

Research Methods

Statistics with SPSS: Scale Development

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Reliability and Validity

Reliability and validity are concepts used to evaluate the quality of the research. They indicate how well a method, technique, or test measures something. Reliability is about the consistency of a measure, and validity is about the accuracy of a measure.

Reliability

The extent to which a measure produces consistent, dependable, and repeatable results under the same conditions.

- Test-Retest Reliability - evaluates how consistent a measure's results are over time.
- Inter-Rater Reliability - measures how consistently two or more independent observers agree when rating, coding, or assessing the same phenomenon.
- Internal Consistency - is the consistency of the measurement itself. Do you get the same results from different parts of a scale that are designed to measure the same thing?

Validity

The extent to which a measure accurately reflects the concept or construct it's intended to measure.

- Content Validity - measures the appropriateness of the content and composition of the scale, given what is being measured?
- Construct Validity - measures the underlying construct that the scale is designed to measure.
- Criterion Validity - measures whether or not the results obtained from the scale can be used to predict something related to the scale.

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Student Satisfaction

- Teaching Quality
- Course Content
- Support and Guidance
- Rooms and Facilities
- Resources

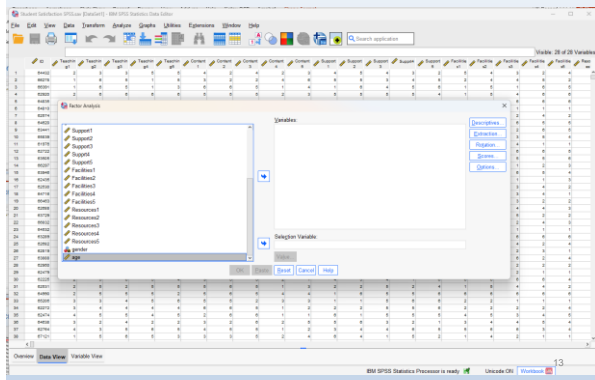
- 6 Extremely satisfied
5 Very satisfied
4 Moderately satisfied
3 Moderately dissatisfied
2 Very dissatisfied
1 Extremely dissatisfied

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Student Satisfaction

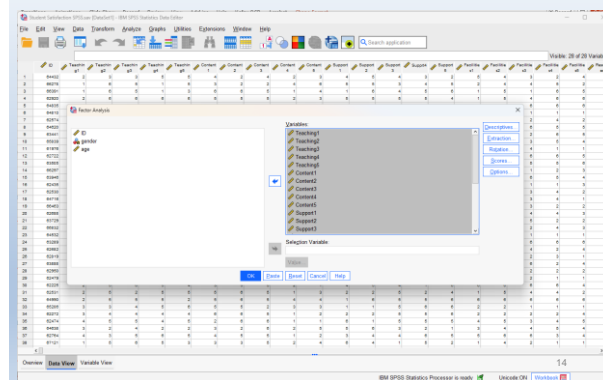
	Teaching	Course Content	Support and Guidance	Rooms and Facilities	Resources
1	5	4	3	2	1
2	4	3	2	1	0
3	3	2	1	0	-1
4	2	1	0	-1	-2
5	1	0	-1	-2	-3
6	0	-1	-2	-3	-4
7	-1	-2	-3	-4	-5
8	-2	-3	-4	-5	-6
9	-3	-4	-5	-6	-7
10	-4	-5	-6	-7	-8
11	-5	-6	-7	-8	-9
12	-6	-7	-8	-9	-10
13	-7	-8	-9	-10	-11
14	-8	-9	-10	-11	-12
15	-9	-10	-11	-12	-13
16	-10	-11	-12	-13	-14
17	-11	-12	-13	-14	-15
18	-12	-13	-14	-15	-16
19</					

