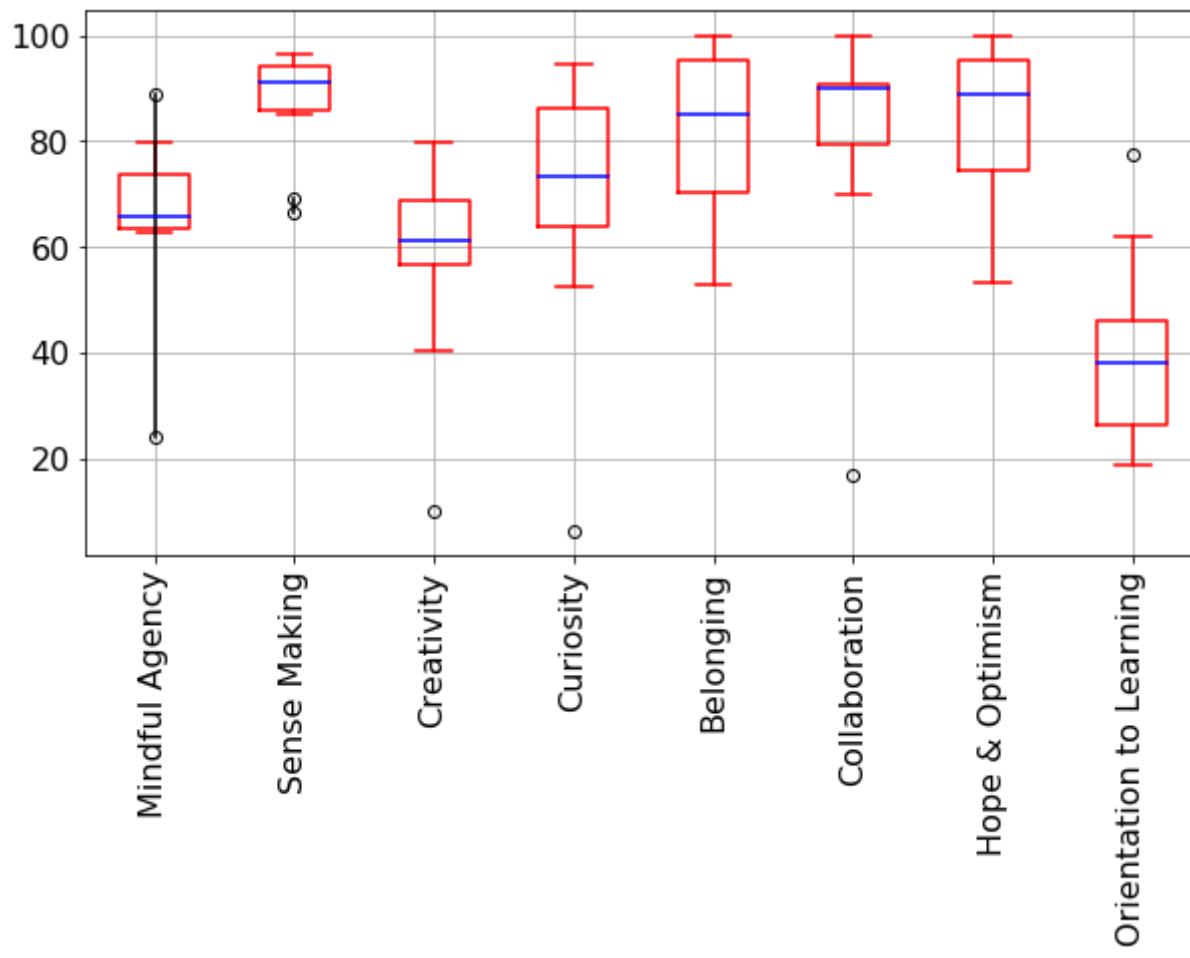
	Collaboration	Hope & Optimism	Orientation to Learning	\
12	86.48	97.06	47.54	
13	NaN	NaN	NaN	
14	NaN	NaN	NaN	
15	90.10	91.74	60.24	
16	86.44	89.66	65.18	
17	NaN	NaN	NaN	
18	69.94	68.00	40.10	
19	89.94	77.10	71.28	
20	96.78	96.24	10.14	
21	86.60	97.04	18.98	
22	NaN	NaN	NaN	
23	93.32	100.00	39.32	

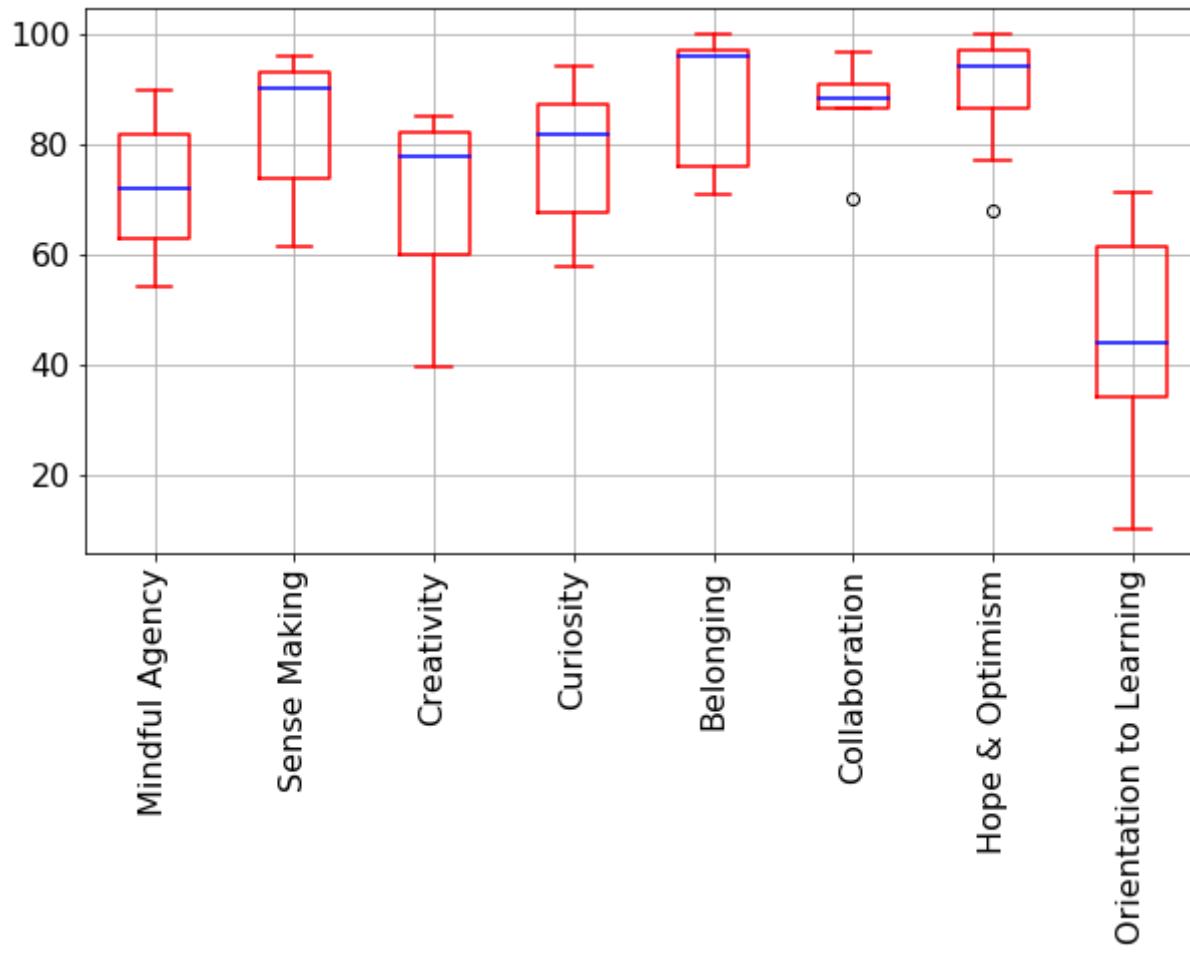
Summary

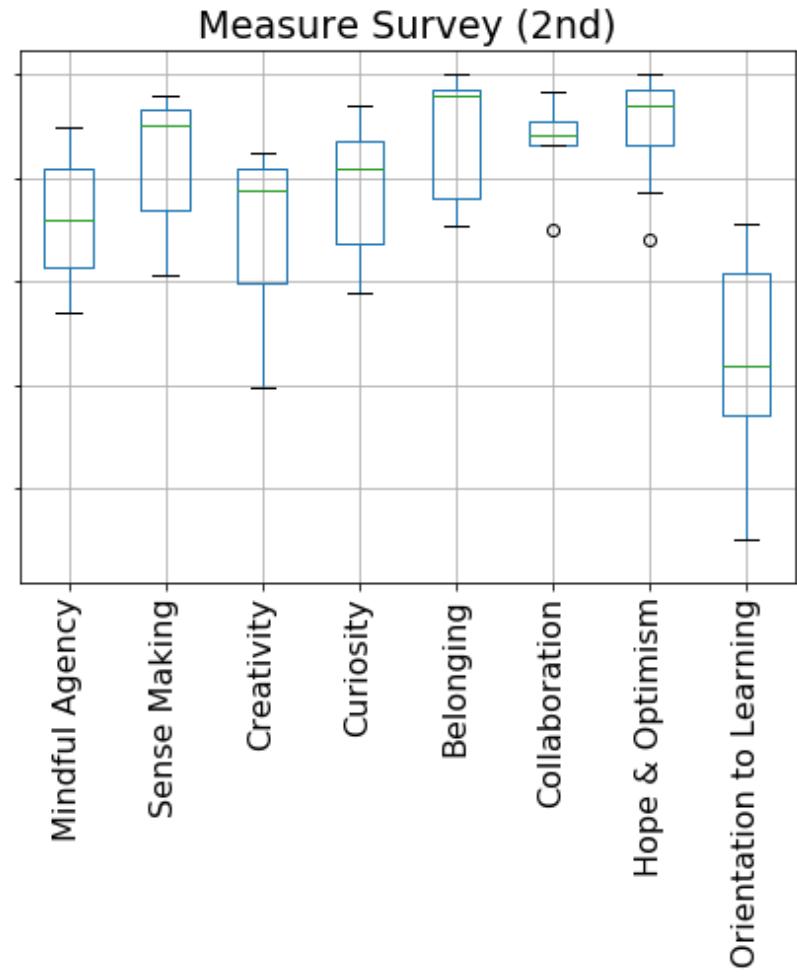
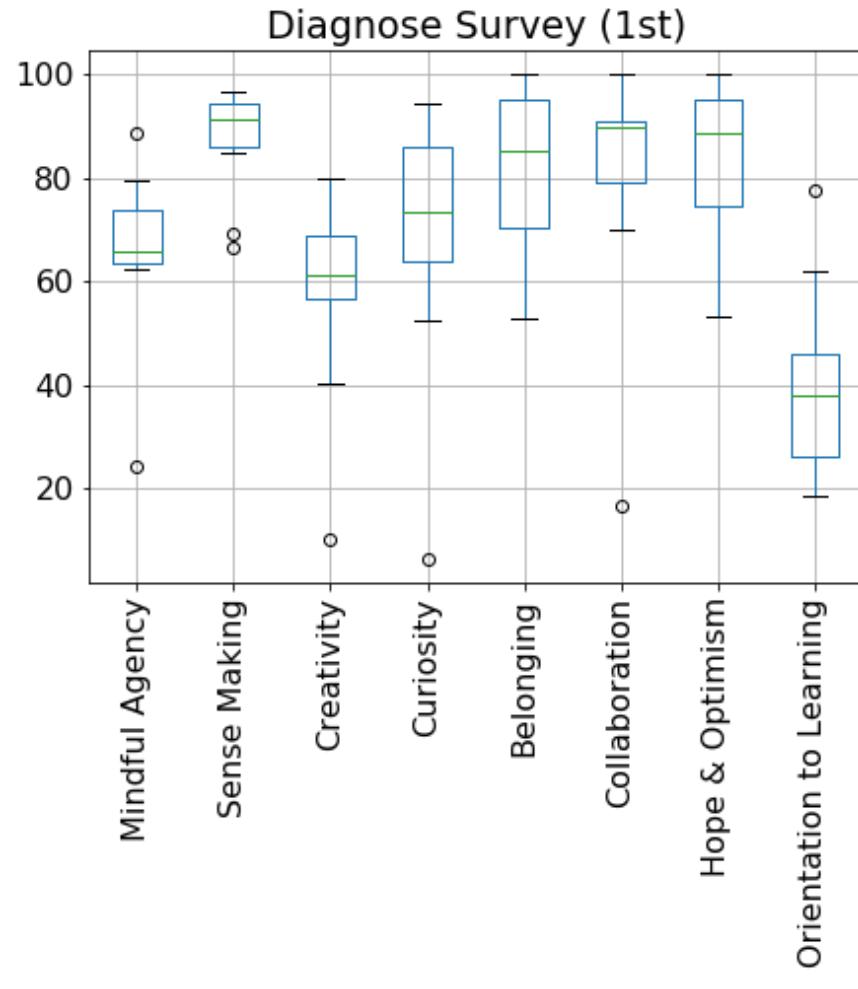
12	Measure Survey (2nd)
13	Measure Survey (2nd)
14	Measure Survey (2nd)
15	Measure Survey (2nd)
16	Measure Survey (2nd)
17	Measure Survey (2nd)
18	Measure Survey (2nd)
19	Measure Survey (2nd)
20	Measure Survey (2nd)
21	Measure Survey (2nd)

22 Measure Survey (2nd)

23 Measure Survey (2nd)



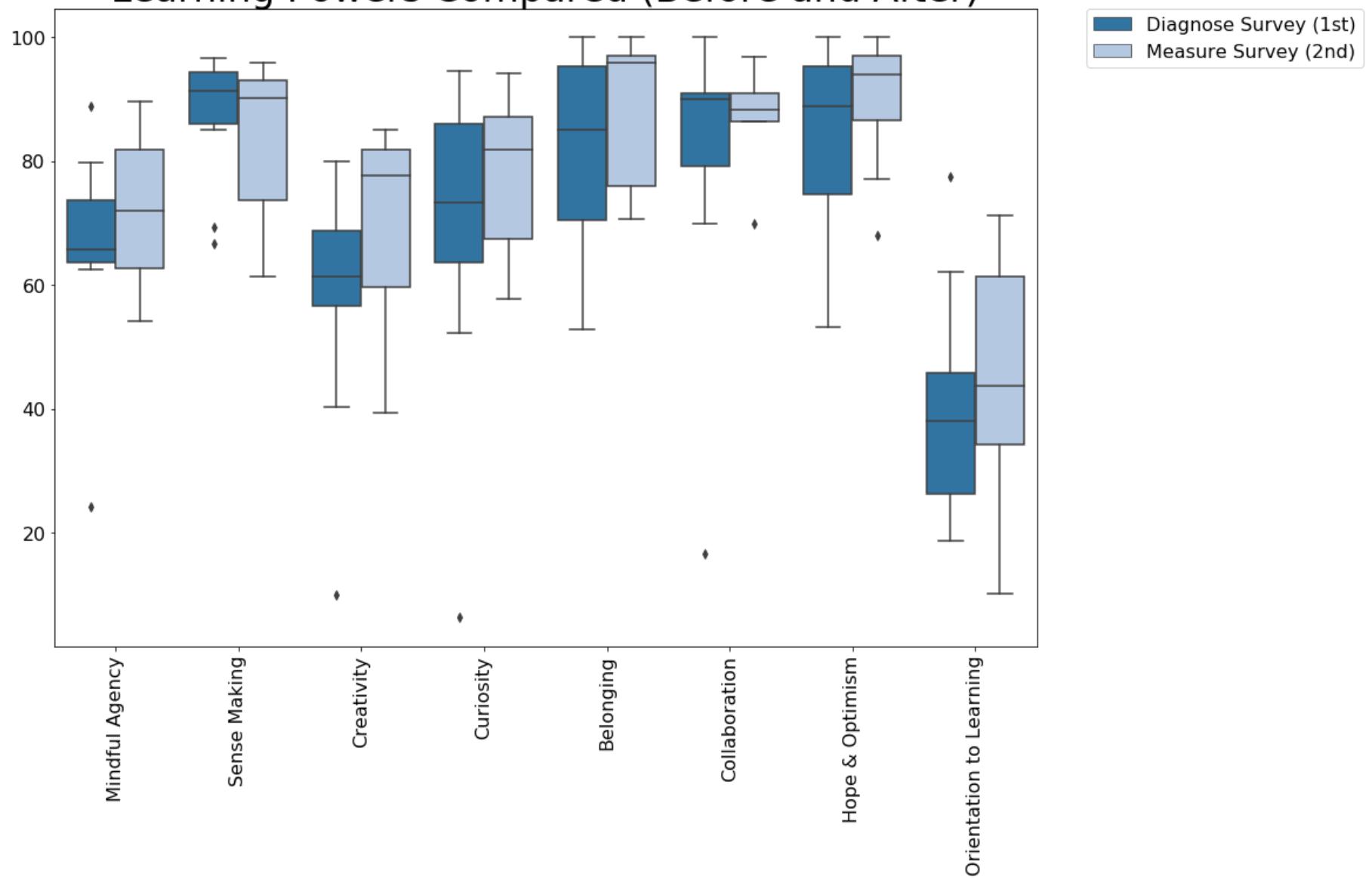




Side by Side Boxplot Comparison

```
Index(['Mindful Agency', 'Sense Making', 'Creativity', 'Curiosity',
       'Belonging', 'Collaboration', 'Hope & Optimism',
       'Orientation to Learning', 'Rigid Persistence', 'Fragile Dependence',
       'Summary'],
      dtype='object')
(24, 11)
```

Learning Powers Compared (Before and After)



