

## QUESTIONNAIRE EVALUATION WITH FACTOR ANALYSIS: ATTITUDE TOWARDS INCLUSIVE EDUCATION

### Article Particulars

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### Abstract

*This paper focused on the Questionnaire Evaluation with Factor Analysis: Attitude towards Inclusive Education. Factor analysis is by far the most often used multivariate technique of research studies. Factor analysis, thus, seeks to resolve a large set of measured variables in terms of relatively few categories, known as factors. This technique allows the researcher to group variables into factors and the factors so derived may be treated as new variables and their value derived by summing the values of the original variables which have been grouped into the factor. The meaning and name of such new variables is subjectively determined by the researcher. Since the factors happen to be linear combinations of data, the coordinates of each observation or variable is measured to obtain what are called factor loading. Such factor loading represent the correlation between the particular variables and the factor, and are usually place in a matrix of correlations between the variable and the factor. The data were collected using survey method. Simple random sampling technique was used in this study. The number of respondent was 249 students both boys and girls studying in Chennai schools at High school level. After a pilot study item analysis is done for each items, 41 statements were retained out of 50 statements. The tool on a five point rating scale like strongly Agree to strongly Disagree. The statistical technique used was factor analysis. The result showed five new dimensions or factors was successfully constructed using factor analysis.*

**Keywords:** *Factor Analysis, Inclusive Education, KMO and Bartlett's test, Total Variance Explained.*

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### Introduction

Integration and inclusion is an important part of equal opportunity in Educator. Demands for integrated and inclusive classroom have increased and fostered major changes to schooling and education. The diversity of the 21<sup>st</sup> century classroom creates numerous challenges for teachers who may not have known the same diversity themselves as students. Students with special needs are educated along with their peers within the confined community therefore schools are required to adapt to

accommodate adverse group of students with a variety of needs. Approaches to the inclusion into mainstream classroom and the identification and recognition of special education needs, is an integral part of school work. The learning potential of diverse students is just challenging the organization of learning settings in the school.

### **Definition of Attitude**

According to Sorenson (1977) An attitude is a particular feeling about something. It therefore involves a tendency to behave in a certain way in situations which involve that something, whether person, idea or object. It is partially rational and partially emotional and is acquired, not inherent in an individual.

### **Inclusive Education**

Inclusive Education means that all students like students with special needs and general education students attend and are welcomed by their neighborhood schools in age – appropriate, regular classes and are supported to learn, contribute and participate in all aspects of the life of the school.

### **Tool Construction and Validation**

Attitude towards Inclusive Education tool was constructed and validated by the researcher. The researcher constructs the statements after referring some available materials of Attitude towards Inclusive Education related journals, books and theses; acceptance or rejection of each one would imply a different degree of favorable or unfavorable related to tool. The statements were then screened and edited in accordance with guidelines suggested by Likerts and others.

### **Final Tool**

After a pilot study Item analysis is done for each item 41 statements were retained out of 50 for the Attitude towards Inclusive Education scale based on Item total correlation value. The tool on a five point rating scale such as SA- Strongly Agree, A- Agree, NI- No Idea, DA- Disagree, and SDA- Strongly Disagree.

The reliability of Attitude towards Inclusive Education tool was worked out by using Cronbach's Alpha and split half method. The reliability co-efficient is .933 and .865 respectively and which is fairly high and indicates the questionnaire is suitable. The validity for Attitude towards Inclusive Education tool was found to be (.93) which indicates that it has possesses' high validity.

### **Factor Analysis**

Factor analysis (FA) attempts to identify underlying variables, of factors. The explain the pattern of correlations within a set of observed variables. Factor analysis is often used in data reduction to identify a small number of factors that explain most of the variance observed in a much larger number of manifest variables. Factor analysis can

be also be used to generate hypothesis regarding causal mechanisms or to screen variables for subsequent analysis. In short, factor analysis is a mechanism to group the similar variables as a factor.

Table 1

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.907
Bartlett's Test of Sphericity	Approx. Chi-Square	4117.85
	df	820
	Sig.	0.000

**KMO Test:** Test the suitability of Factor Analysis. This measure varies between 0 and 1, and values closer to 1 are better.

### Bartlett Test of Sphericity

Statistical test for overall significance of the correlations within a correlation matrix. Uses Chi Square distribution with  $p(p-1)/2$  d.f., where p is number of variables. Sig. gives the p-value which is .000, less than 0.05 here. Thus there is significant for further analysis.

