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## DEVELOPMENT AND VALIDATION OF ACADEMIC ENGAGEMENT SCALE FOR ADOLESCENTS

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### ABSTRACT

The role of engagement in understanding students' educational trajectories and outcomes emerged as a topic of interest and importance in recent decades. Academic Engagement is an emerging focus of academics in the present era in understanding students' educational trajectories and outcomes. The broad spectrum of academic engagement comprised of three major dimensions viz., Behavioural Engagement, Emotional Engagement and Cognitive Engagement (Skinner and Pitzer, 2012). The present study was envisaged to develop a valid and reliable scale to assess the academic engagement among adolescents. The items were pooled in from various sources and were subjected to statistical procedures of face validity, content validity, construct validity, factor analysis and reliability and internal consistency. The final version of Academic Engagement Scale (AES) consisted of 72 items. This questionnaire was then administered to 400 high school students to test the reliability and validity. The tool has been emerged as a highly reliable with 0.864 on Spearman-Brown and 0.864 Guttman Spilt –half co-efficient and valid scale.

**Key words:** Adolescents, Academic Engagement, Behavioural Engagement, Emotional Engagement and Cognitive Engagement.

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### INTRODUCTION

In the present education system the assessment of academic engagement has emerged as a topic of interest and importance. Academic Engagement is comparatively a new concept in the field of academic research. Academic engagement refers to the extent of a student's active involvement in a learning activity (Wellborn, 1991). The students' level, type, and frequency of engagement in academics has been shown to impact several educational outcomes, including retention and persistence (Pascarella and Terenzini, 2005; Horstmanshof and Zimitat, 2007), as well as "growth in academic competence" (Reasons, Terenzini & Domingo, 2006).

Skinner and Pitzer (2012) states conceptualization of engagement includes three major dimensions: Behavioural engagement, Emotional engagement and Cognitive engagement. Students' involvement in all the three components of academic engagement is essential. In view of the above discussion, the present study was focused to develop and validate a scale to assess academic engagement of adolescents.

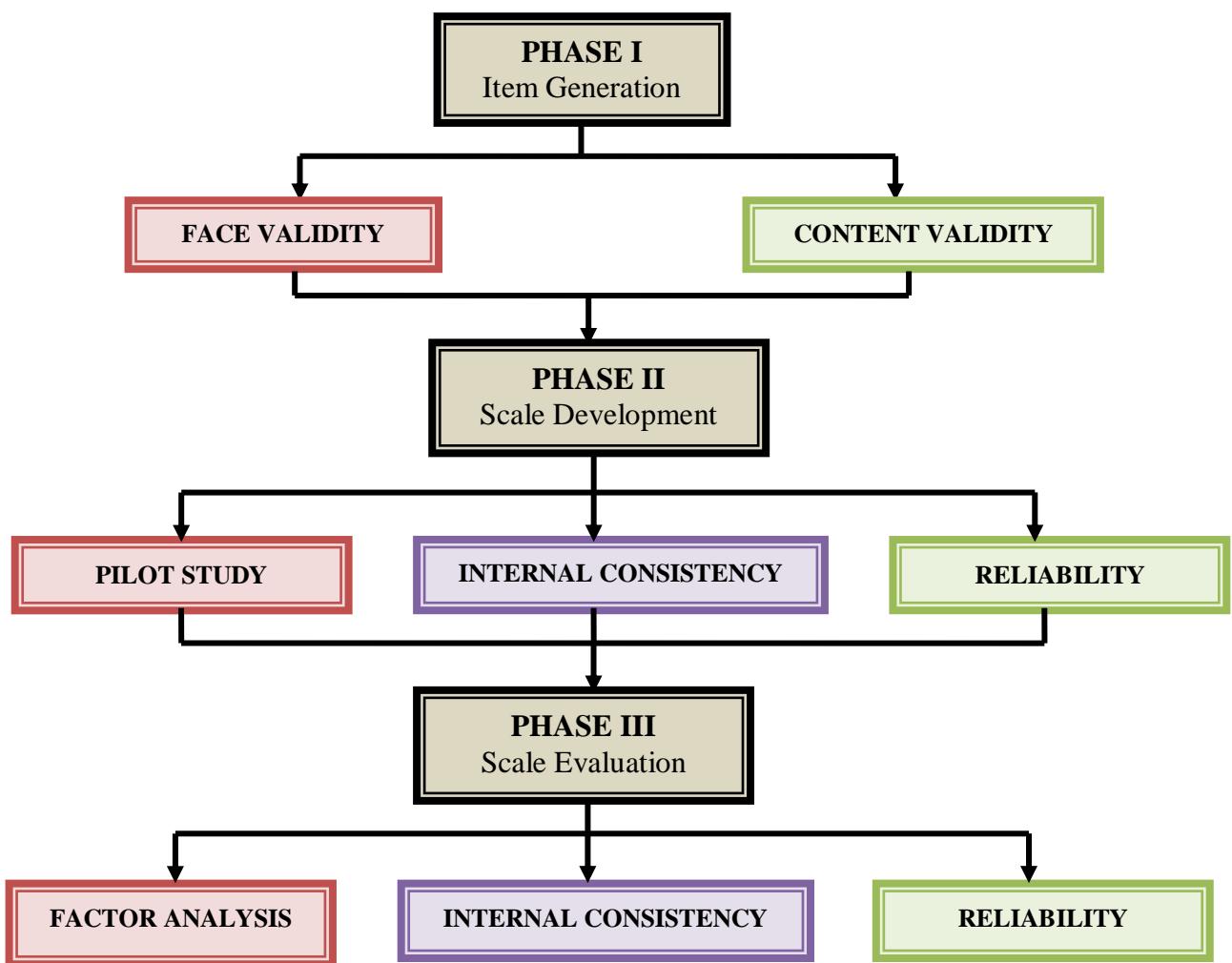
### Materials and Methods :