Combined Radar Chart

This shows all the students on the one chart for the first survey

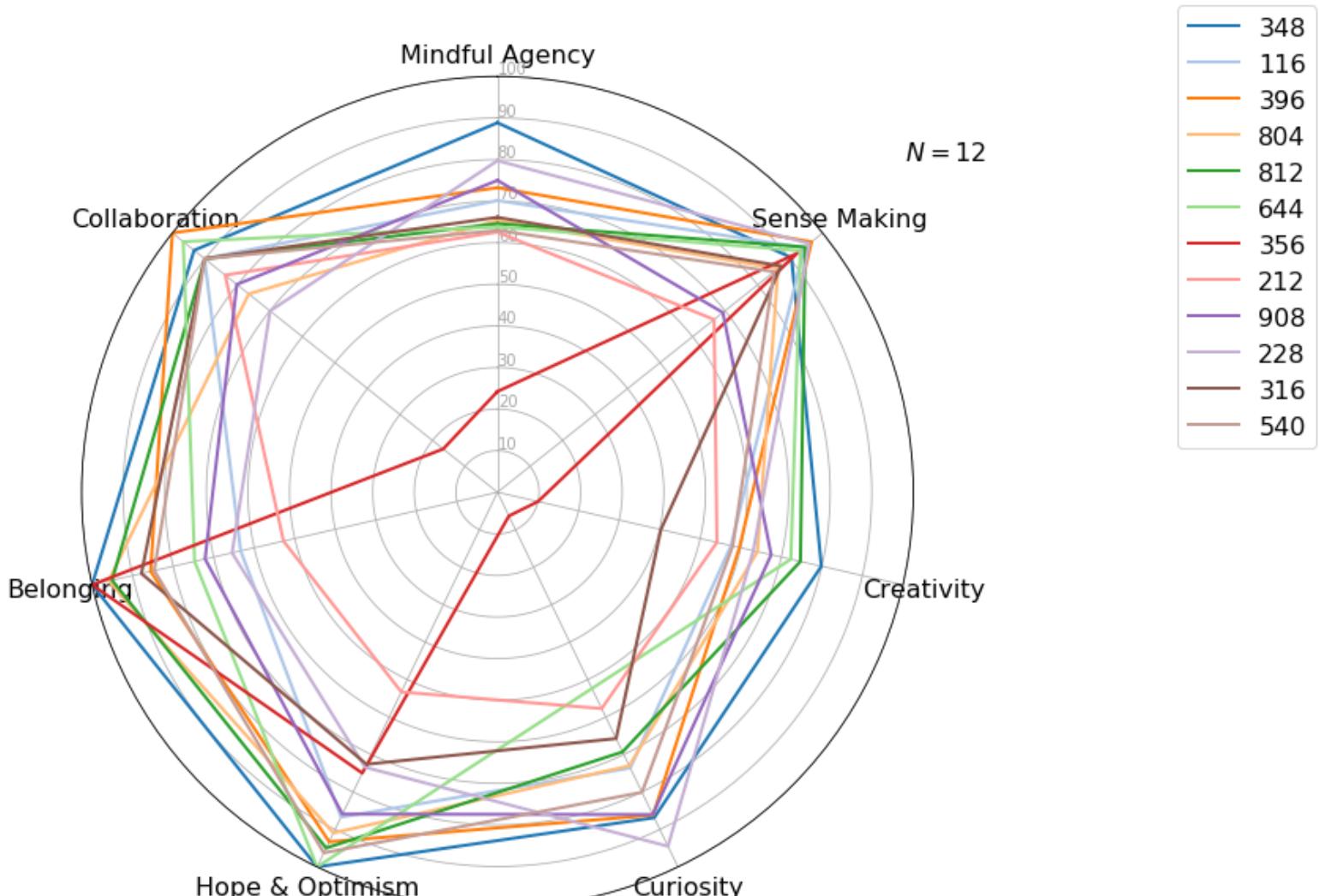


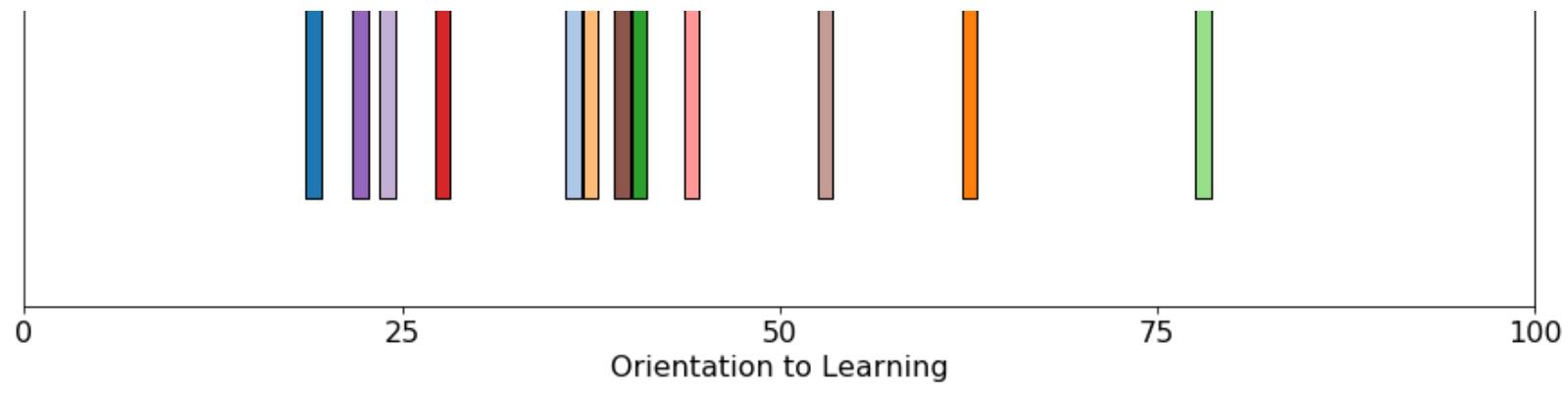
Combined Radar Chart - Survey 1

This shows all the students on the one chart for the first survey



Learning Power - All Students - Diagnose (1st Survey)

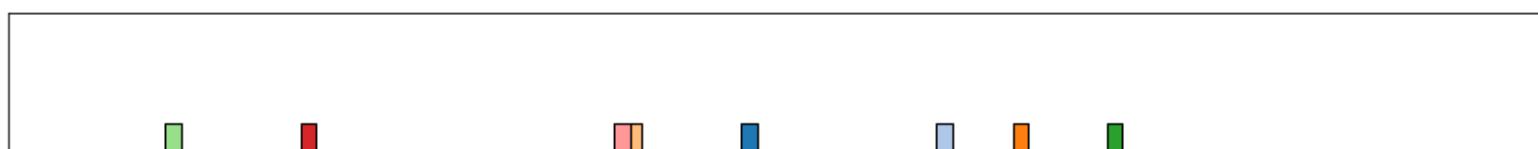
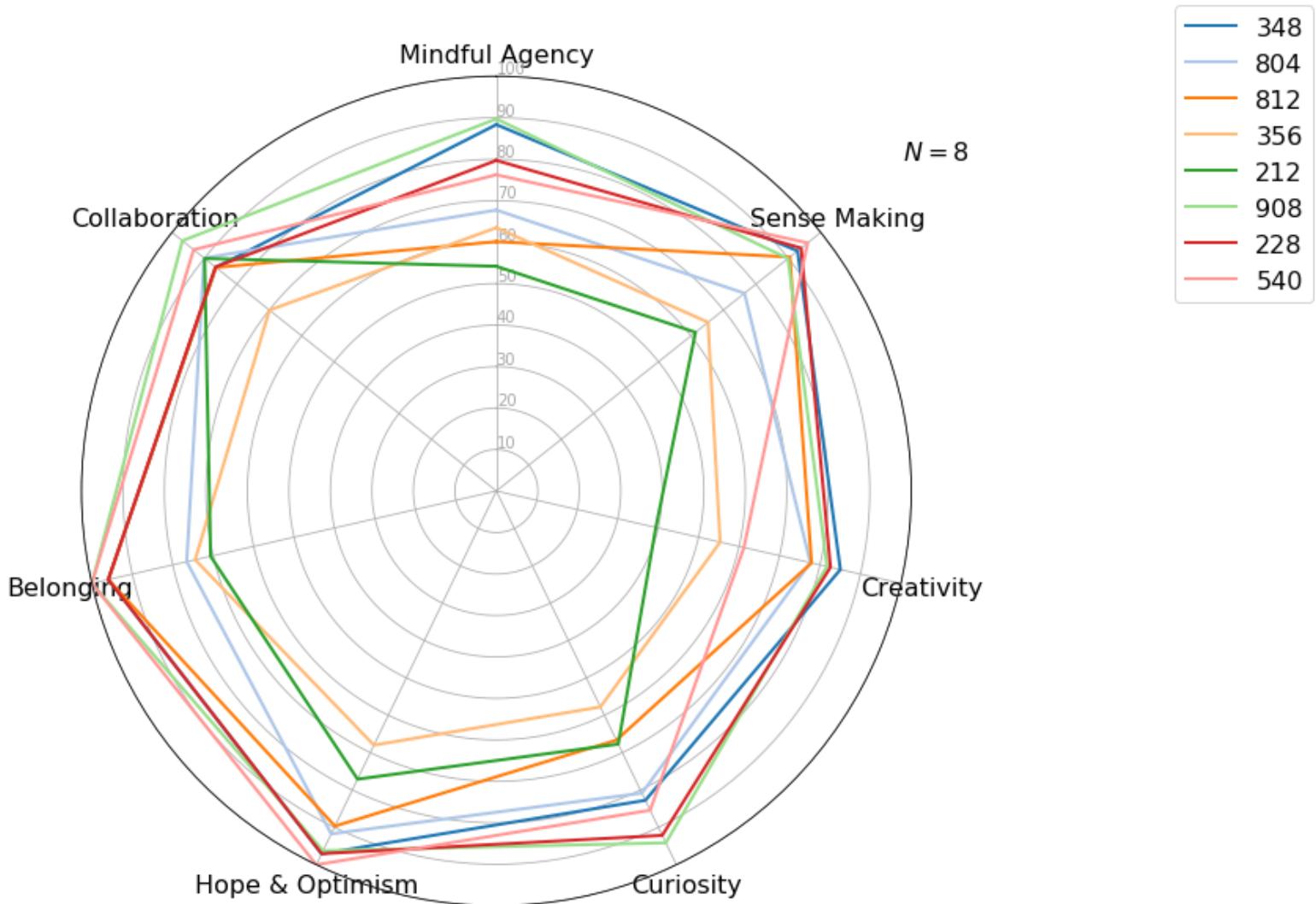


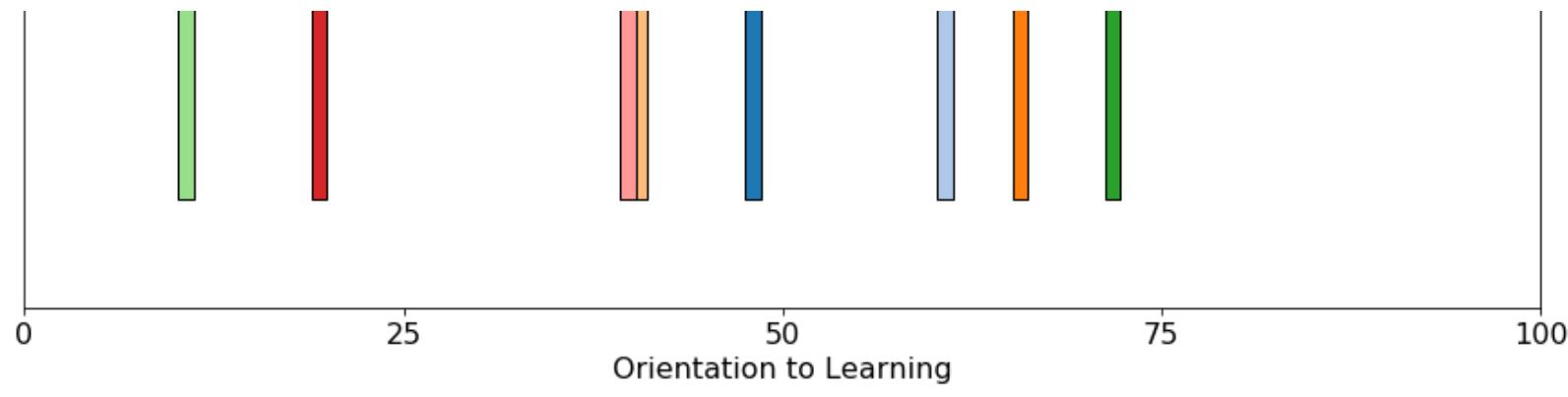


Combined Radar Chart - Survey 2

This shows all the students on the one chart for the second survey

Learning Power - All Students - Measure (2nd Survey)





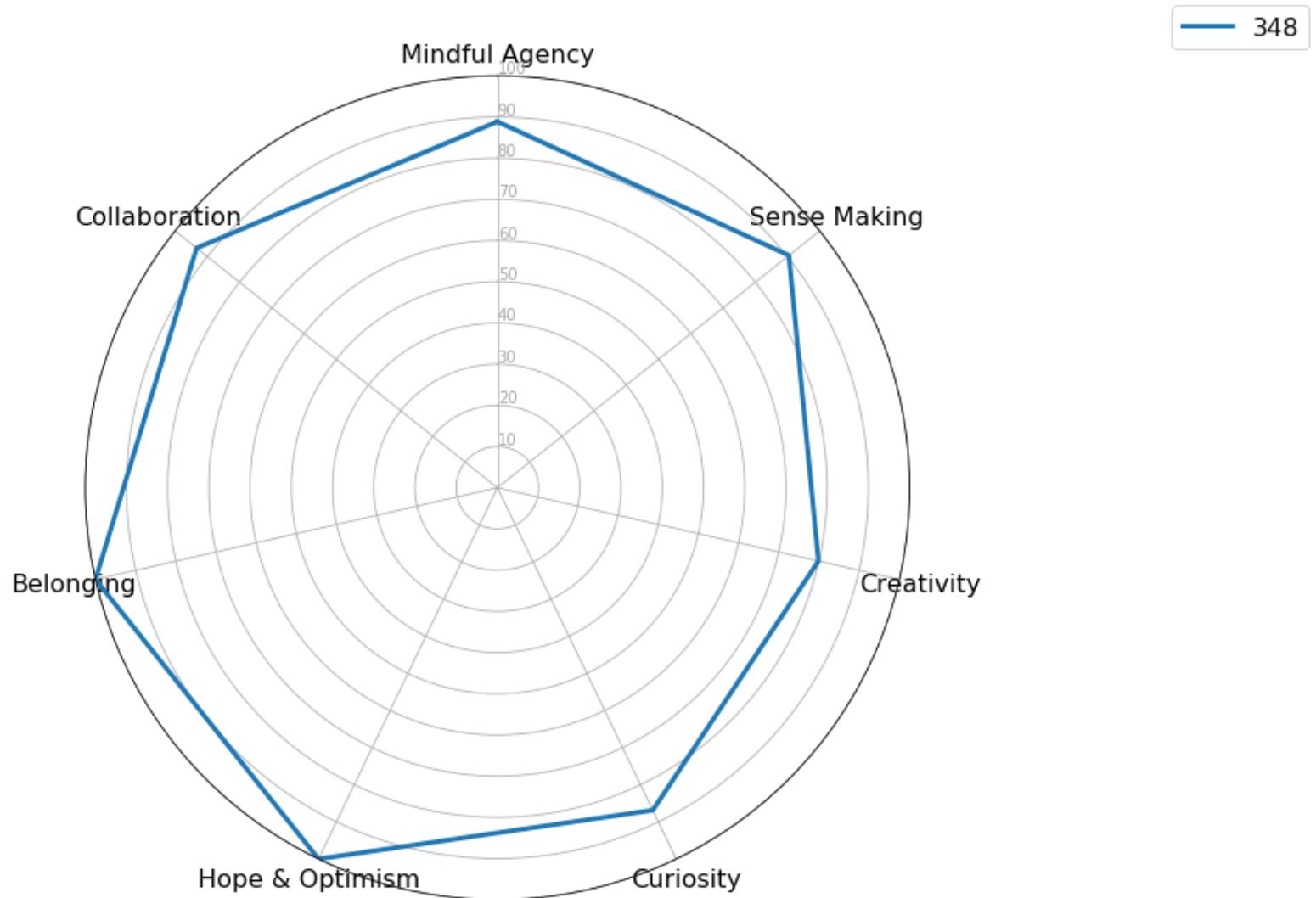
© UTS : CIC

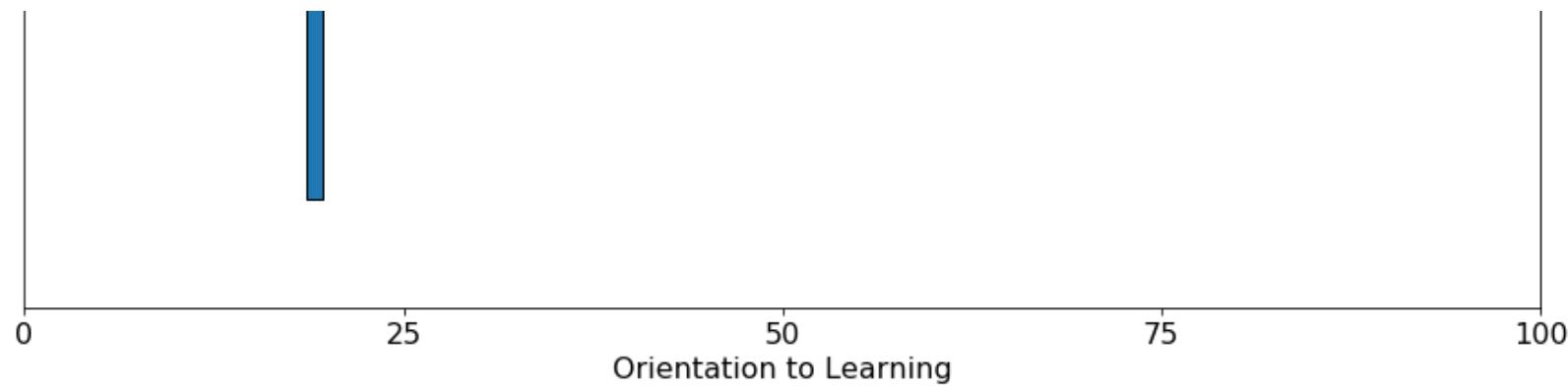
Individual Radar Chart 1

This shows each students chart for the first survey



Chart of Student 348 - Diagnose (1st Survey)