Table 2

Component	Total Variance Explained								
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	12.359	30.143	30.143	12.359	30.143	30.143	6.03	14.706	14.706
2	1.873	4.568	34.711	1.873	4.568	34.711	4.647	11.333	26.04
3	1.609	3.925	38.635	1.609	3.925	38.635	4.577	11.163	37.202
4	1.491	3.636	42.271	1.491	3.636	42.271	1.781	4.343	41.545
5	1.397	3.408	45.679	1.397	3.408	45.679	1.695	4.135	45.679
6	1.291	3.149	48.828						
7	1.236	3.015	51.844						
8	1.163	2.837	54.681						
9	1.117	2.725	57.406						
10	1.023	2.496	59.902						
11	0.966	2.357	62.259						
12	0.919	2.241	64.5						
13	0.887	2.163	66.663						
14	0.852	2.077	68.74						
15	0.824	2.01	70.75						
16	0.791	1.93	72.68						
17	0.747	1.822	74.502						
18	0.724	1.767	76.269						
19	0.693	1.69	77.959						
20	0.67	1.634	79.593						
21	0.621	1.514	81.107						
22	0.591	1.442	82.55						
23	0.58	1.414	83.964						
24	0.562	1.371	85.335						
25	0.547	1.333	86.669						
26	0.487	1.188	87.857						
27	0.46	1.123	88.98						
28	0.455	1.11	90.089						
29	0.43	1.048	91.138						
30	0.423	1.033	92.17						
31	0.409	0.998	93.168						
32	0.381	0.928	94.096						

33	0.359	0.877	94.973						
34	0.325	0.793	95.766						
35	0.288	0.702	96.468						
36	0.28	0.682	97.15						
37	0.256	0.624	97.774						
38	0.251	0.613	98.387						
39	0.242	0.591	98.978						
40	0.223	0.543	99.521						
41	0.196	0.479	100						

Extraction Method: Principal Component Analysis.

### Total Variance Explained

We used principal component (PC) method of factor analysis. In PC method is called as component. The initial number of factors is the same as the number of variables used in the factor analysis. However, not all 41 factors will be retained. Researcher can choose number of factors or eigenvalue method. In the later method, the number of factors+ number of eigenvalues of correlation matrix more than 1. Initial Eigenvalues are the eigenvalues of correlation matrix. The above table shows that, only ten eigenvalues are more than 1. Also 10 factors explain 59.9% variance, while 11 factors explain 62.26% variance.

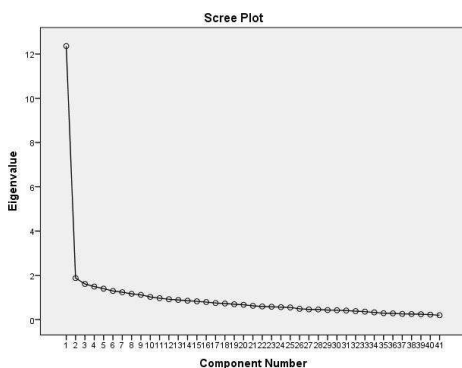
### Extraction Sums of Squared Loadings

The number of rows in this panel of the table correspond to the number of factors retained. The values in this panel of the table are calculated in the same way as the values in the left panel. In some other method, these values may be smaller.

### Rotation Sums of Squared Loading

The matrix of factor loadings is rotated orthogonally using Varimax rotation. Total amount of variance accounted for is redistributed over the five extracted factors. This helps making the factors distinct. The total variance explained of the factors should be more than 60%. Thus, the 5 factors explained 45.68% variance between the factors of homogeneous variables.

Figure – 1



### Scree Plot

This is a plot between the eigen value and the factor number. From the second factor on, seen that the line is almost flat, meaning the each successive factor is accounting for smaller and smaller amounts of the total variance. This plot is called a 'Scree' Plot because it often looks like a 'Scree' slope, where rocks have fallen down and accumulated on the side of a mountain.