#### a. Sample:

The study sample consisted of 400 students studying in 8<sup>th</sup> and 9<sup>th</sup> standard in schools catering to the state syllabus located in Bangalore city. The sample for the present study was selected though simple random sampling technique.

#### b. Procedure:

The steps followed for development and standardization of the tools are depicted in the flowchart presented below:



## RESULTS AND DISCUSSION

### Phase I: Item Generation

The items were generated from the review of literature related to Academic Engagement; online tests on academic engagement, questionnaire on individual dimensions, online sources; books related to children. The statements were formulated to understand the level of Academic Engagement among the respondents. Hence, a total of 250 statements were pooled for the dimensions of academic engagement, that covered both positive and negative questions (Refer table 1).

**Table 1: Items selected from various Sources for Face Validity**

Sources	No. of items	Percentage
<b>Previous literature</b>		
Thesis	30	12
Peer reviewed journals	30	12
<b>Books</b>		
Adolescent related books	25	10

Magazines	15	06
<b>Internet sources</b>		
Online questionnaire	40	16
Online library	40	16
Online journals	40	16
<b>Others</b>	30	12
<b>Total</b>	<b>250</b>	<b>100</b>

### i. Face Validity

The face validity is determined by a review of the items. It is the degree to which a measure appears to be related to a specific construct and subjective judgment on the operationalization of a construct. The researcher and the research guide glided down the surface in order to form an opinion whether it looks like a good translation of the construct. The suitable statements were picked, and 105 statements were retained.

### ii. Content Validity

Content validity is defined as “the degree to which items in an instrument reflect the content universe to which the instrument will be generalized” (Straub, Boudreau et al. 2004). It involves evaluation of a new survey instrument in order to ensure that it includes all the items that are essential and eliminates undesirable items to a particular construct domain (Lewis et al., 1995, Boudreau et al., 2001).

The pool of statements finalized in face validity was given to the subject experts in the disciplines of Human Development, Psychology, Education and School teachers (10 subject experts) to identify and select the most relevant statements (at the rate of 1-10 scoring) for the tool to establish the content validity.

The result obtained from the content analysis was quantified. The items which obtained more than eight ratings were identified. Thus, a total of 72 statements were retained. (Refer table 2).