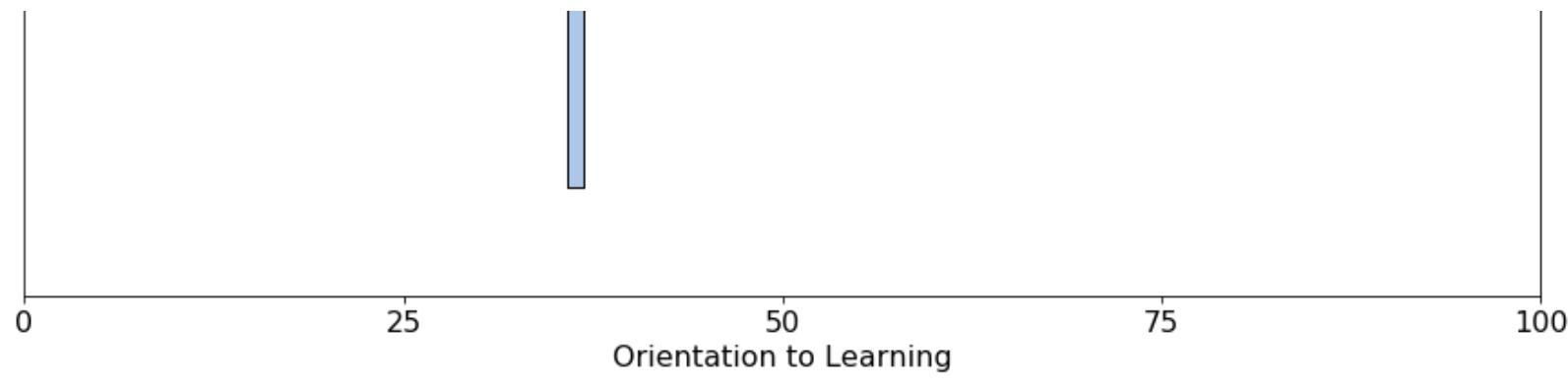


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Chart of Student 116 - Diagnose (1st Survey)

— 116

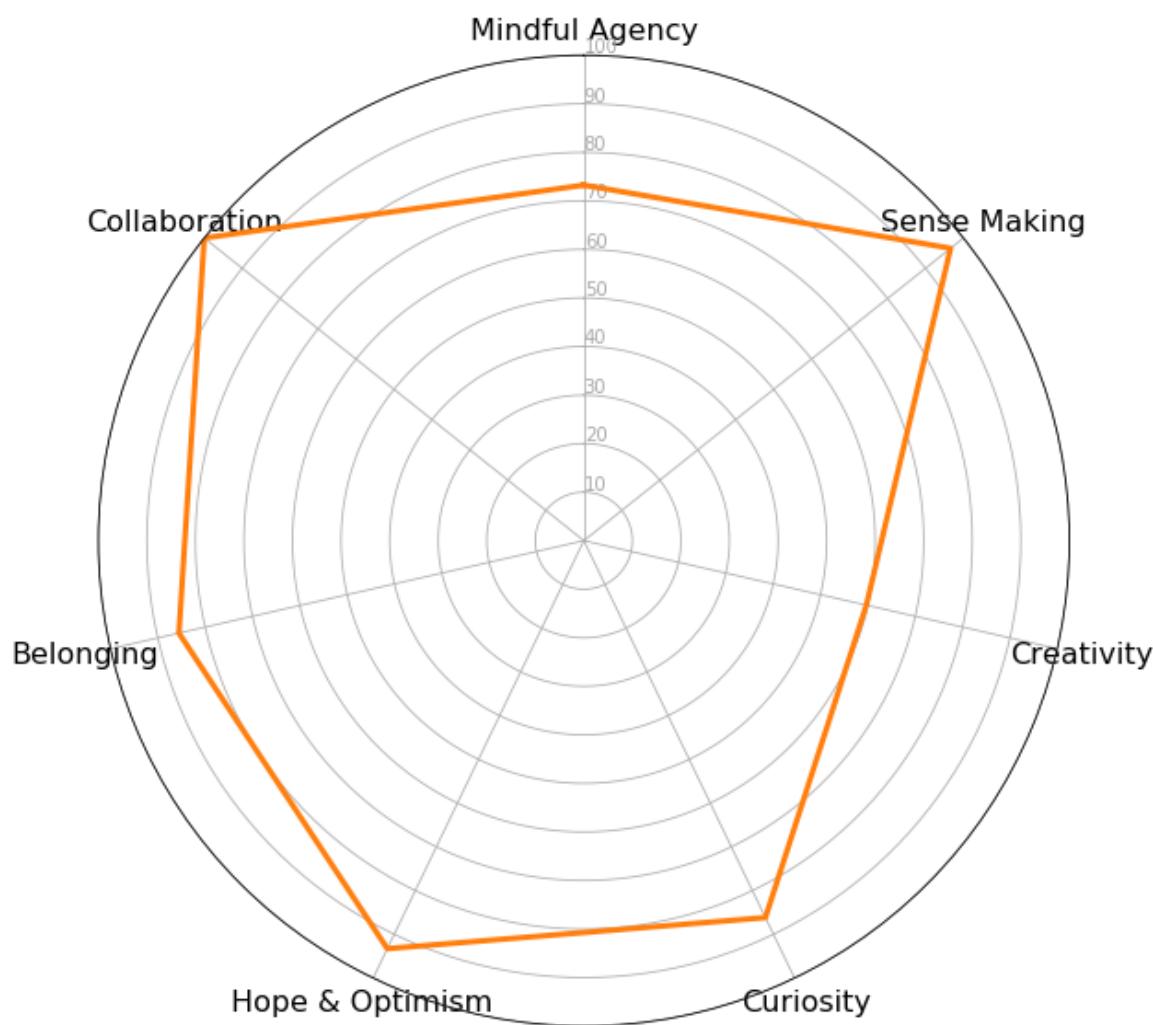


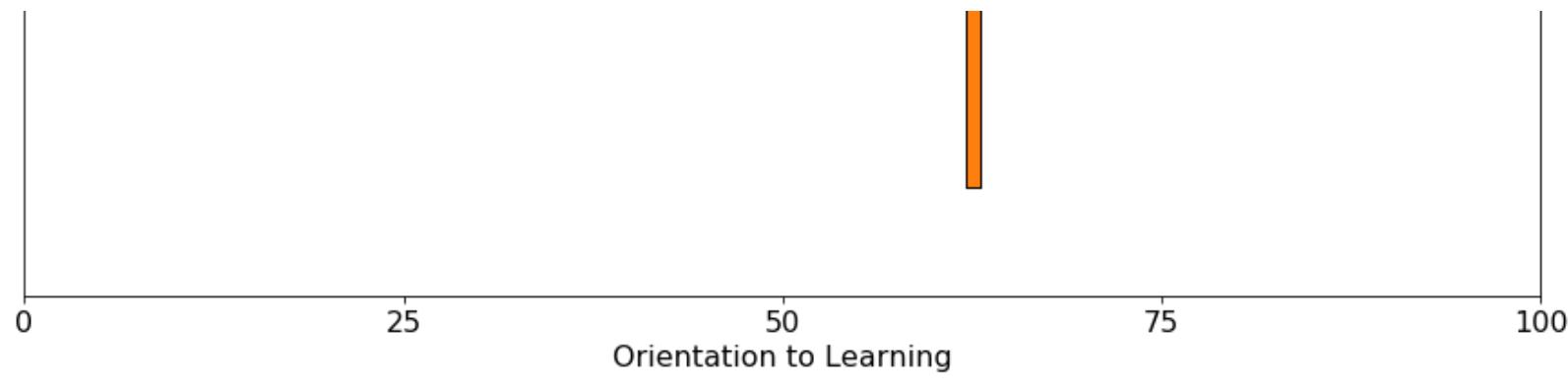


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Chart of Student 396 - Diagnose (1st Survey)

— 396



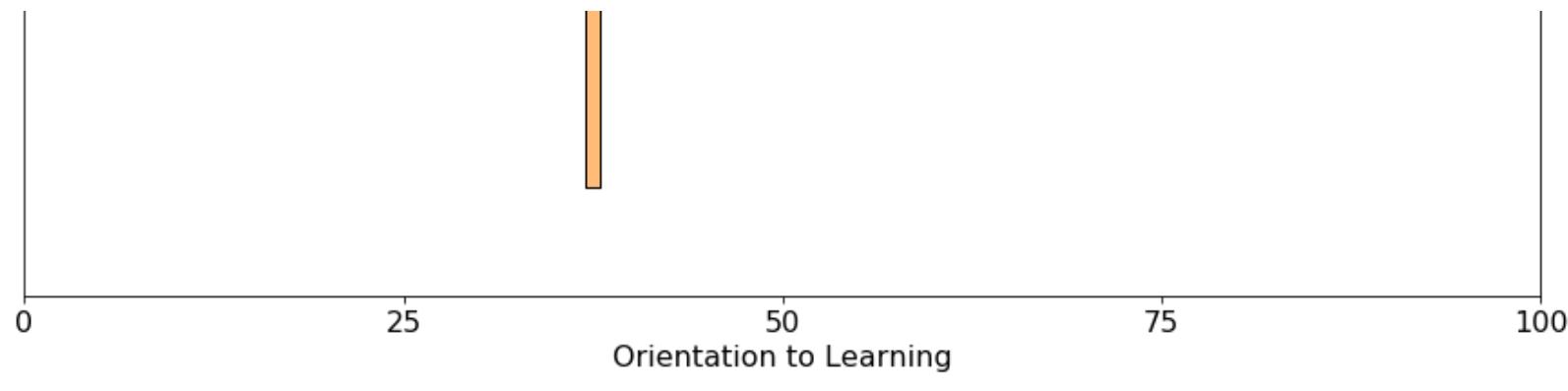


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Chart of Student 804 - Diagnose (1st Survey)



— 804

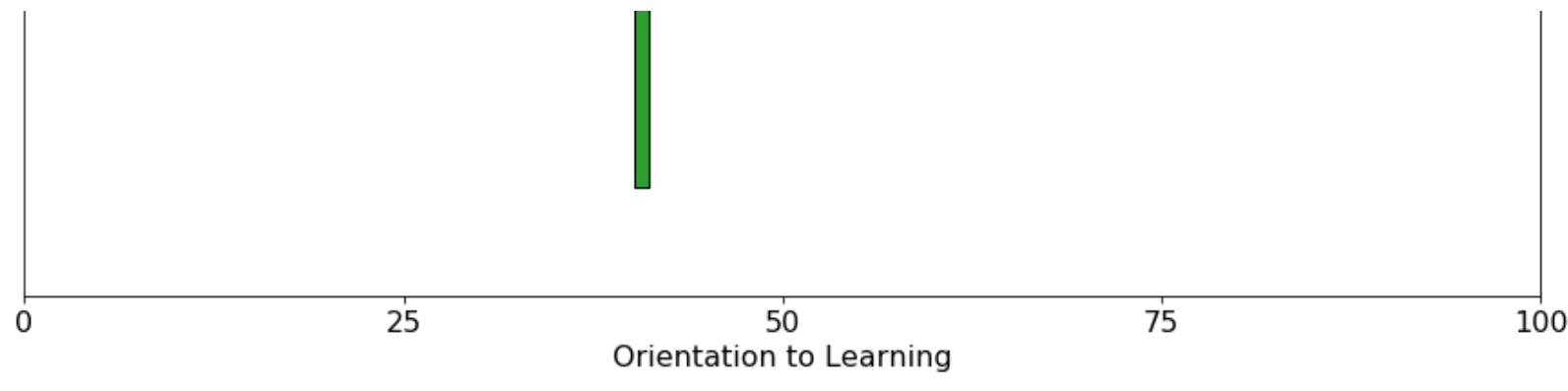


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Chart of Student 812 - Diagnose (1st Survey)



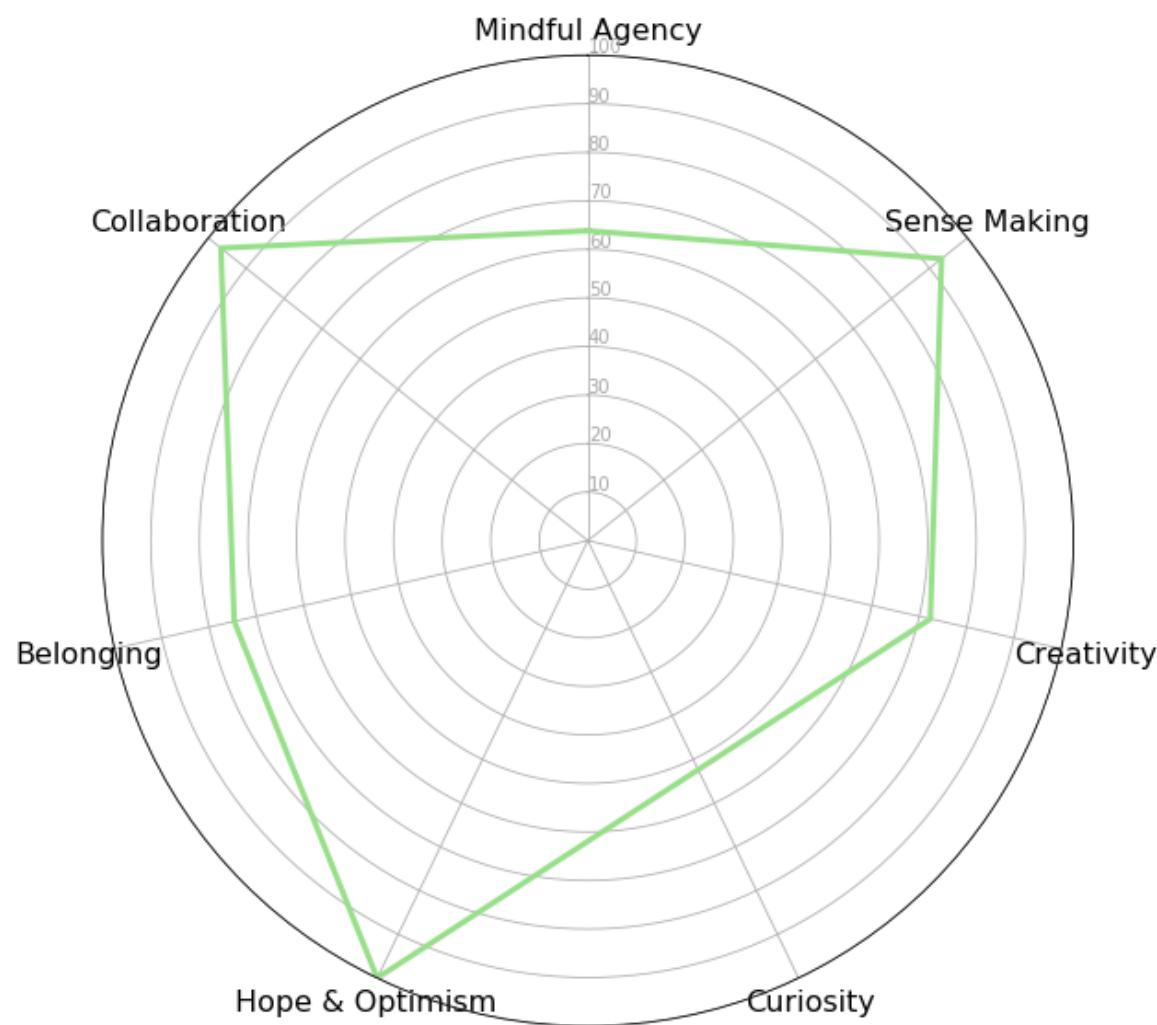
812

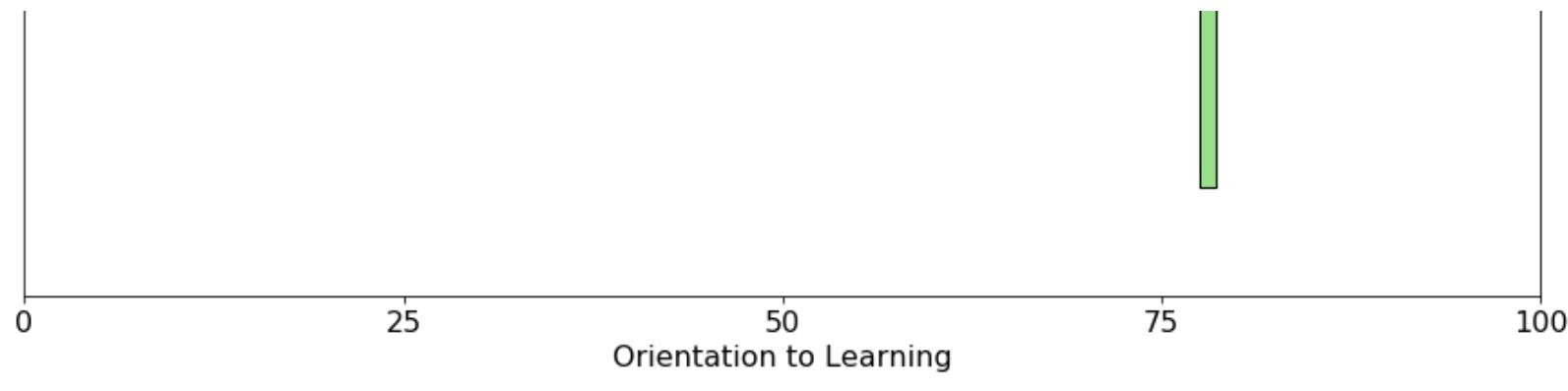


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Chart of Student 644 - Diagnose (1st Survey)

644



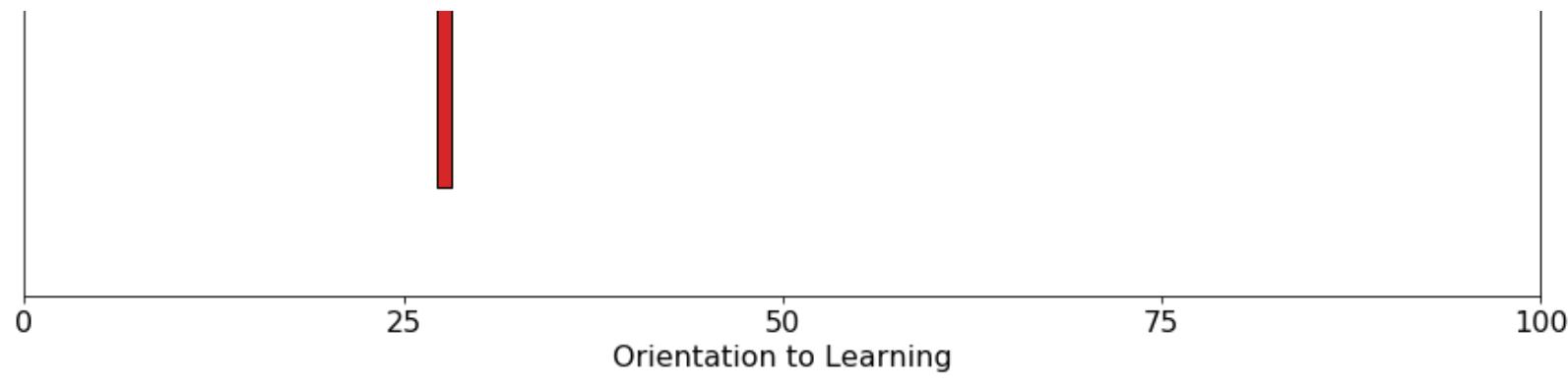


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Chart of Student 356 - Diagnose (1st Survey)

