



## EXPLORATORY FACTOR ANALYSIS OF ACADEMIC RESILIENCE SCALE FOR PRE- SERVICE TEACHERS

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### ABSTRACT

*The excessive emphasis on academic achievement on Indian school students puts them at risk of feeling worthlessness and insecurity. Students falling prey to this kind of pressure often go through psychological problems like stress, anxiety and depression. It is thus important to empower students to face setbacks and adversities in life. School students are largely influenced by their teachers. Teachers being role model for their students should be resilient in order that their students can be resilient individuals. Thus it is important to study the academic resilience of future teachers (pre- service teachers). The purpose of the present study was to develop reliable and valid likert type scale to measure academic resilience of pre-service teachers. Intensive review of literature related to academic resilience helped in developing the tool and deciding its dimensions. The content validity of the scale was sought by consulting various experts in the field of education. Based on the recommendations of experts a scale comprising of 56 items was developed. After finding discrimination index, a final draft of academic resilience scale with 43 items emerged. Further in order to determine construct validity of the scale, exploratory factor analysis was performed. In this way, a two factor construct of 32 items explaining 28.466 % variance was obtained. The internal consistency reliability of the scale was found to be 0.91. Hence the present study shows that the academic resilience scale is a valid and reliable tool to study the academic resilience of pre-service teachers.*

**KEY WORDS:** Academic Resilience, Pre-service Teachers, Factor Analysis.

### INTRODUCTION

Educated individuals are expected to collectively lead to social and national development. Thus, in India increasing importance is given to education. But the big question remains whether majority of schools in India strive to achieve the goal of providing education for all around development of students.' In India, schools predominantly focus on facilitating academic achievement of students. The fact that in India there are many students committing suicide after the declaration of results emphasises education that focuses on test scores. The focus upon academic achievement is so intense that a student who is unable to do well in academics starts feeling worthless and insecure. As a result, the cases of depression and stress among young children are on rise. Some students manage to face the challenges and overcome them but many are weak in facing the pressure, stress, poor performance and setbacks in the academic setting. Students who face the challenges are termed as academically resilient students. The number of students overpowered by academic adversities is on rise. Thus, there is a need to study the academic resilience of students.

It is thus important to teach children to face failure, setbacks and adversities. That means it is required that the students develop into resilient individuals. One person who can have a strong and long lasting influence on school students is a teacher. The present as well as future teachers have an important role to play in developing students as resilient individuals.

Teachers are role model for their students. If students are to be equipped to face the real world, it is the need of the hour that the teachers hold all the qualities that their students can emulate them. If students should be academically resilient, it becomes imperative for the teacher to be resilient individuals. Thus there is a need to study academic resilience of pre-service teachers. Academically resilient students are those who succeed in school despite the presence of adversities (Grotberg, 2001).

Academic resilience is defined as students' ability to deal effectively with academic setbacks, stress, and study pressure (Martin and Marsh, 2003). It is the ability of an individual to face adversities in an academic situation and emerge out stronger. According to Martin, academic resilience is the ability to sustain high levels of achievement motivation and performance despite the presence of stressful events and conditions that place pupils at risk of doing poorly and ultimately dropping out of school. Academic resilience is defined as the ability to deal with adversity, stress or pressure in academic settings (Rojas, 2015). Wang, Haertel & Walberg (1994) suggested that academic resilience as the heightened likelihood of success in school despite environment adversities brought about by early traits, conditions, and experiences.

Since psychological characteristics such as academic resilience could depend on the social context, the researcher found it necessary to develop an academic resilience scale suitable to the Indian context. The present paper is aimed at describing the exploratory factor analysis of the academic resilience scale.

#### **AIM OF THE STUDY:**

The aim of this study was to develop reliable and valid likert type scale to measure academic resilience of pre- service teachers.

#### **OBJECTIVES OF THE STUDY:**

- To conduct exploratory factor analysis of the academic resilience scale
- To present the final form of academic resilience scale with reduced set of factors.

#### **Sample:**

The sample of the study comprised of pre-service teachers pursuing second year of the B. Ed. Course from two colleges of education from Mumbai affiliated to University of Mumbai. Data were collected from 94 pre-service teachers who were either graduates or post- graduates from the faculty of Arts/ Commerce/ Science. Of all the students 55 student- teachers were from Arts faculty, 30 from Science faculty and 9 from Commerce faculty.

#### **The Process of Tool Development:**

The following steps describe the development of items of the scale and establishment of content validity:

The first step included writing a definition of academic resilience. After that, initially an extensive review of literature was conducted on academic resilience and tools measuring it. This helped in constructing statements pertaining to each dimensions of the scale. The initial draft of the scale comprised of 48 statements with five options covering all the dimensions of academic resilience. In order to establish face and content validity 8 Experts from the field of education were approached with preliminary draft of the scale. After incorporating recommendations given by expert, a provisional draft of 56 statements was developed. The academic resilience scale was tried out preliminarily on 48 student-teachers for conducting the item analysis. After finding the discrimination index, 43 statements were a part of the revised draft of the academic resilience scale. The Academic Resilience Scale comprising of 43 items was administered to the pre- service teachers. Responses to the scale were on a likert type scale ranging from not true at all=1, rarely true= 2, sometimes true= 3, often true= 4 and always true= 5 for positively worded statements and in reverse order for the negatively worded statements. There were 32 positively worded and 11 negatively worded statements.