Factor Editing Screen



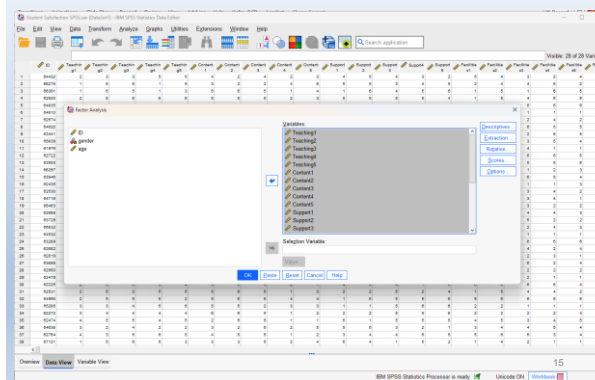
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Factor Editing Screen



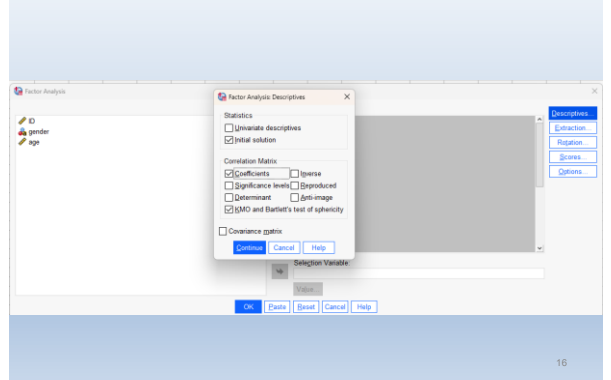
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Factor Editing Screen

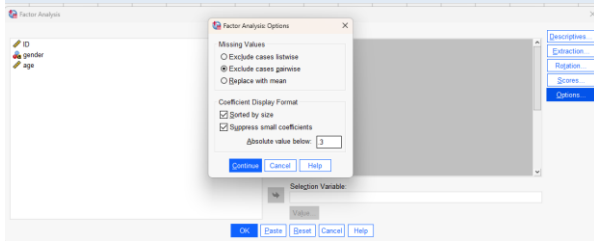


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EFA Editing Screen



Factor Editing Screen



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Results

KMO and Bartlett's Test	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.808
Bartlett's Test of Sphericity	Approx. Chi-Square 2204.278
df	300
Sig.	<.001

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Results

Correlation Matrix	
Comprehension	Teacher1g Teacher2g Teacher3g Teacher4g Teacher5g Commet1g Commet2g Commet3g Commet4g Support1g Support2g Support3g Support4g Support5g Facilitat1g Facilitat2g Facilitat3g Facilitat4g Facilitat5g
Teacher1g	1.000
Teacher2g	.322
Teacher3g	.276
Teacher4g	.302
Teacher5g	.294
Commet1g	.484
Commet2g	.484
Commet3g	.484
Commet4g	.484
Commet5g	.484
Support1g	.484
Support2g	.484
Support3g	.484
Support4g	.484
Support5g	.484
Facilitat1g	.484
Facilitat2g	.484
Facilitat3g	.484
Facilitat4g	.484
Facilitat5g	.484

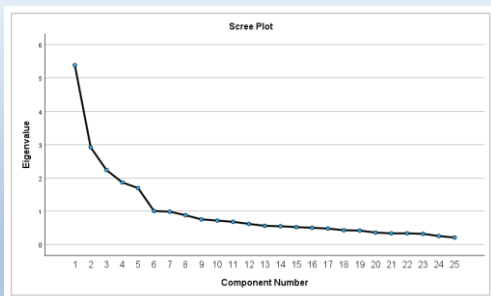
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Results

Total Variance Explained	
Component	Total
1	5.385
2	2.919
3	2.235
4	1.864
5	1.692
6	1.056
7	.895
8	.878
9	.755
10	.718
11	.680
12	.618
13	.581
14	.549
15	.521
16	.502
17	.478
18	.428
19	.417
20	.358
21	.334
22	.334
23	.319
24	.253
25	.208