— 356



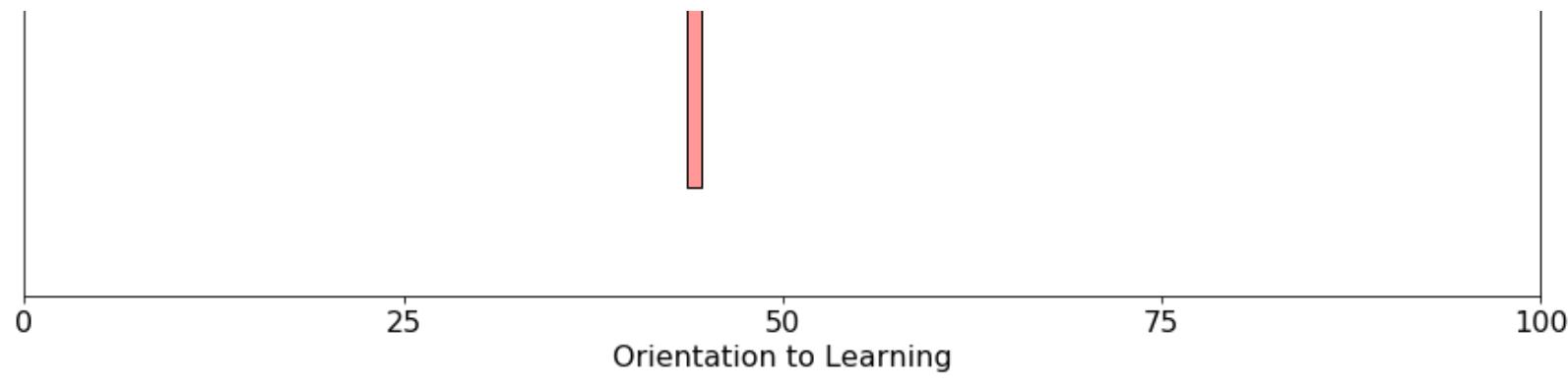


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Chart of Student 212 - Diagnose (1st Survey)

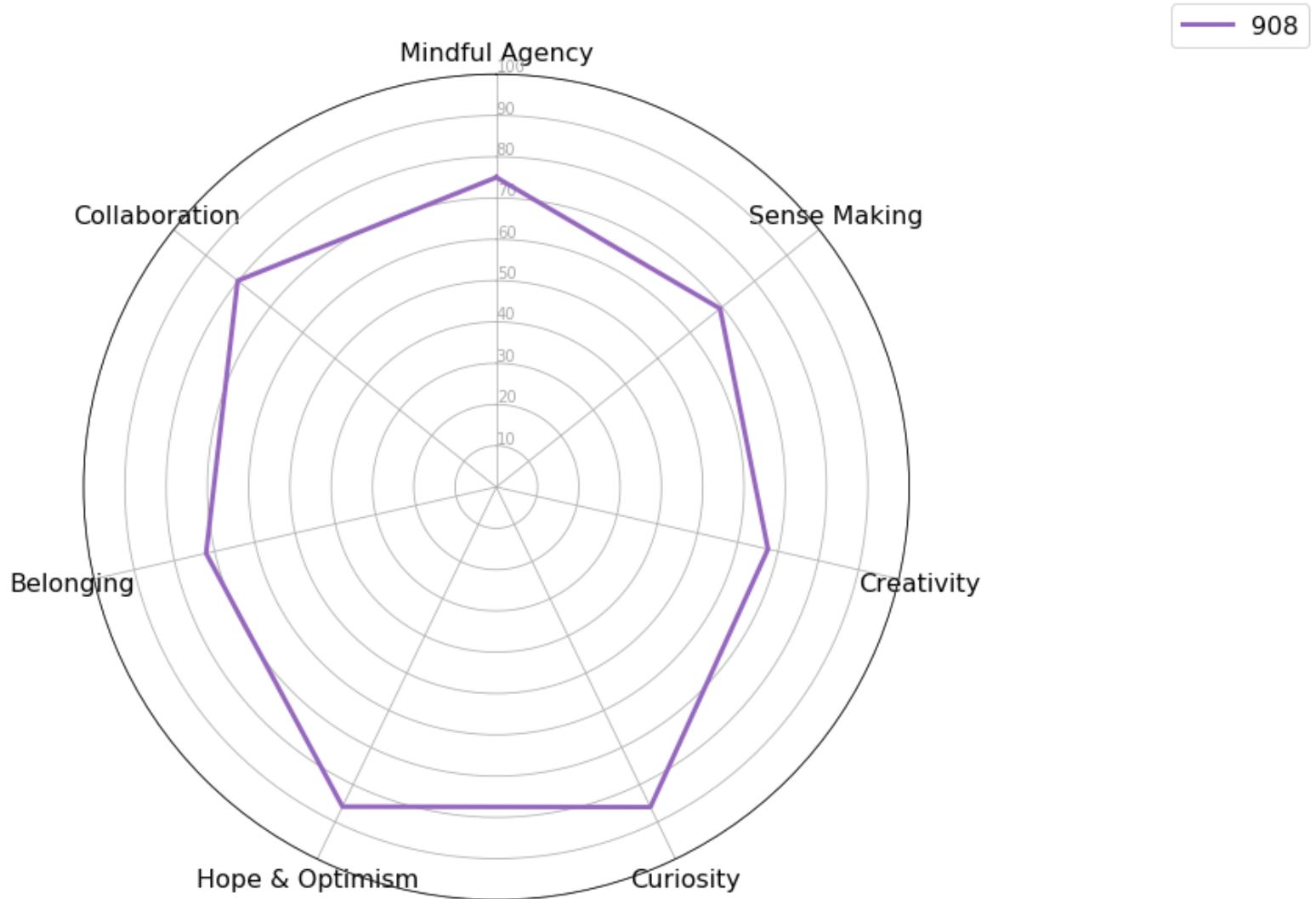
— 212

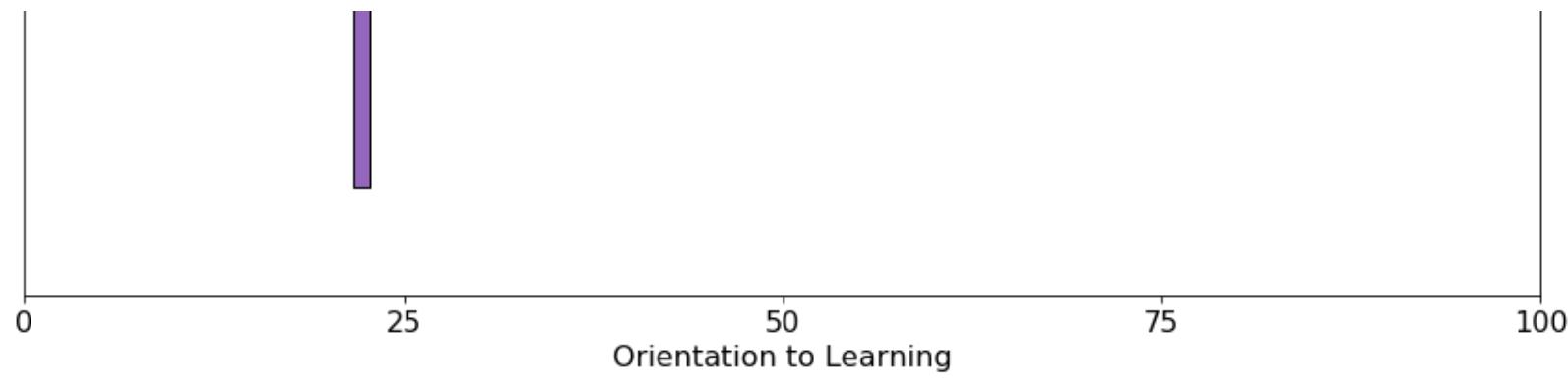




© UTS : CIC

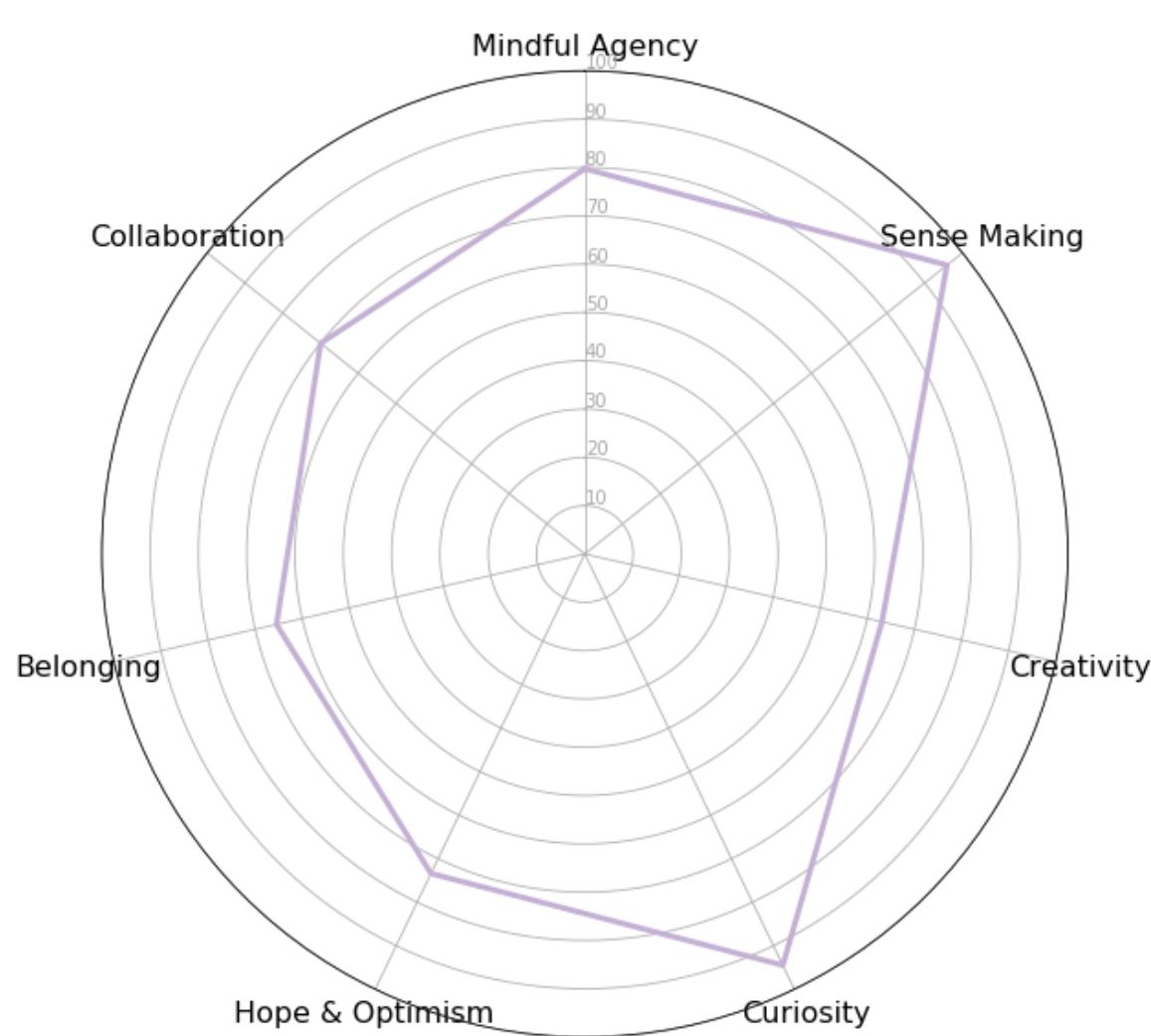
Chart of Student 908 - Diagnose (1st Survey)



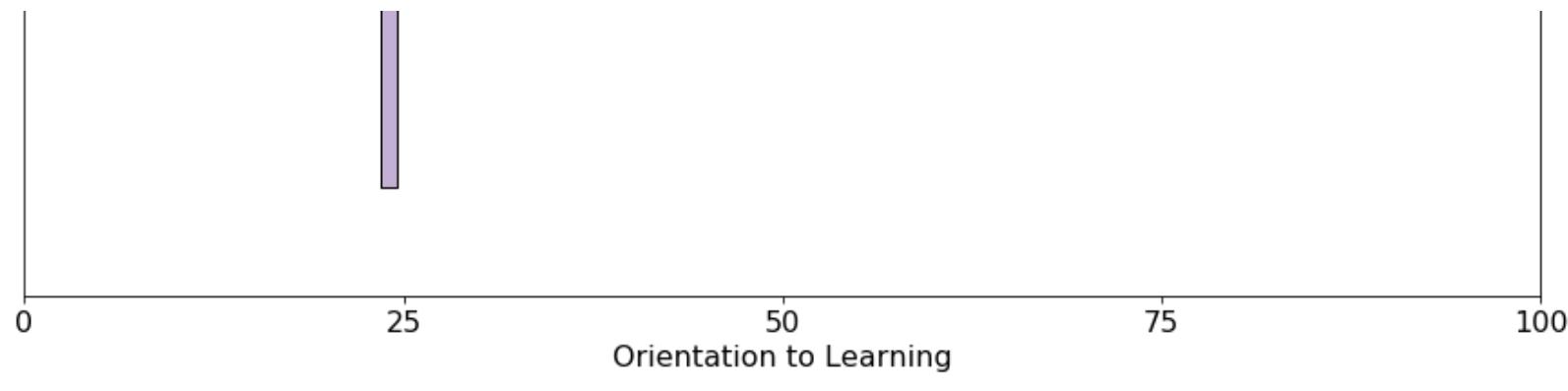


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Chart of Student 228 - Diagnose (1st Survey)



— 228

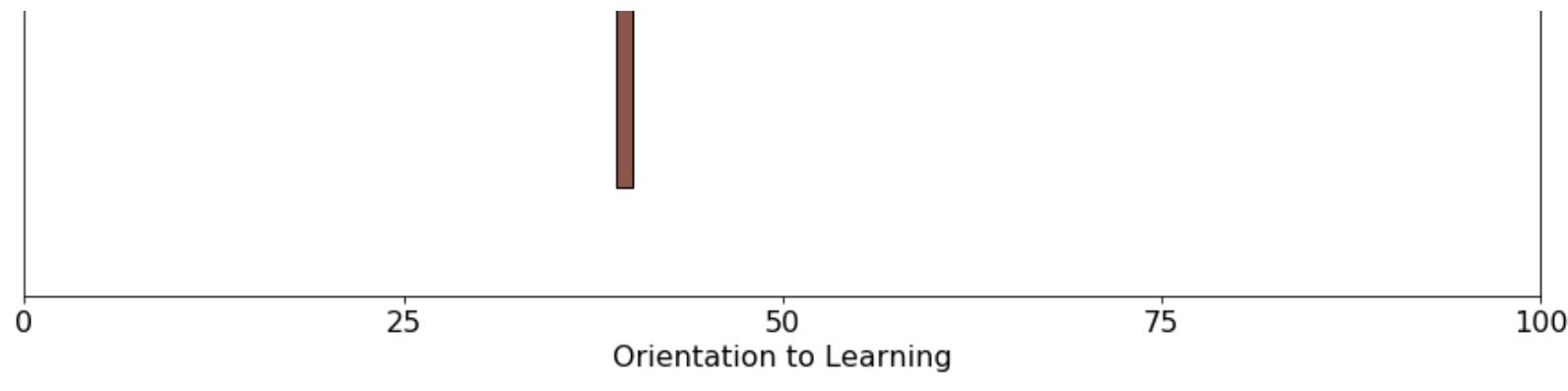


© UTS : CIC

Chart of Student 316 - Diagnose (1st Survey)