Table 3

Rotated Component Matrix <sup>a</sup>					
	Component				
	1	2	3	4	5
AT1	-0.013	-0.054	0.031	0.017	0.75
AT2	0.146	0.116	0.016	0.188	0.607
AT3	0.276	0.031	0.535	0.156	-0.02
AT4	0.259	0.07	0.616	0.014	0.071
AT5	-0.035	0.299	0.21	0.418	-0.434
AT6	0.108	0.13	0.469	0.109	-0.262
AT7	0.034	0.212	0.649	-0.002	0.19
AT8	0.447	0.218	0.204	0.39	-0.049
AT9	0.417	0.184	0.466	-0.018	0.058
AT10	0.392	0.279	0.197	0.004	0.126
AT11	0.493	0.014	0.185	0.248	0.067
AT12	0.738	0.21	0.22	-0.12	-0.014
AT13	0.293	0.271	0.544	-0.064	-0.097
AT14	0.496	0.201	0.431	-0.03	0.031
AT15	0.524	0.326	0.21	-0.029	-0.159
AT16	-0.016	0.312	-0.014	-0.606	-0.04
AT17	0.402	0.141	0.548	-0.188	-0.045
AT18	0.507	0.179	0.359	0.059	-0.028
AT19	0.743	0.298	0.119	0.069	0.079
AT20	0.648	0.135	0.25	0.079	0.14
AT21	0.483	0.35	0.43	-0.068	0.123
AT22	0.253	0.587	0.244	0.001	0.138
AT23	-0.243	0.37	0.261	0.392	0.094
AT24	0.339	0.589	0.104	-0.011	-0.027
AT25	0.079	0.103	-0.082	0.619	0.122
AT26	0.262	0.429	0.252	-0.019	-0.154
AT27	0.476	0.347	0.338	0.008	-0.001
AT28	0.417	0.524	0.133	0.077	0.055
AT29	0.513	0.255	0.184	0.424	-0.25
AT30	0.139	0.611	0.224	0.125	-0.231
AT31	0.213	0.132	0.46	0.21	-0.085
AT32	0.161	0.457	0.486	0.169	0.126
AT33	0.279	0.62	0.071	-0.023	0.081
AT34	0.468	0.33	0.27	0.039	0.048
AT35	0.181	0.436	0.414	-0.118	0.006
AT36	0.351	0.521	0.179	0.161	-0.049
AT37	0.423	0.264	0.392	0.113	-0.159
AT38	0.413	0.28	0.228	-0.054	0.295
AT39	0.335	0.334	0.325	-0.009	0.142
AT40	0.55	0.455	0.057	0.075	-0.01
AT41	0.142	0.409	0.4	0.055	-0.068

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 10 iterations.

## Grouping of Variables into Factors

Select the highest factor loading (0.75) of each variable and group under a factor (Factor 1). Continue the same procedure to group the variables under the factors.

## Naming of Factors

Rotated matrix reveals that variables 8, 10, 11, 12, 14, 15, 18, 19, 20, 21, 27, 29, 34, 37, 38, 39 and 40 under factor 1; variables 16, 22, 24, 26, 28, 30, 33, 35, 36 and 41 are grouped under factor 2; variables 3, 4, 6, 7, 9, 13, 17, 31 and 32 are grouped under factor 3; variables 5, 23 and 25 are grouped under factor 4 and variables 1 and 2 under factor 5. Thus, Factor 1 may be named as Awareness, Factor 2 as Peer Relations, Factor 3 as Academic Support, Factor 4 as Motivations and Factor 5 as Guidance.

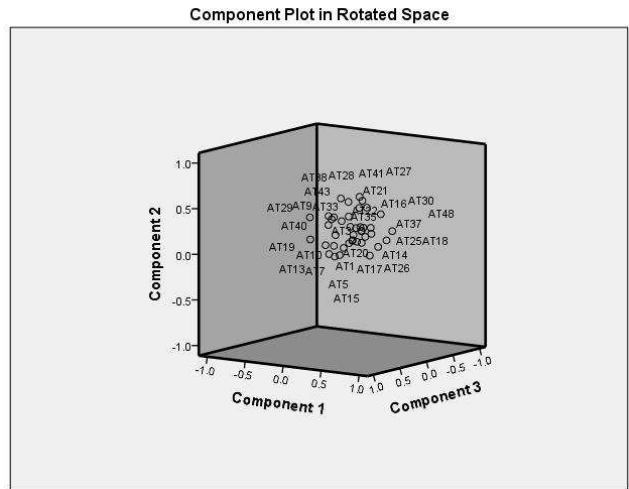


Figure 2

## Conclusion

In this paper an example is given of the use of factor analysis. Nevertheless, a principal component analysis has been carried out with oblique rotation. This resulted in five correlated factors such as Awareness, Peer Relations, Academic Support, Motivations and Guidance, constituting several aspects of Attitude towards Inclusive Education. This can be important for tool construction, as it gives opportunities to improve the quality in constructing a tool effectively.

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