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Result



Results

	Component				
	1	2	3	4	5
Teaching2	756				
Teaching3	728				
Teaching1	-633				
Teaching5	588				
Teaching4	498				
Resource4	417				
Facilities2	821				
Facilities1	889				
Facilities3	775				
Facilities4	838				
Facilities5	581				
Content1		760			
Content2		753			
Content4		-566			
Content3		651			
Content5		-828			
Resource5			-671		
Resource3			645		
Resource2			-635		
Resource1			617		
Support5				721	
Support3				-679	
Support4				671	
Support1				-638	
Support2				-587	

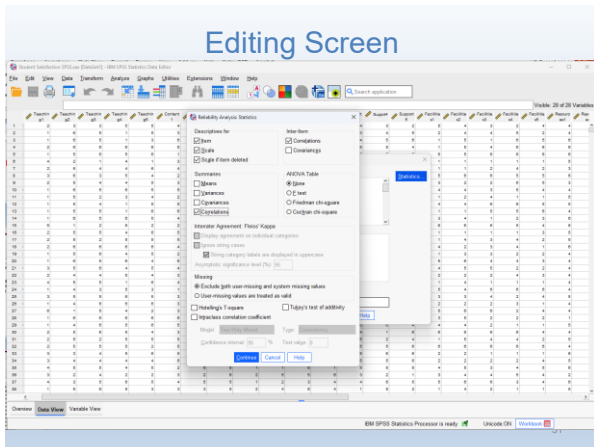
Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.
a. Rotation converged in 28 iterations.

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Results

Total Variance Explained							Rotation Sums of Squared Loadings ^a
Component	Total	Initial Eigenvalues	% of Variance	Cumulative %	Extraction Sums of Squared Loadings	% of Variance	
1	5.385	21.539	21.539	5.385	21.539	21.539	2.952
2	2.919	11.676	33.214	2.919	11.676	33.214	3.375
3	2.235	8.940	42.154	2.235	8.940	42.154	3.257
4	1.864	7.456	49.610	1.864	7.456	49.610	2.344
5	1.692	6.770	56.380	1.692	6.770	56.380	3.713
6	1.086	4.026	60.406				
7	989	3.663	64.348				
8							

Editing Screen



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Results

Reliability Statistics	
Cronbach's Alpha	N of Items
.561	25

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Correlations

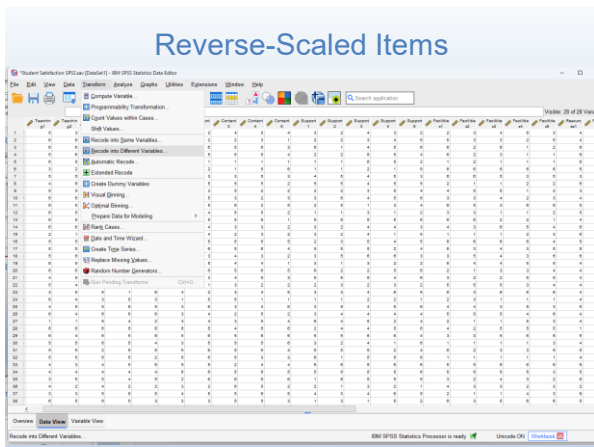
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Reverse-Scaled Items

Teaching 1
Content 4
Content 5
Support 1
Support 2
Facilities 1
Facilities 2
Facilities 3
Facilities 4
Facilities 5
Resources 2
Resources 4
Resources 5

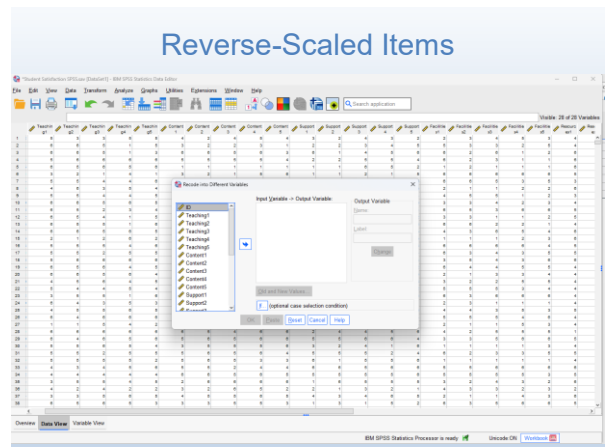
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Reverse-Scaled Items