— 316

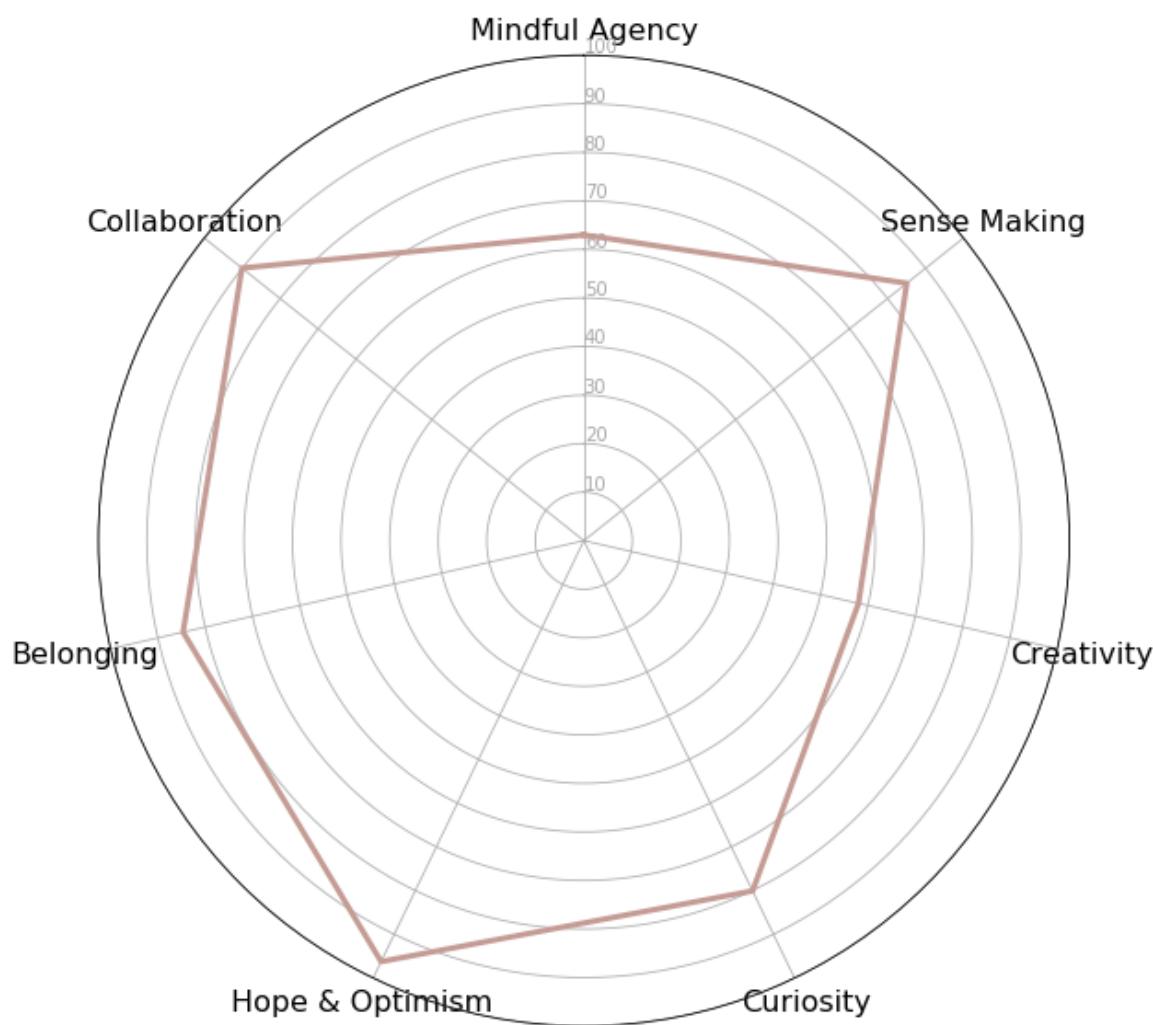


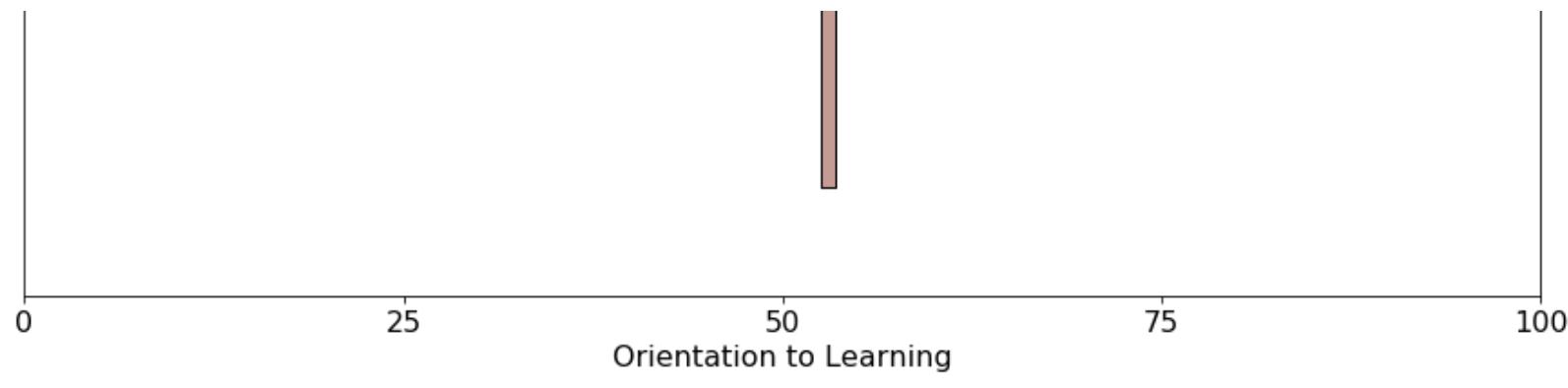


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Chart of Student 540 - Diagnose (1st Survey)

— 540





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Individual Radar Chart 2

This shows each students chart for the second survey

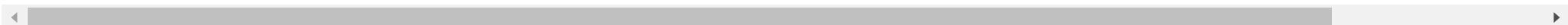
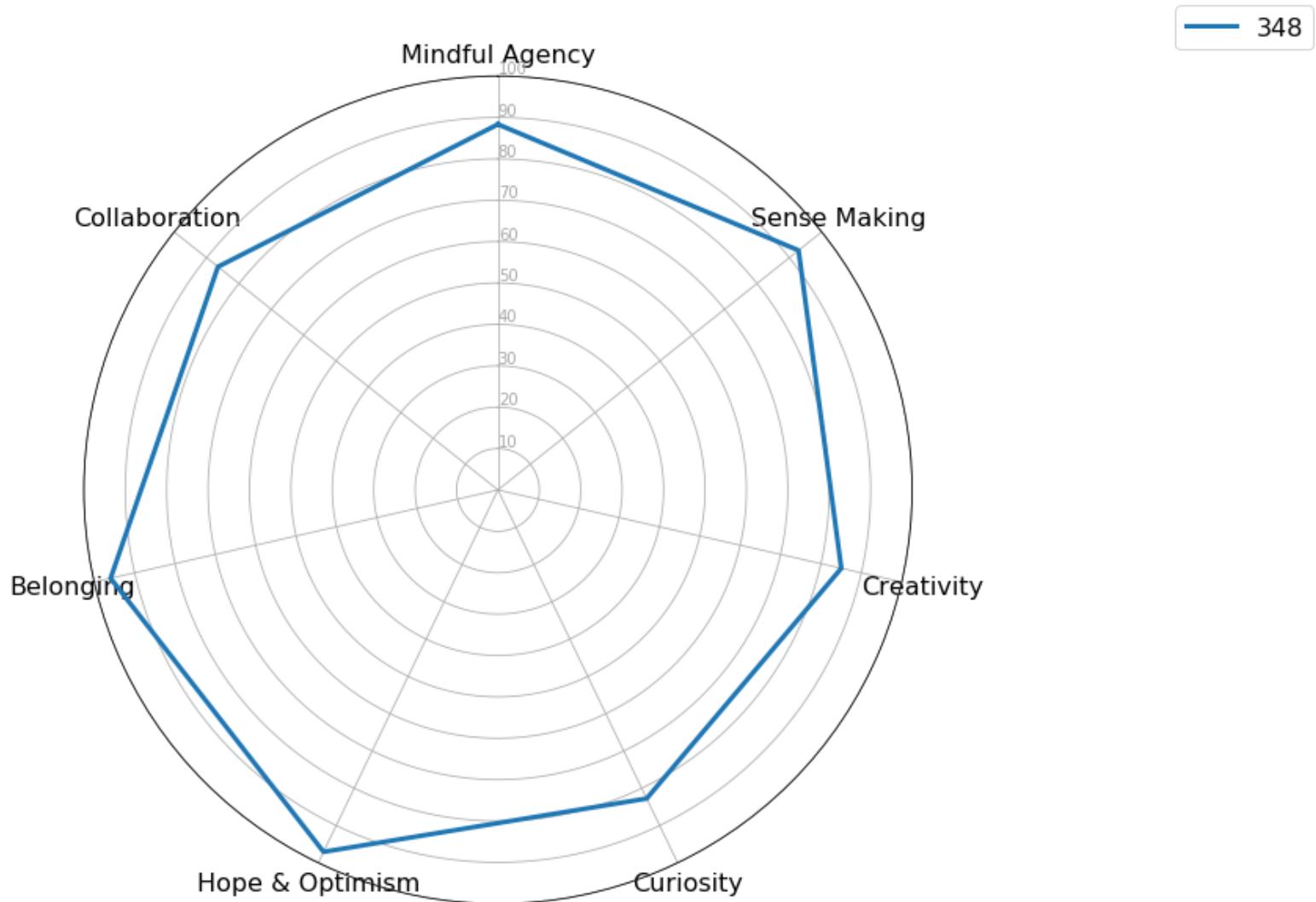
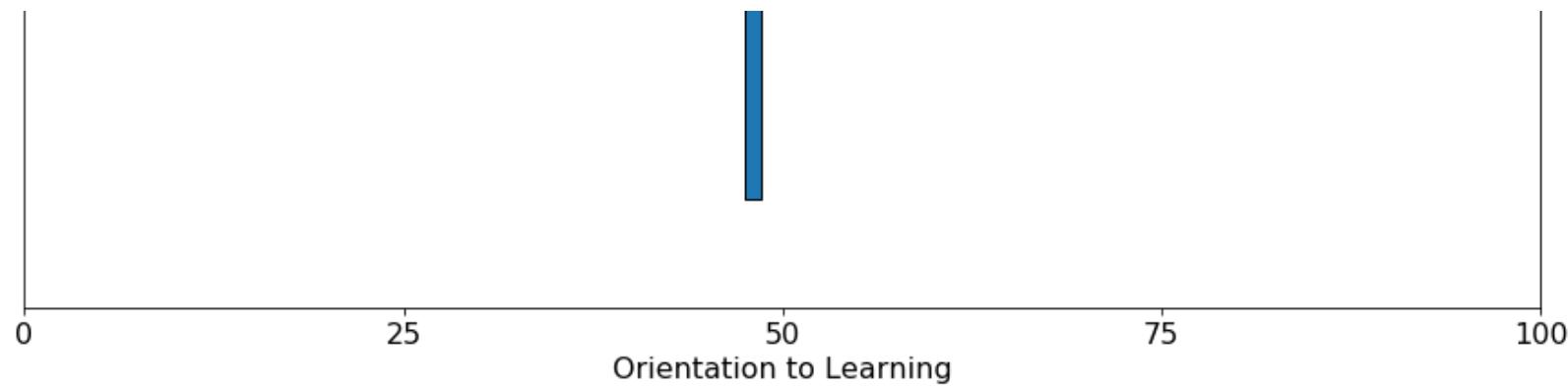


Chart of Student 348- Measure (2nd Survey)



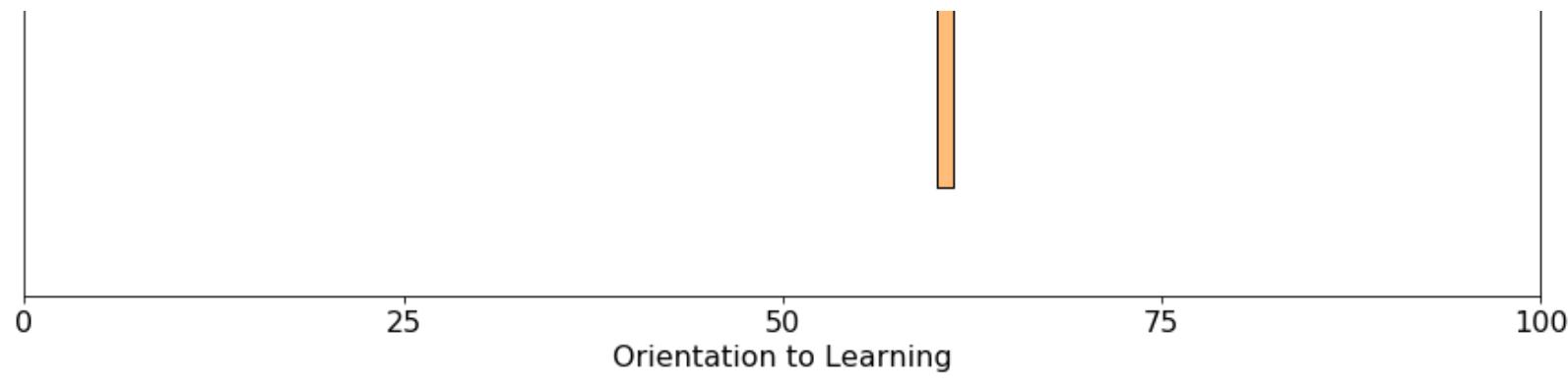


© UTS : CIC

Chart of Student 804- Measure (2nd Survey)



804

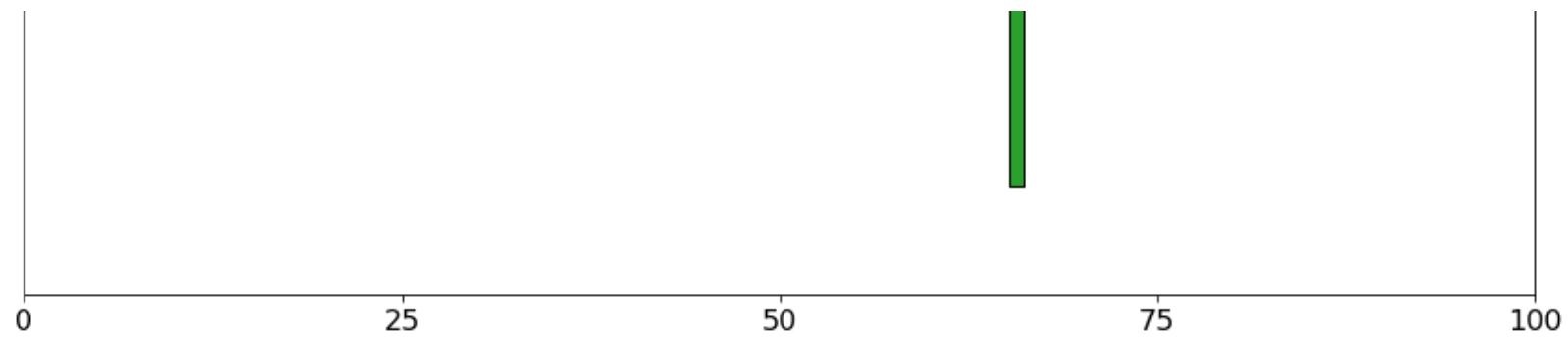


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Chart of Student 812- Measure (2nd Survey)



812



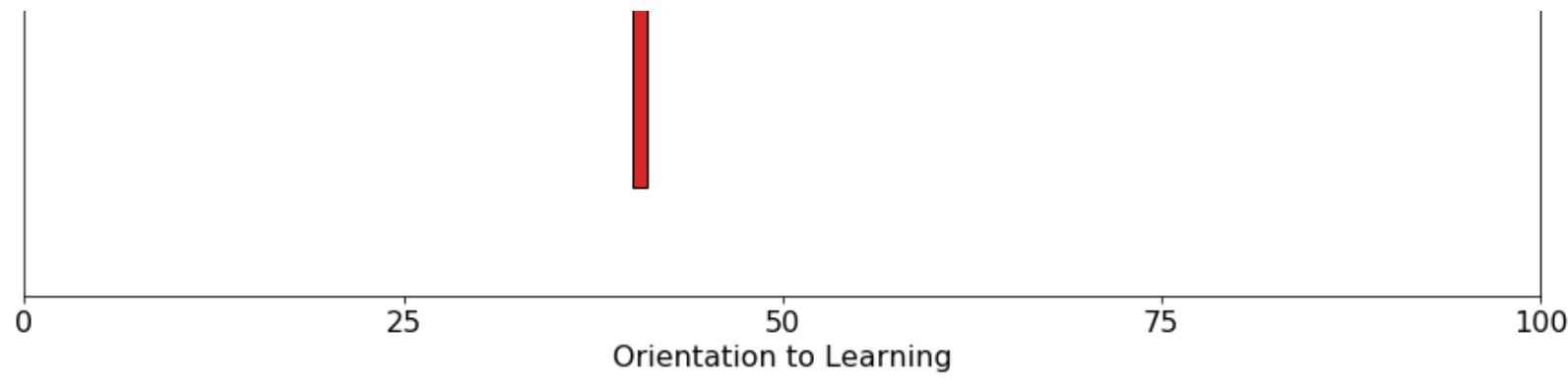
Orientation to Learning

© UTS : CIC

Chart of Student 356- Measure (2nd Survey)

— 356



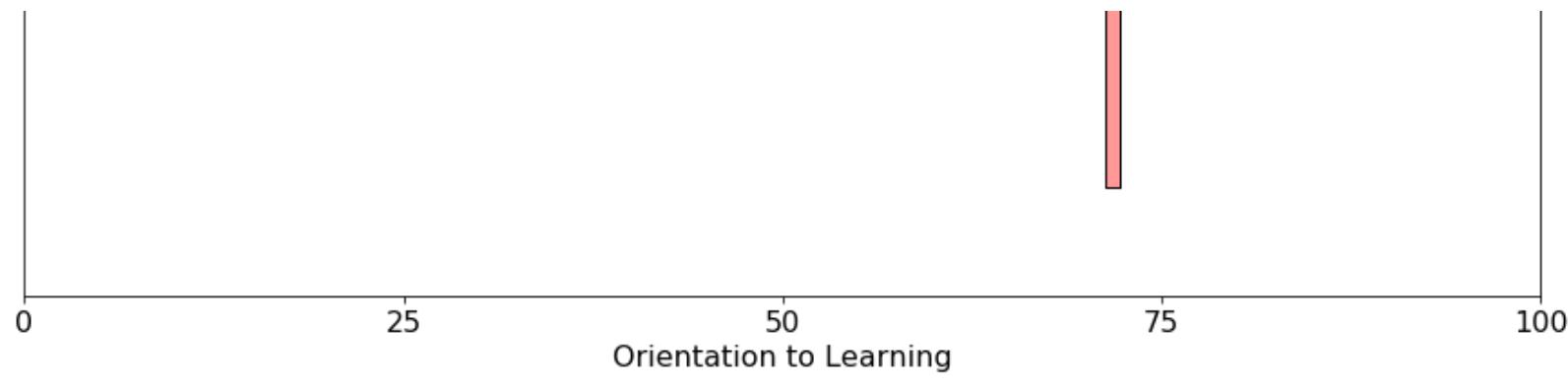


© UTS : CIC

Chart of Student 212- Measure (2nd Survey)