**Table 2: Content Validity of Ten Subject Experts for Developing AES**

Description	Number of Items	Percentage
Number of items screened at face validity	250	100.0
Number of items evaluated by subject experts	105	42
Number of items retained	72	28.8
Number of items considered for pilot study	72	28.8

## Phase II: Scale Development

### i. Pilot study

Pilot studies are small-scale, preliminary studies which aim to investigate whether crucial components of a main study – usually a randomized controlled trial (RCT) – will be feasible.

According to Connelly (2008), extant literature suggests that a pilot study sample should be 10% of the sample projected for the larger parent study. For the present study, a sample of 40 students studying in 8<sup>th</sup> and 9<sup>th</sup> standard in Bengaluru city was randomly selected for conducting the pilot

study. The data obtained were subjected to statistical analysis to check internal consistency and reliability.

### **ii. Internal Consistency**

Internal consistency reflects the extent to which items within an instrument measure various aspects of the same characteristic or construct. If the internal consistency is high, that shows the measure of the construct is reliable (Jack and Clarke ,1998).

The internal consistency of the AES was assessed through Cronbach's alpha coefficient. The scale obtained Cronbach's Alpha of **0.928**, indicating high Internal Consistency.

### **iii. Reliability**

It refers to the amount of variance attributable to the true score of the latent construct. Reliability refers to the repeatability, stability or consistency of a tool. Reliability is a necessary pre-condition for validity (Bryman , Cramer, 1997).

The Spearman-Brown Spilt –half and Guttman Spilt –half co-efficient methods were used to assess the reliability of the instrument for the present study. The AES obtained 0.864 on Spearman-Brown and 0.864 Guttman Spilt –half co-efficient indicating high reliability of the scale.

## **Phase III: Scale Evaluation**

After assessing the reliability and internal consistency of the AES based on Pilot study results, it was administered to the larger sample. Again, the scale was evaluated through factor analysis, reliability, and internal consistency based on the results obtained from a large scale study.

### **i. Factor Analysis**

The purpose of an exploratory factor analysis is to analyse scores on several items to see if they can be reduced to underlying dimensions. For the present study, exploratory factor analysis was conducted on the data obtained by the respondents.

The exploratory factor analysis was conducted for 72 items using SPSS 20.0. A Principal Component Analysis of 72 Likert scale statements from Academic Engagement Scale was conducted on data gathered from 400 participants. Bartlett's test was administered, and the results are as follows:

An examination of Kaiser-Meyer-Olkin (KMO) suggested (Refer table 4) that the sample was factorable (**KMO = 0.953**).

The results of the factor analysis on AES are as follows; there were totally 9 factors namely; 1. Behavioural Engagement-Initiation, 2. Behavioural Engagement-Ongoing participation, 3. Behavioural Engagement-Reengagement, 4. Emotional Engagement-Initiation, 5. Emotional Engagement-Ongoing participation, 6. Emotional Engagement –Reengagement, 7. Cognitive Engagement-Initiation, 8. Cognitive Engagement-Ongoing participation, and 9. Cognitive Engagement-Reengagement with a total of 72 items.