**Procedure:**

Participants were requested to complete the Academic Resilience Scale by answering all the statements in the tool.

**Factor Analysis:**

To begin with, the factorability of the variables was examined to study the suitability of the data for factor analysis. The following well established criteria for the factorability of the correlation were used:

- To determine the inter- dependency of the sub scales, Bartlett test of sphericity was used.
- KMO (Kaiser- Meyer Olkin measure of sample adequacy) was used to examine the sample sufficiency.
- Examining the communalities

Table 1 shows the results of KMO and Bartlett’s test.

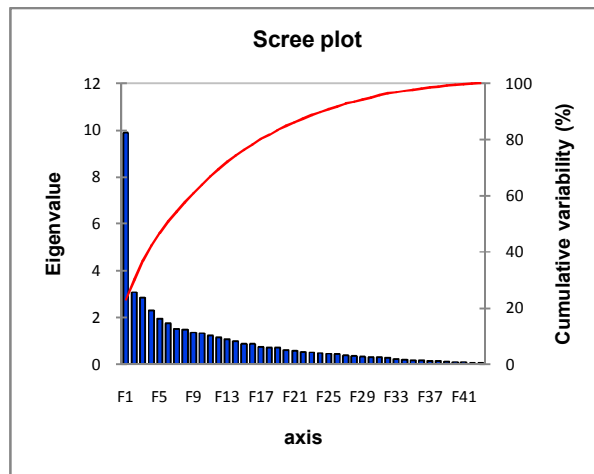
**Table 1 : KMO AND BARTLETT’S TEST**

Sr. No	Test	Values
1	Kaiser- Meyer Olkin measure of sampling adequacy	0.689
2	Bartlett’s sphericity test	
	Chi square (observed value)	2072.298
	Chi square (critical value)	834.254
	df	903
	P value	<0.0001
3	Communalities between the variables and factors	All above 0.4

As can be seen from table 1 that the observed value of KMO is 0.689 which is higher than the commonly recommended value Of 0.5 that is suitable for factor analysis. It should be noted that the Bartlett’s test of sphericity was significant. The communalities further confirmed that there exist some common variances within the variables. Thus all the above pointers indicated that factor analysis was suitable for this 43 item Academic Resilience scale.

Principal Component Analysis was used with the primary objective of reducing large number of variables into a smaller set of variables and to provide construct validity to the self reporting measure of academic resilience.

**Figure 1 shows a scree plot of Eigen values plotted against the factor numbers.**



Initially the criteria of Eigen value > 1 was used to determine the number of factors. Based on this criteria, the initial factor pattern generated was of 14 factors.

The researchers suggest using multiple approaches for factor extraction. Thus another consideration when deciding the number of factors is to find whether a variable might relate to more than one factor. Rotation techniques is helpful in this matter as it maximises high item loadings and minimises low item loadings, therefore producing a more interpretable and simplified solution. Thus varimax rotation was used to produce unrelated factors. It further helped to confirm the scale's construct validity. The result of factors extracted through rotation and variance explained are presented in table 2.

**Table 2: Factors extracted and its variance explained**

	D1	D2
Variability (%)	18.460	10.006
Cumulative %	18.460	28.466

As can be seen from the above table, two factors with 28.47% variance were obtained. The first factor explained 18.46% variance with factor loadings ranging from 0.443 to 0.674. Second factor showed 10.01 % variance with factor loading ranging from 0.402 to 0.636.

A total of 11 items were eliminated as they failed to meet the criteria of having a minimum factor loading of 0.4 and above. In this way, a two factor construct of 32 items explaining 28.466 % variance was obtained. The factor loadings after varimax rotation for both the factors are given in the table 3.