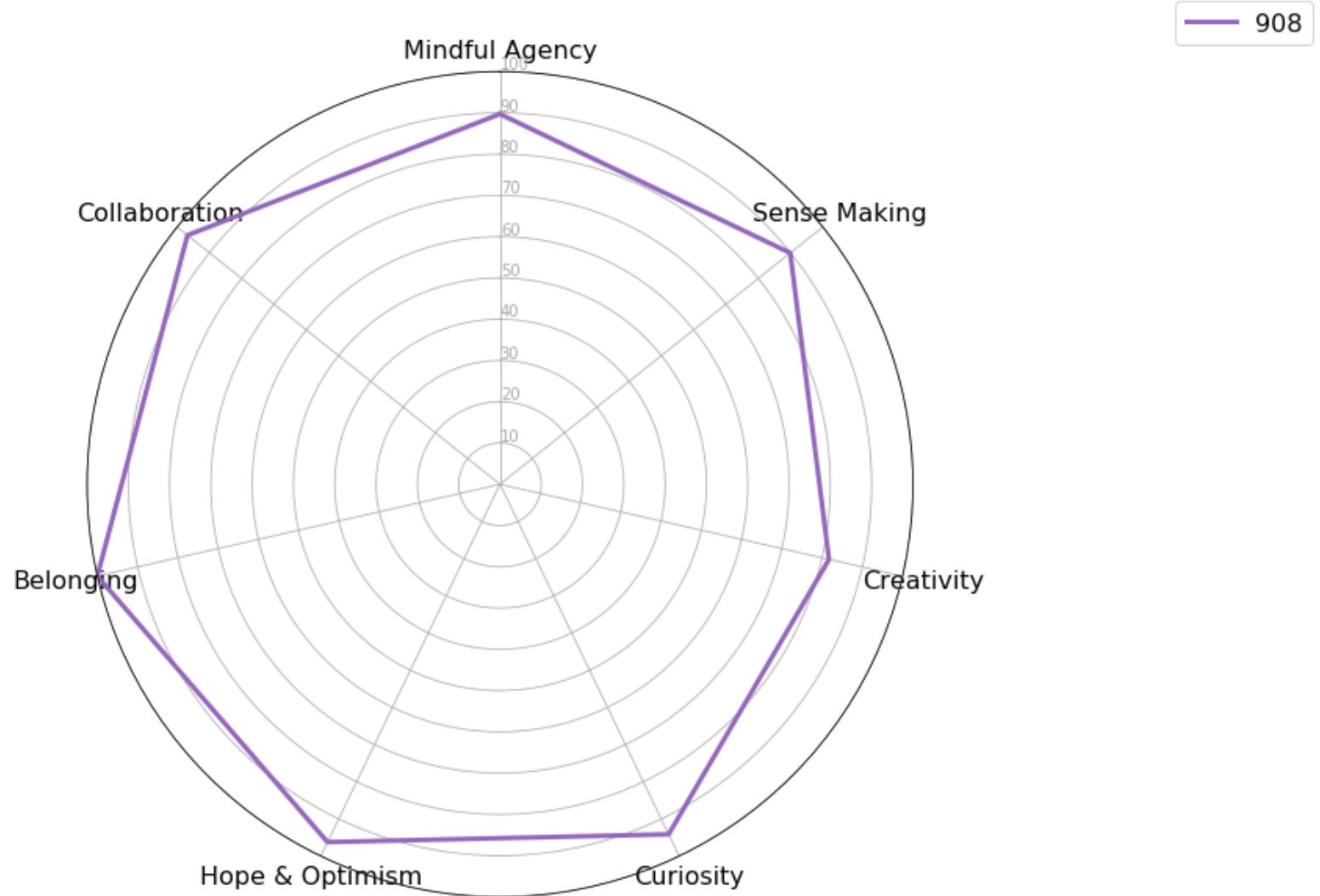


— 212

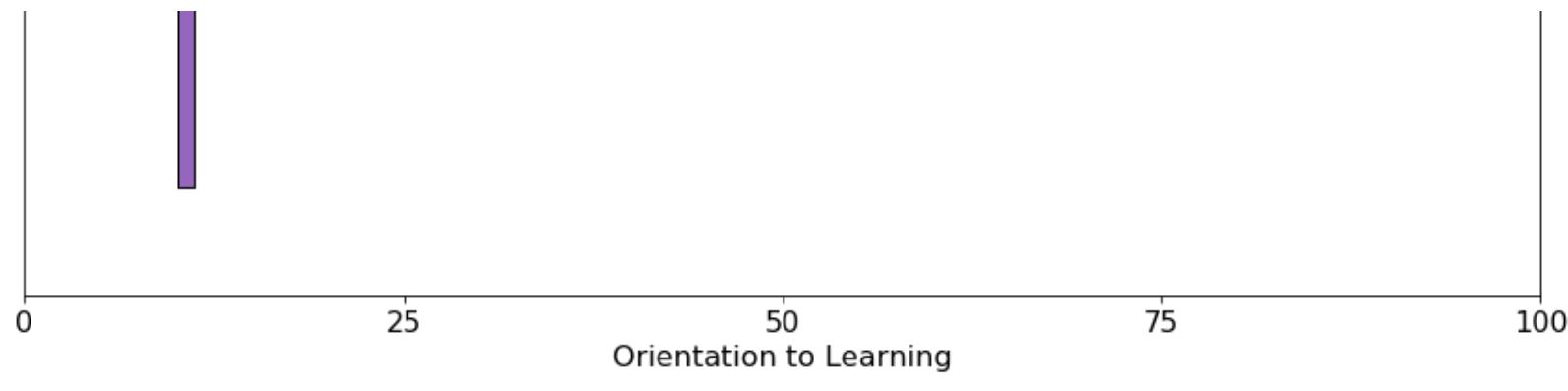


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Chart of Student 908- Measure (2nd Survey)

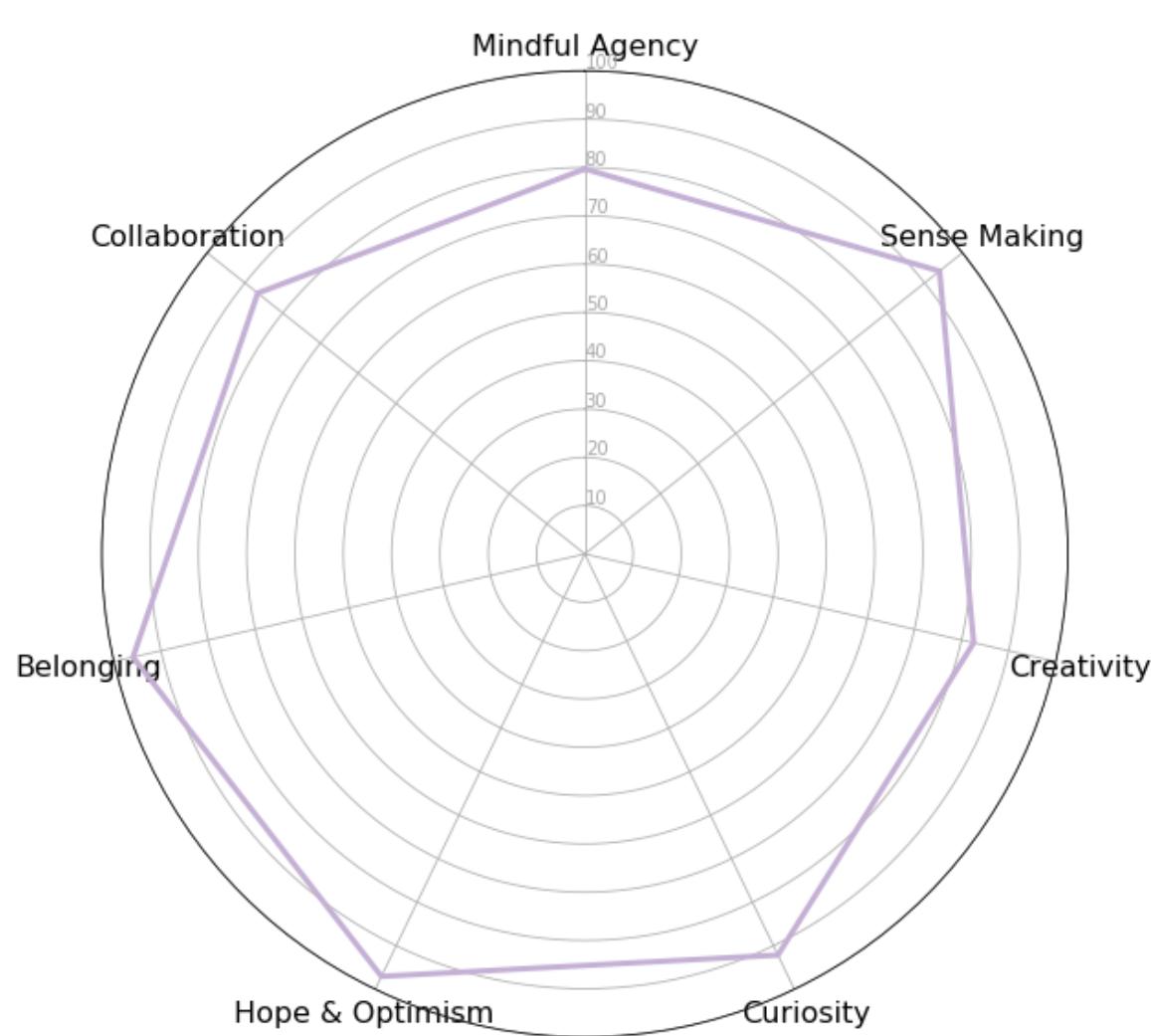


— 908

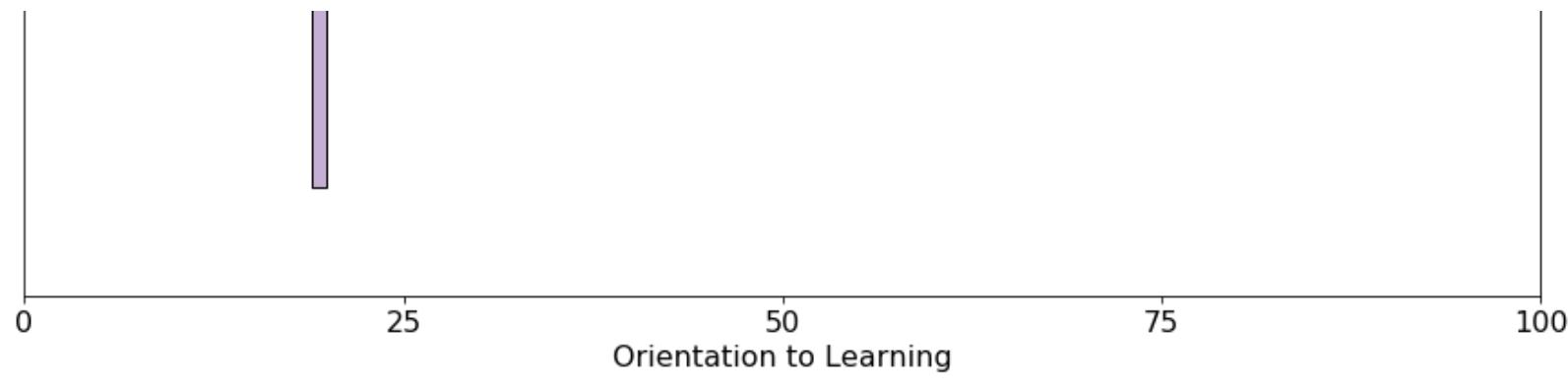


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Chart of Student 228- Measure (2nd Survey)



— 228

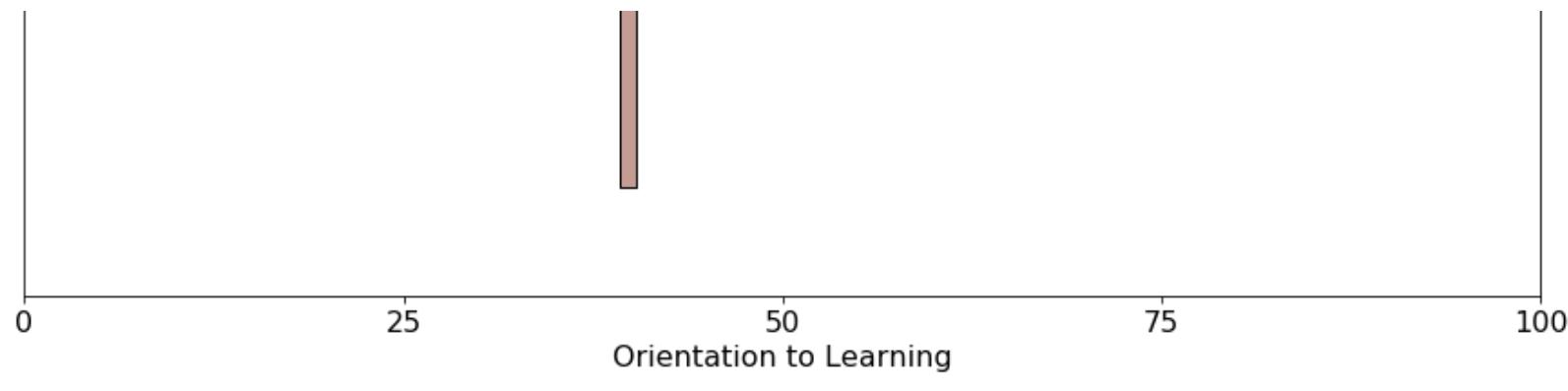


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Chart of Student 540- Measure (2nd Survey)

— 540





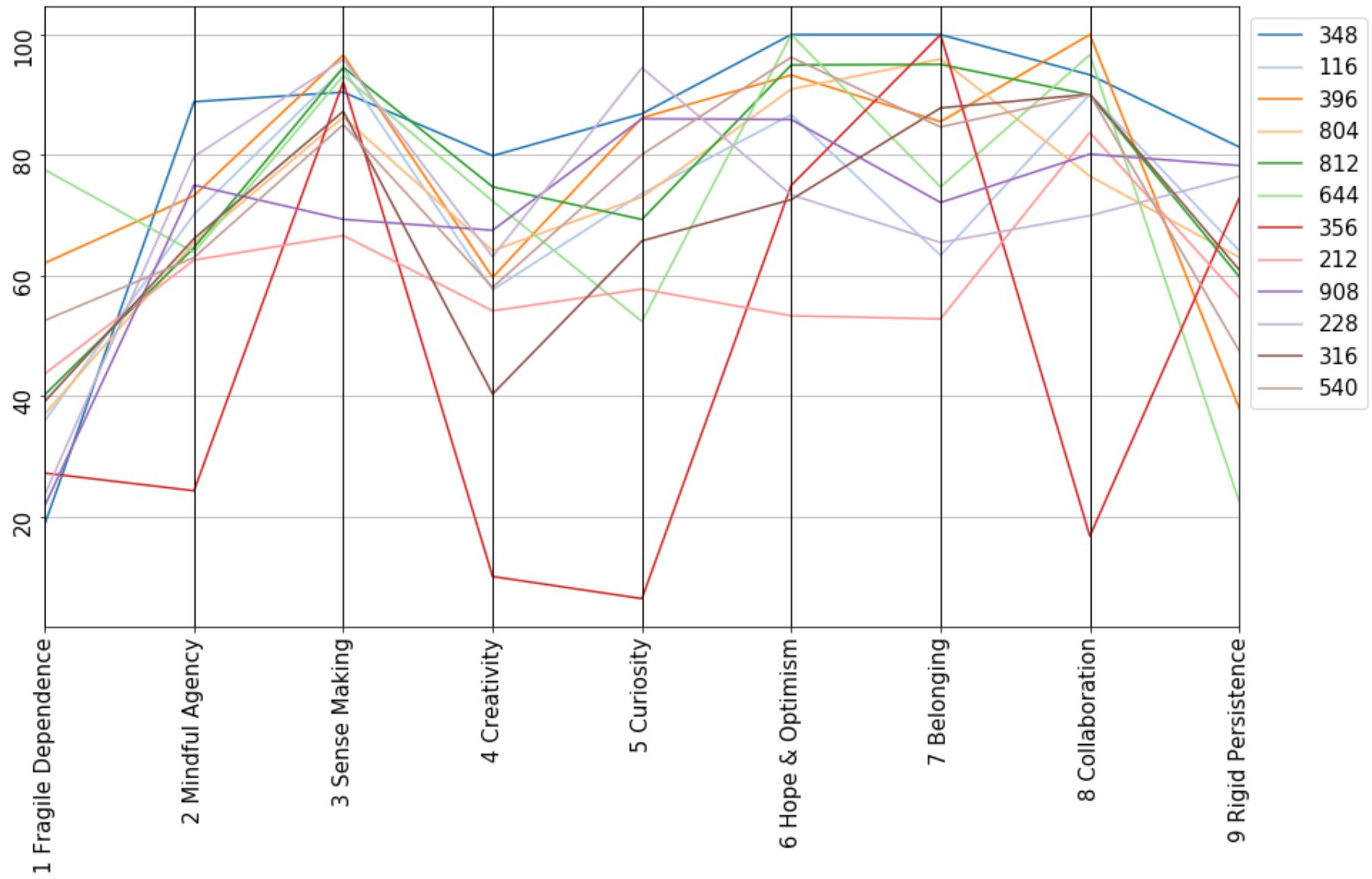
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Parallel Coordinate Charts