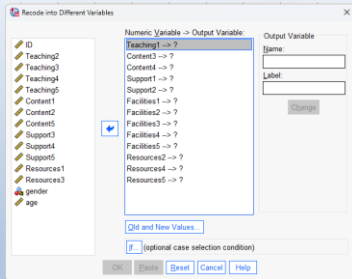
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Reverse-Scaled Items



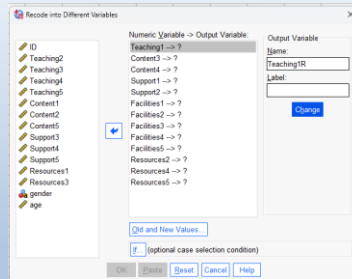
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Reverse-Scaled Items



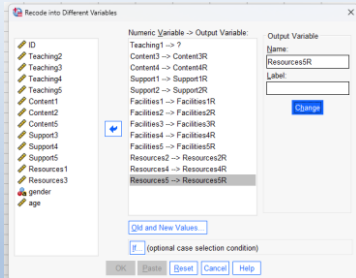
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Reverse-Scaled Items



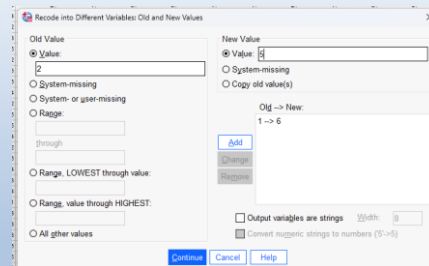
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Reverse-Scaled Items



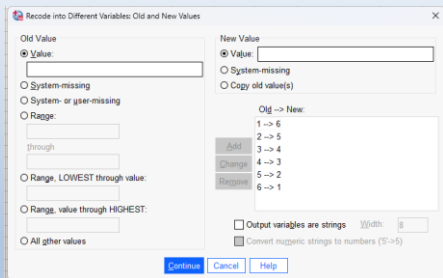
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Reverse-Scaled Items



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Reverse-Scaled Items



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Internal Consistency: Results

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.829	.827	25

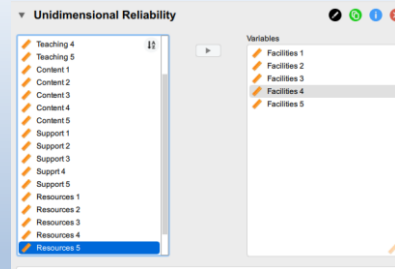
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Internal Consistency: Results

	Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Teaching1	98.85	250.758	.083	.330	.834
Teaching2	98.58	244.003	.283	.416	.826
Teaching3	98.81	237.296	.458	.513	.822
Teaching4	98.62	238.772	.362	.350	.823
Teaching5	98.88	234.125	.509	.472	.818
Content1	98.94	239.607	.417	.462	.822
Content2	98.98	242.405	.303	.410	.826
Content3	99.06	248.800	.151	.270	.831
Content4	98.90	231.033	.551	.547	.816
Content5	99.69	238.445	.595	.478	.817
Support1	99.45	236.650	.342	.339	.824
Support2	99.59	222.708	.627	.589	.811
Support3	99.36	235.819	.426	.489	.821
Support4	99.09	231.634	.484	.516	.818
Support5	98.81	236.583	.454	.395	.828
Facilities1	99.39	232.841	.422	.627	.821
Facilities2	100.04	238.364	.318	.593	.825

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Internal Consistency: Results



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Internal Consistency: Results

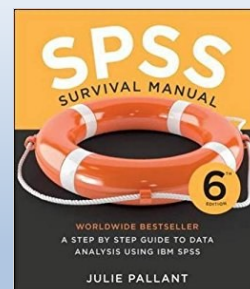
Low Cronbach's alpha

Maybe the underlying model is wrong. Cronbach's Alpha assumes unidimensionality. That could be wrong in your case.

What does EFA tell you?

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Reading



References & Further Reading

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