**Table 3 : Result of factor analysis**

Item No.	Scale Items	M	SD	Factor I	FactorII
1	I am confident about achieving my academic goals.	4.19	0.99	0.47	
2	Belief in myself helps me overcome academic challenges.	4.22	0.89	0.65	
3	I think I am good at dealing with academic work pressure.	3.80	1.01	0.58	
5	When things are tough academically, I focus and work hard towards the goal.	4.26	.93	0.60	
6	I draw strength from having overcome previous academic challenges and tough experiences.	4.05	.93	0.65	
8	I put my best efforts in studies no matter what difficulties come my way.	3.98	1.08	0.50	
9	I am determined to do well in my academic.	4.25	0.94	0.51	
12	I am good at dealing with setbacks at college (low grade, unsatisfactory academic performance, negative feedback, etc.)	3.17	1.13	0.45	
13	I know that I succeed academically, if I persist with my efforts.	4.32	0.83	0.65	
14	I am realistically optimistic about my	3.84	1.03	0.65	

	academic plans / goals.				
17	I view academic failure as an opportunity to learn.	3.55	1.10	0.63	
27	I believe that overcoming academic adversities and challenges make my life more meaningful.	4.19	0.93	0.52	
30	I channelize and spend my energy working towards making the changes that are within my power and reach.	3.94	0.95	0.60	
33	I have a fairly good idea of what lies within my control and what is beyond my control when it comes to academic success.	3.99	0.91	0.443	
35	I am able to stand up to group or peer pressures.	3.43	1.26	0.469	
37	I consider it important to be flexible during difficult circumstances.	4.03	1.04	0.47	
38	I am able to interact with teachers to complete my assignments effectively.	3.85	1.07	0.48	
39	I tend to blame my fate for my academic performance.	4.16	0.98	0.49	
40	I take responsibility for my actions, whether those actions are good or bad.	4.09	1.03	0.65	
41	I hold myself accountable for my academic success or failure.	4.14	0.93	0.67	
42	I believe that academic success is a matter of hard work; luck has little or no role to play.	4.16	1.04	0.52	
43	I believe in preparing myself thoroughly for all the academic events (tests, presentations, assignments, events, etc.) in order to do well rather than leaving things to fate.	4.33	0.93	0.59	
	<b>FACTOR 2</b>				
18	My peers in college support me when I face hurdles in my academic performance.	4.05	0.96		0.63
19	I rarely have someone to help me when I am in need of academic help.	3.82	1.20		0.44
20	I have friends that offer vitally important resources such as affection, advice, affirmation and practical assistance.	4.33	0.82		0.55
21	My family provide me with the necessary support to build my strength.	4.44	0.84		0.40
22	My friends encourage me to push through trials and overcome academic setbacks.	4.25	0.91		0.64
24	My institution works to foster close relationship between teachers and students.	4.19	1.06		0.52
25	My teachers are considerate of my academic problems and concerns.	4.14	0.88		0.59
26	I feel that I am a valuable member of my	4.09	0.96		0.62

	institution.				
34	It is difficult for me to establish friendship among peers.	4.07	1.10		0.427
36	I can easily garner support from friends or peer group members.	3.85	0.98		0.569
	<b>Cronbach's <math>\alpha</math> (%)</b>			<b>0.91</b>	<b>0.76</b>
	<b>Variance Explained (%)</b>			<b>18.46</b>	<b>10.01</b>
	<b>Total Variance Explained (%)</b>				<b>28.47</b>

Each factor was labelled in accordance with the items under that construct. The first factor was labelled as self-efficacy. It comprised of items related to self- determination, confidence in academic qualities, disposition to expect positive outcomes and belief in one's ability to influence outcomes in life. This factor consists of 22 items with factor loadings ranging from 0.4 to 0.6 and total variance at 18.46 %.

The items from second factor are related to the support and encouragement received from family, friends and members of educational institute as well as the ability to achieve personal goals in social interaction. Thus this factor was labelled as Social support and Social competence. This factor comprises of 10 items with factor loadings ranging from 0.4 to 0.6 with 10.01 % variance.

**Reliability of the Tool:** In order to determine the reliability of the entire tool as well as its factors (dimensions), Cronbach alpha reliability coefficients was calculated. The value of Cronbach's alpha for the whole scale was 0.91 and for factor 1 and factor 2 was 0.91 and 0.76 respectively. The internal consistency reliability was quite high to testify the consistency of the academic resilience scale. Therefore, it can be said that the items in the scale are consistent with each other and measure same property. In other words, the scale is a reliable and valid measurement tool.

### CONCLUSIONS AND DISCUSSION:

A two factor structure for 32 out of 43 items for the Academic Resilience scale was seen from the Principal Component Exploratory Factor Analysis with Varimax Rotation.

- The internal consistency reliability of the entire scale was found to be quite high at 0.91 whereas the reliability coefficients of its subscales were 0.91 for factor 1 and 0.76 for factor 2 which is satisfactory too.
- The tool can further be strengthened by:
  - Revising items with lower factor loadings
  - Adding new items in factor 2 as its items are only 10 as compared to 22 in factor 1.
  - Strengthening the internal consistency of factor 2 as its low compared to factor 1 and the whole scale.
- The two- factor Academic Resilience scale developed can be used by the researchers to conduct quantitative as well as mixed methods study. It can be used to study academic resilience of college and school students with required modifications.
- A Confirmatory Factor Analysis can be conducted by further studies to test its factor structure.
- A study can also be conducted to find out whether the factor structure is invariant across sub- samples in terms of gender, socio-economic status, academic achievement, etc.

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