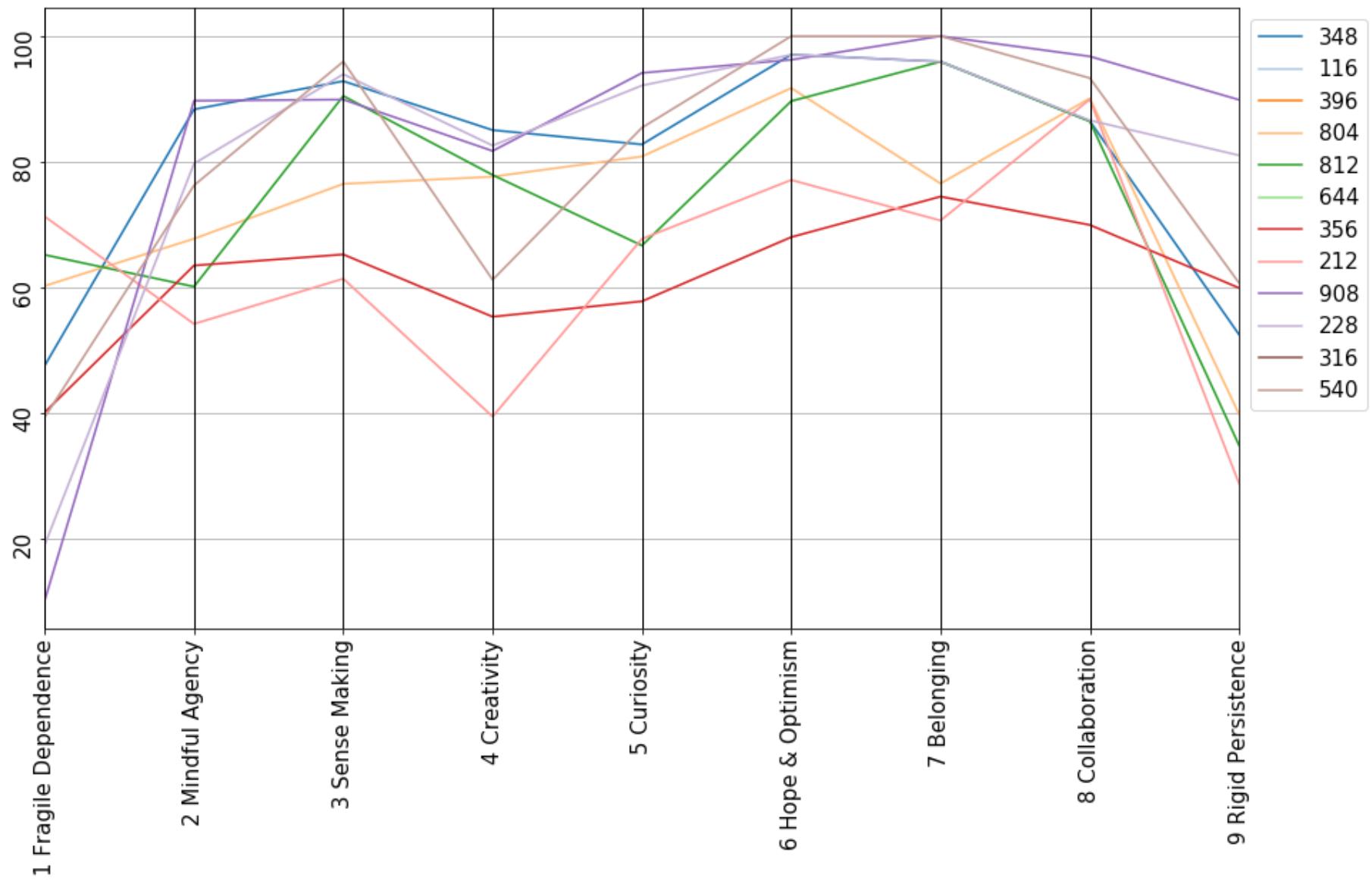
First survey

CLARA Scores - Diagnose Survey (1st)



Second survey

CLARA Scores - Measure Survey (2nd)



Plot the Differences

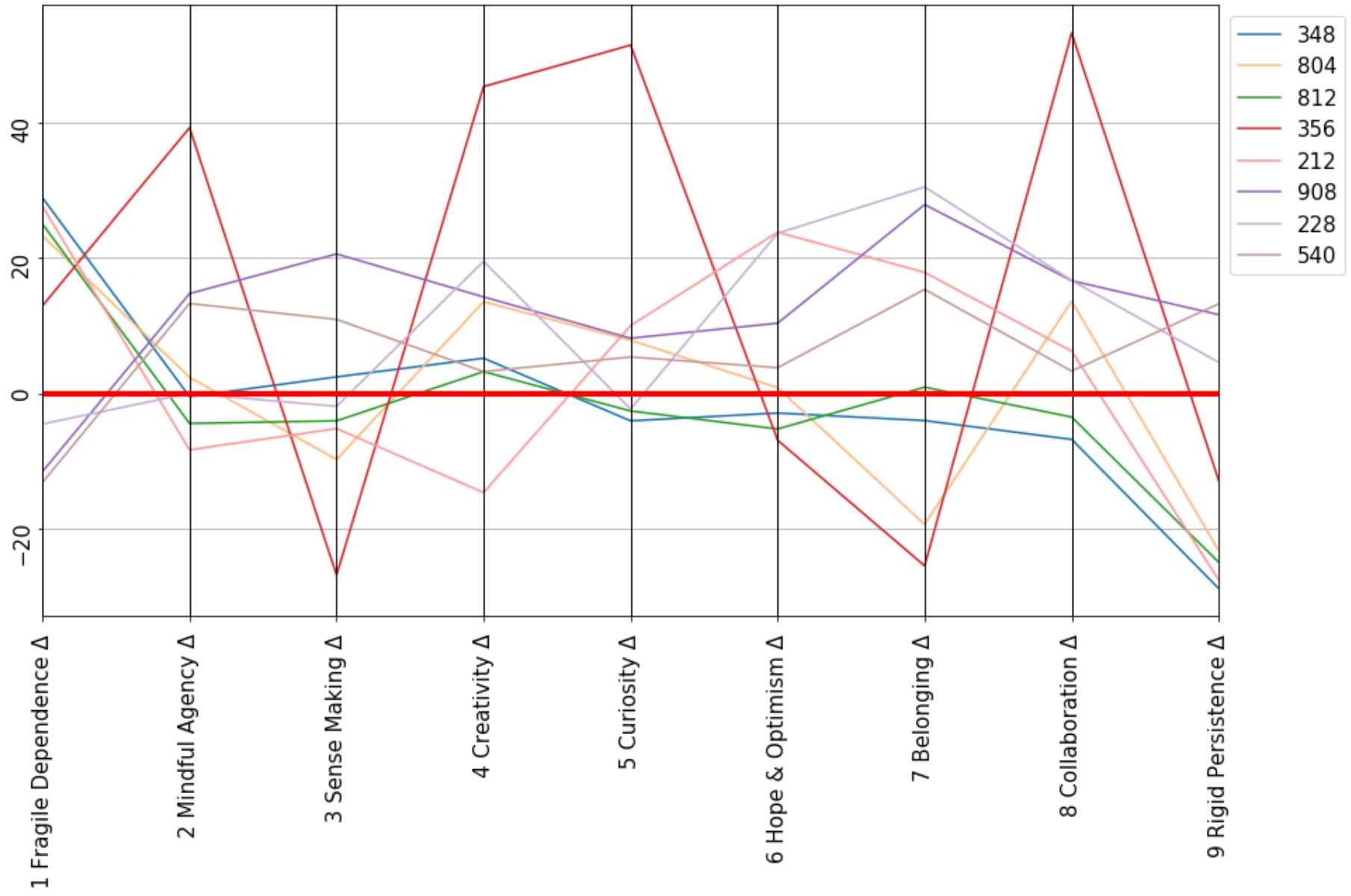
Only interested in the data that has two surveys, this code will remove any records that don't have values prior to analysis



Create Plot for Differences



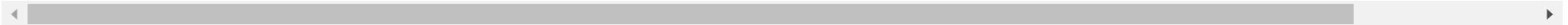
CLARA Scores - Delta (Δ) for Diagnose & Measure



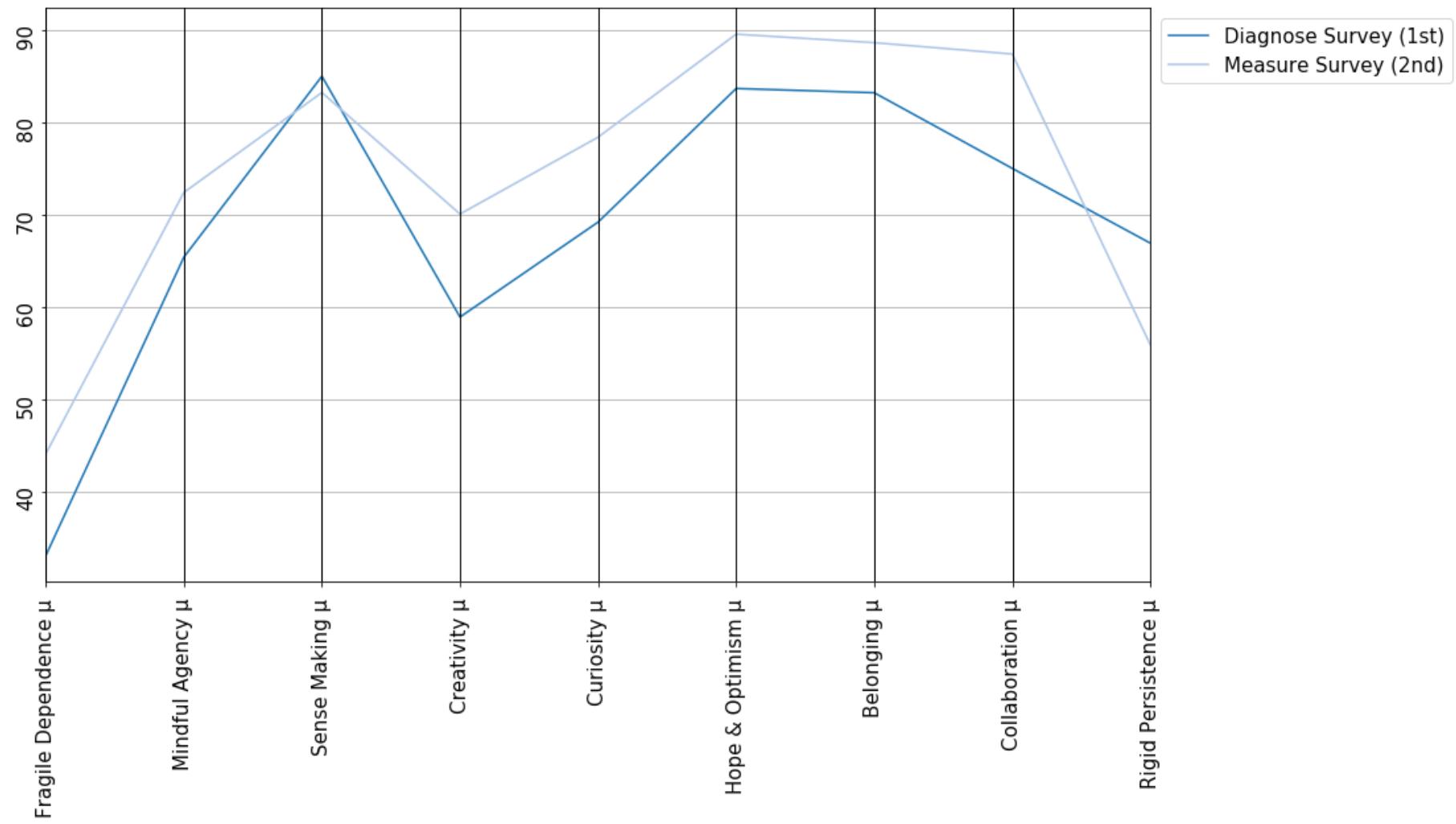
Plot the Means



Parallel Coordinates



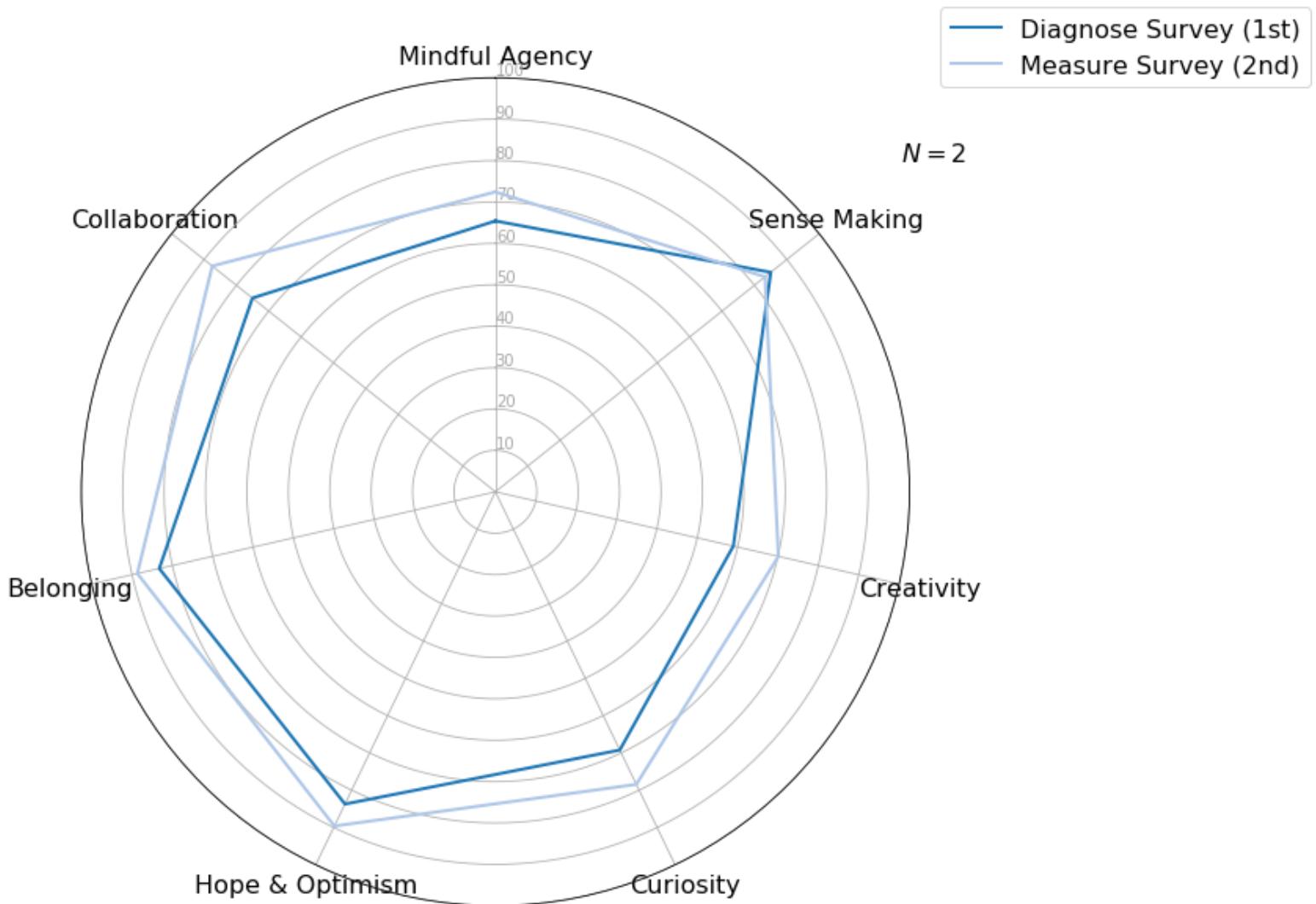
CLARA Scores - Mean (μ) for Diagnose & Measure

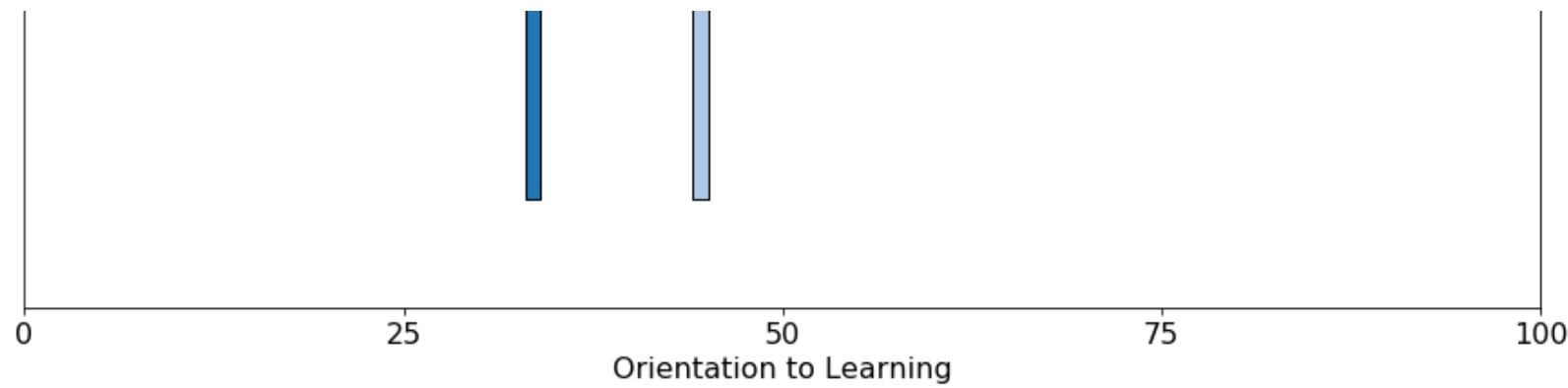


Radar Combined Chart



Learning Power - Mean (μ) for Diagnose & Measure





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Text Based Feedback

This section will look to provide feedback as text.



72% of cohort (i.e. N of TOTAL) show a significant increase in Curiosity pre/post test. 24% of cohort show worryingly low Agency (i.e. <1.5 on the dimension) 87% of the cohort reporting high collaboration are from Etc

Highest scores

This looks to see which student received the most number of highest scores

The list of students with the highest number of dimensions that have positively changed are:

Student: 356 had 4 dimensions with the highest positive change

Student: 228 had 1 dimensions with the highest positive change

Student: 908 had 1 dimensions with the highest positive change

Student: 212 had 1 dimensions with the highest positive change

Student: 348 had 1 dimensions with the highest positive change

Out[67]:

	Student Index	Belonging Difference	Mindful Agency Difference	Sense Making Difference	Creativity Difference	Curiosity Difference	Hope & Optimism Difference	Collaboration Difference	Orientation to Learning Difference
0	348	-4.06	-0.52	2.4	5.16	-4.1	-2.94	-6.84	28.88
1	804	-19.4	2.34	-9.8	13.5	7.82	0.8	13.6	23.26
2	812	0.88	-4.48	-4.1	3.18	-2.64	-5.3	-3.54	25
3	356	-25.54	39.24	-26.9	45.32	51.46	-6.96	53.24	12.92
4	212	17.86	-8.38	-5.24	-14.7	9.98	23.8	6.2	27.62
5	908	27.88	14.72	20.58	14.22	8.12	10.34	16.62	-11.6
6	228	30.48	-0.04	-1.96	19.48	-2.34	23.64	16.66	-4.56
7	540	15.34	13.26	10.9	3.18	5.34	3.76	3.26	-13.2

Lowest scores

This looks to see which student received the most number of lowest scores

Out[68]:

	Student Index	Belonging Difference	Mindful Agency Difference	Sense Making Difference	Creativity Difference	Curiosity Difference	Hope & Optimism Difference	Collaboration Difference	Orientation to Learning Difference
0	348	-4.06	-0.52	2.4	5.16	-4.1	-2.94	-6.84	28.88
1	804	-19.4	2.34	-9.8	13.5	7.82	0.8	13.6	23.26
2	812	0.88	-4.48	-4.1	3.18	-2.64	-5.3	-3.54	25
3	356	-25.54	39.24	-26.9	45.32	51.46	-6.96	53.24	12.92
4	212	17.86	-8.38	-5.24	-14.7	9.98	23.8	6.2	27.62
5	908	27.88	14.72	20.58	14.22	8.12	10.34	16.62	-11.6
6	228	30.48	-0.04	-1.96	19.48	-2.34	23.64	16.66	-4.56
7	540	15.34	13.26	10.9	3.18	5.34	3.76	3.26	-13.2

The list of students with the highest number of dimensions that have negatively changed are:

Student: 356 had 3 dimensions with the highest negative change

Student: 212 had 2 dimensions with the highest negative change

Student: 348 had 2 dimensions with the highest negative change

Student: 540 had 1 dimensions with the highest negative change

Out[70]:

	Student Index	Belonging Difference	Mindful Agency Difference	Sense Making Difference	Creativity Difference	Curiosity Difference	Hope & Optimism Difference	Collaboration Difference	Orientation to Learning Difference
0	348	-4.06	-0.52	2.4	5.16	-4.1	-2.94	-6.84	28.88
1	804	-19.4	2.34	-9.8	13.5	7.82	0.8	13.6	23.26
2	812	0.88	-4.48	-4.1	3.18	-2.64	-5.3	-3.54	25
3	356	-25.54	39.24	-26.9	45.32	51.46	-6.96	53.24	12.92
4	212	17.86	-8.38	-5.24	-14.7	9.98	23.8	6.2	27.62
5	908	27.88	14.72	20.58	14.22	8.12	10.34	16.62	-11.6
6	228	30.48	-0.04	-1.96	19.48	-2.34	23.64	16.66	-4.56
7	540	15.34	13.26	10.9	3.18	5.34	3.76	3.26	-13.2

Out[71]:

	Student Index	Belonging Difference	Mindful Agency Difference	Sense Making Difference	Creativity Difference	Curiosity Difference	Hope & Optimism Difference	Collaboration Difference	Orientation to Learning Difference
0	348.00	-4.06	-0.52	2.40	5.16	-4.10	-2.94	-6.84	28.88
1	804.00	-19.40	2.34	-9.80	13.50	7.82	0.80	13.60	23.26
2	812.00	0.88	-4.48	-4.10	3.18	-2.64	-5.30	-3.54	25.00
3	356.00	-25.54	39.24	-26.90	45.32	51.46	-6.96	53.24	12.92
4	212.00	17.86	-8.38	-5.24	-14.70	9.98	23.80	6.20	27.62
5	908.00	27.88	14.72	20.58	14.22	8.12	10.34	16.62	-11.60
6	228.00	30.48	-0.04	-1.96	19.48	-2.34	23.64	16.66	-4.56
7	540.00	15.34	13.26	10.90	3.18	5.34	3.76	3.26	-13.20

5 Number Summary

These are the summary stats for the two surveys as well as the difference.

Out[72]:

	Mindful Agency	Sense Making	Creativity	Curiosity	Hope & Optimism	Belonging	Collaboration	Orientation to Learning
count	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
mean	66.39	87.64	58.45	69.31	85.19	81.45	81.44	39.92
std	15.47	9.94	18.47	23.46	14.07	15.64	22.09	17.37
min	24.24	66.62	10.00	6.32	53.30	52.78	16.70	18.66
25%	63.62	85.98	56.73	63.74	74.57	70.45	79.25	26.27
50%	65.76	91.29	61.39	73.31	88.82	85.10	90.02	38.02
75%	73.68	94.40	68.72	86.06	95.28	95.28	90.90	45.88
max	88.86	96.60	79.88	94.48	100.00	100.00	100.00	77.56

Out[73]:

	Mindful Agency 2	Sense Making 2	Creativity 2	Curiosity 2	Hope & Optimism 2	Belonging 2	Collaboration 2	Orientation to Learning 2
count	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
mean	72.44	83.28	70.10	78.43	89.61	88.68	87.45	44.10
std	13.13	13.69	16.35	13.03	11.28	12.48	7.96	21.64
min	54.18	61.38	39.42	57.78	68.00	70.64	69.94	10.14
25%	62.64	73.67	59.73	67.45	86.52	76.02	86.47	34.23
50%	71.99	90.19	77.76	81.80	93.99	95.94	88.27	43.82
75%	81.86	93.11	81.94	87.10	97.05	96.95	90.90	61.48
max	89.72	95.96	85.04	94.14	100.00	100.00	96.78	71.28

Out[75]:

	Belonging Difference	Mindful Agency Difference	Sense Making Difference	Creativity Difference	Curiosity Difference	Hope & Optimism Difference	Collaboration Difference	Orientation to Learning Difference
count	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
mean	5.43	7.02	-1.76	11.17	9.21	5.89	12.40	11.04
std	20.94	15.28	14.10	17.25	17.95	12.27	18.71	18.07
min	-25.54	-8.38	-26.90	-14.70	-4.10	-6.96	-6.84	-13.20
25%	-7.90	-1.51	-6.38	3.18	-2.42	-3.53	1.56	-6.32
50%	8.11	1.15	-3.03	9.33	6.58	2.28	9.90	18.09
75%	20.37	13.62	4.53	15.53	8.59	13.67	16.63	25.66
max	30.48	39.24	20.58	45.32	51.46	23.80	53.24	28.88

<https://stackoverflow.com/questions/44635626/rename-result-columns-from-pandas-aggregation-futurewarning-using-a-dict-with>
(<https://stackoverflow.com/questions/44635626/rename-result-columns-from-pandas-aggregation-futurewarning-using-a-dict-with>)

<https://github.com/pandas-dev/pandas/issues/18366> (<https://github.com/pandas-dev/pandas/issues/18366>)

<https://stackoverflow.com/questions/46694207/applying-different-aggregate-functions-to-different-columns-now-that-dict-with>
(<https://stackoverflow.com/questions/46694207/applying-different-aggregate-functions-to-different-columns-now-that-dict-with>)

fix the below with this link

Belonging

The mean of the change was 5.43 with a median of 8.11 and a standard deviation of 20.94
The following students were in the top quartile for a change in the dimension of Belonging

- * 908,
- * 228

The following students were in the bottom quartile for a change in the dimension of Belonging

- * 804,
- * 356

The largest positive change was 30.48 for student 228

The largest negative change was -25.54 for student 356

Mindful Agency

The mean of the change was 7.02 with a median of 1.15 and a standard deviation of 15.28

The following students were in the top quartile for a change in the dimension of Mindful Agency

- * 356,
- * 908

The following students were in the bottom quartile for a change in the dimension of Mindful Agency

- * 812,
- * 212

The largest positive change was 39.24 for student 356

The largest negative change was -8.38 for student 212

Sense Making

The mean of the change was -1.76 with a median of -3.03 and a standard deviation of 14.10

The following students were in the top quartile for a change in the dimension of Sense Making

- * 908,
- * 540

The following students were in the bottom quartile for a change in the dimension of Sense Making

- * 804,
- * 356

The largest positive change was 20.58 for student 908

The largest negative change was -26.90 for student 356

Creativity

The mean of the change was 11.17 with a median of 9.33 and a standard deviation of 17.25

The following students were in the top quartile for a change in the dimension of Creativity

- * 356,
- * 228

The following students were in the bottom quartile for a change in the dimension of Creativity

- * 212,
- * 540

The largest positive change was 45.32 for student 356

The largest negative change was -14.70 for student 212

Curiosity

The mean of the change was 9.21 with a median of 6.58 and a standard deviation of 17.95

The following students were in the top quartile for a change in the dimension of Curiosity

- * 356,
- * 212

The following students were in the bottom quartile for a change in the dimension of Curiosity

- * 348,
- * 812

The largest positive change was 51.46 for student 356

The largest negative change was -4.10 for student 348

Hope and Optimism

The mean of the change was 5.89 with a median of 2.28 and a standard deviation of 12.27

The following students were in the top quartile for a change in the dimension of Hope and Optimism

- * 212,
- * 228

The following students were in the bottom quartile for a change in the dimension of Hope and Optimism

- * 812,
- * 356

The largest positive change was 23.80 for student 212

The largest negative change was -6.96 for student 356

Collaboration

The mean of the change was 12.40 with a median of 9.90 and a standard deviation of 18.71

The following students were in the top quartile for a change in the dimension of Collaboration

- * 356,
- * 228

The following students were in the bottom quartile for a change in the dimension of Collaboration

- * 348,
- * 812

The largest positive change was 53.24 for student 356

The largest negative change was -6.84 for student 348

Orientation to Learning

The mean of the change was 11.04 with a median of 18.09 and a standard deviation of 18.07

The following students were in the top quartile for a change in the dimension of Orientation to Learning

- * 348,
- * 212

The following students were in the bottom quartile for a change in the dimension of Orientation to Learning

* 908,
* 540

The largest positive change was 28.88 for student 348

The largest negative change was -13.20 for student 540

Clustering

The following section clusters the data using KMeans and then plots that in different ways to show the different clusters

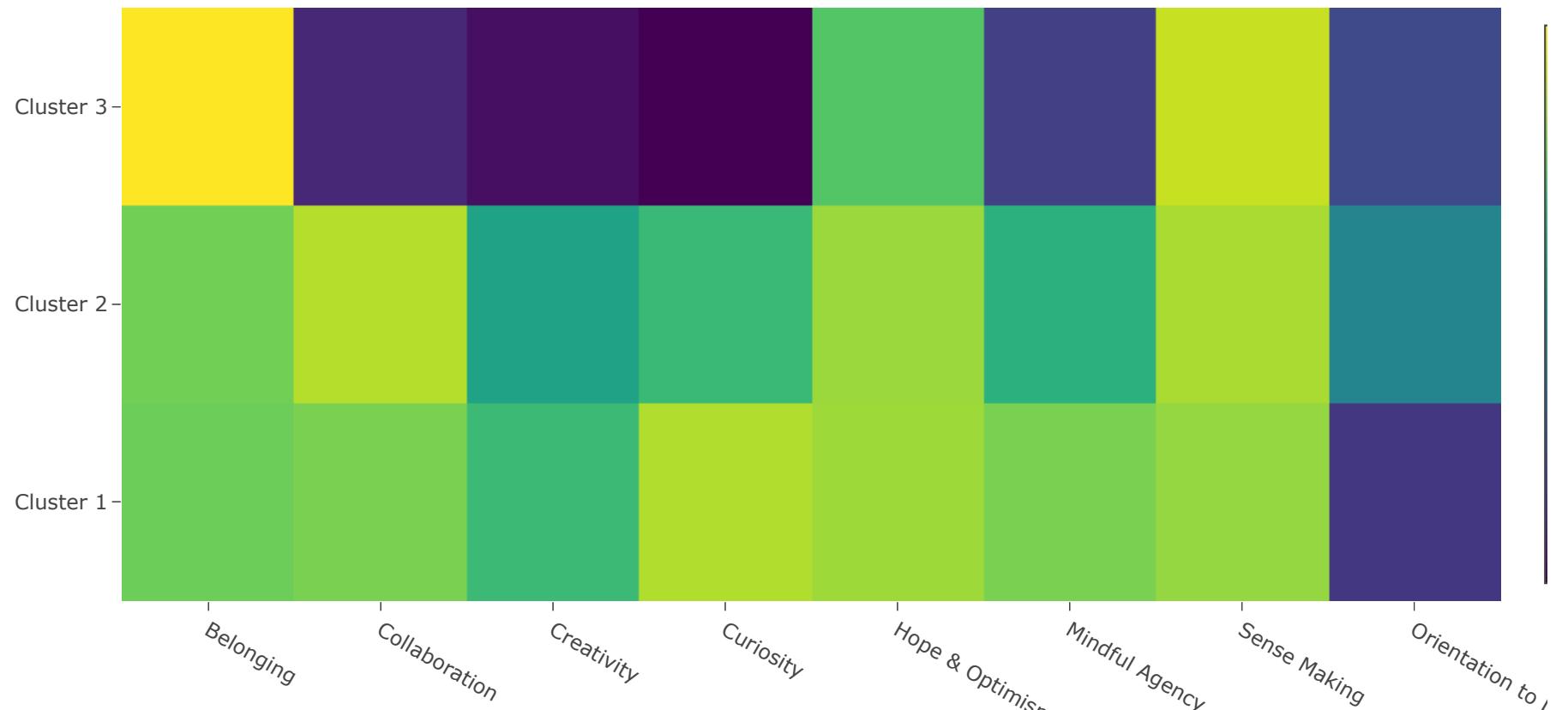
```
the shape before NaNs are dropped  
(12, 8)  
the shape after NaNs are dropped  
(12, 8)
```

	Belonging	Collaboration	Creativity	Curiosity	Hope & Optimism	Mindful Agency	Sense Making	Orientation to Learning	cluster_label			
	0	1	2	3	4	5	6	7	8	9	10	11
0	100.00	93.32	79.88	86.86	100.00	88.86	90.44	18.66	0			
1	63.34	90.10	57.60	73.60	86.70	70.16	94.34	35.86	1			
2	85.54	100.00	59.68	86.18	93.28	73.24	96.60	62.06	1			
3	95.94	76.50	64.12	73.02	90.94	65.40	86.28	36.98	1			
4	95.06	89.98	74.72	69.30	94.96	64.60	94.58	40.18	1			
5	74.70	96.66	72.36	52.36	100.00	63.84	93.18	77.56	1			
6	100.00	16.70	10.00	6.32	74.96	24.24	92.14	27.18	2			
7	52.78	83.74	54.12	57.74	53.30	62.56	66.62	43.66	1			
8	72.12	80.16	67.50	86.02	85.90	75.00	69.32	21.74	0			
9	65.46	69.94	63.10	94.48	73.40	79.74	95.90	23.54	0			
10	87.82	90.10	40.30	65.74	72.60	66.12	87.26	39.06	1			
11	84.66	90.06	58.02	80.08	96.24	62.98	85.06	52.52	1			

Heat Map of Clusters



	Belonging	Collaboration	Creativity	Curiosity	Hope & Optimism	Mindful Agency	Sense Making	Orientation to Learning	
cluster_label	0	1	2	3	4	5	6	7	
0	79.193333	81.1400	70.160	89.1200	86.433333	81.2000	85.22	21.313333	
1	79.980000	89.6425	60.115	69.7525	86.002500	66.1125	87.99	48.485000	
2	100.000000	16.7000	10.000	6.3200	74.960000	24.2400	92.14	27.180000	



	Belonging	Collaboration	Creativity	Curiosity	Hope & Optimism	Mindful Agency	Sense Making	Orientation to Learning
cluster_label								
0	79.193333	81.1400	70.160	89.1200	86.433333	81.2000	85.22	21.313333
1	79.980000	89.6425	60.115	69.7525	86.002500	66.1125	87.99	48.485000
2	100.000000	16.7000	10.000	6.3200	74.960000	24.2400	92.14	27.180000

	Belonging	Collaboration	Creativity	Curiosity	Hope & Optimism	Mindful Agency	Sense Making	Orientation to Learning
cluster_label								
0	3	3	3	3	3	3	3	3
1	8	8	8	8	8	8	8	8
2	1	1	1	1	1	1	1	1

	Belonging	Collaboration	Creativity	Curiosity	Hope & Optimism	Mindful Agency	Sense Making	Orientation to Learning
cluster_label								
0	79.193333	81.1400	70.160	89.1200	86.433333	81.2000	85.22	21.313333
1	79.980000	89.6425	60.115	69.7525	86.002500	66.1125	87.99	48.485000
2	100.000000	16.7000	10.000	6.3200	74.960000	24.2400	92.14	27.180000

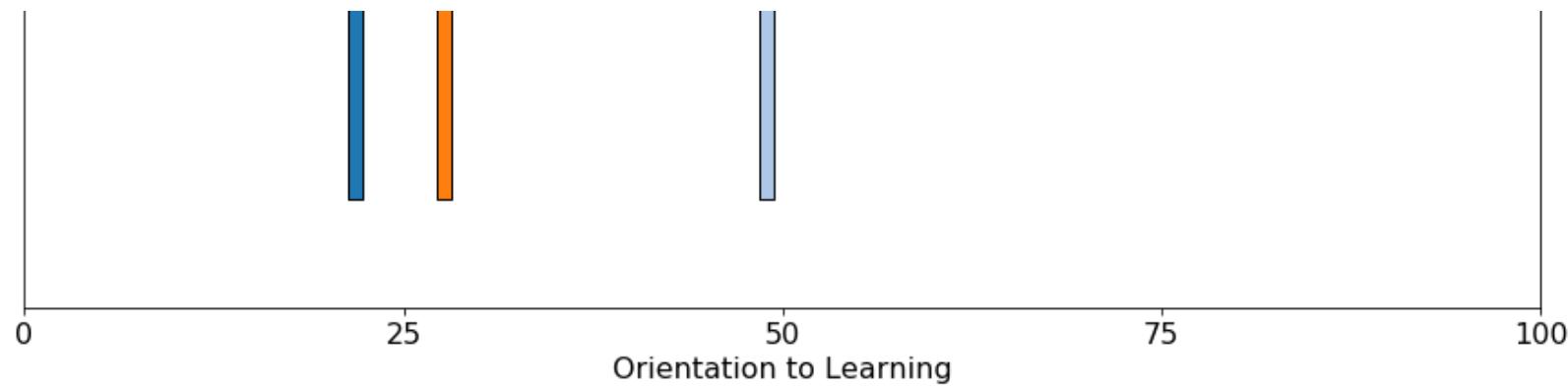
	cluster_label	count	Belonging	Collaboration	Creativity	Curiosity	Hope & Optimism	Mindful Agency	Sense Making	Orientation to Learning
cluster_label										
0	0	3	79.193333	81.1400	70.160	89.1200	86.433333	81.2000	85.22	21.313333
1	1	8	79.980000	89.6425	60.115	69.7525	86.002500	66.1125	87.99	48.485000
2	2	1	100.000000	16.7000	10.000	6.3200	74.960000	24.2400	92.14	27.180000

Cluster Radar Combined Chart



Learning Power - Mean (μ) of the KMeans Clusters





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