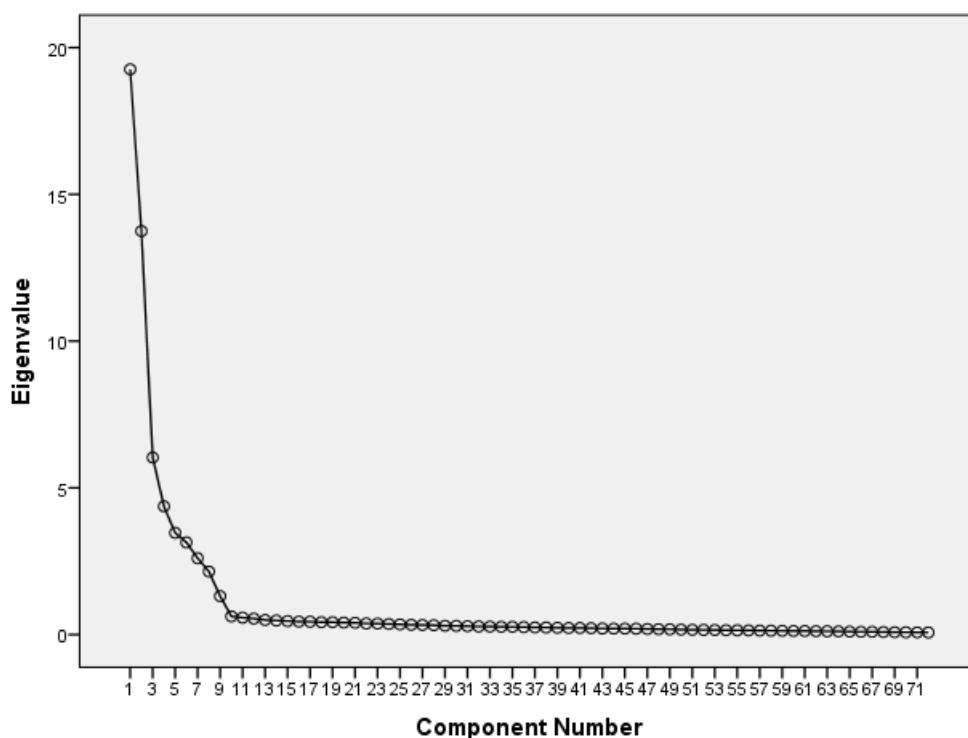
**Table 3:**  
**Explorative Factor analysis: Extraction and Rotation Sums of Squared Loadings**

Components	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings (Varimax)		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	19.32	26.83	26.83	19.32	26.83	26.83	7.23	10.04	10.04
2	14.00	19.45	46.28	14.00	19.45	46.28	6.92	9.61	19.65
3	6.03	8.38	54.66	6.03	8.38	54.66	6.74	9.36	29.01
4	4.37	6.06	60.72	4.37	6.06	60.72	6.67	9.26	38.27
5	3.49	4.85	65.57	3.49	4.85	65.57	6.27	8.70	46.97
6	3.14	4.36	69.93	3.14	4.36	69.93	6.20	8.61	55.57
7	2.59	3.60	73.53	2.59	3.60	73.53	6.11	8.49	64.06
8	2.15	2.99	76.52	2.15	2.99	76.52	5.82	8.08	72.14
9	1.42	1.97	78.49	1.42	1.97	78.49	4.57	6.34	78.49

The Total Variance Explained table determines the number of significant factors. The factors are arranged in the descending order based on the most explained variance. The Extraction Sums of Squared Loadings is identical to the Initial Eigen values except the values which had less than 1 Eigen value. These columns show the Eigen values and variance prior to rotation. The Rotation Sums of Squared Loadings show the Eigen values and variance after rotation. Eigen values refer to the variance accounted for, in terms of the number of “items’ worth” of variance each explains. So, Factor 1 explains almost as much variance as in nineteen items. The Total Variance table shows how the variance is divided among the 9 possible factors. It can be noted that all the nine factors have Eigen values greater than 1.0, which is a common criterion for a factor to be considered.

Principal axis factor analysis with varimax rotation was conducted to assess the underlying structure for the 72 items of the Academic Engagement Scale. Nine factors were requested, based on the fact that the items were designed to index nine constructs: Behavioural Engagement-Initiation, Behavioural Engagement-Ongoing participation, Behavioural Engagement-Reengagement, Emotional Engagement-Initiation, Emotional Engagement-Ongoing participation, Emotional Engagement –Reengagement, Cognitive Engagement-Initiation, Cognitive Engagement-Ongoing participation, and Cognitive Engagement-Reengagement. After rotation, the first factor accounted for 10.04% of the variance, the later eight factors accounted for 9.61%, 9.36%, 9.26%, 8.70%, 8.61%, 8.49%, 8.08% respectively, and the last factor accounted for 6.34%.

**FIGURE 1**  
**Screen Plot of Eigen Values**



In order to decide which factors to be retained, screen plot of Eigen values offers an arbitrary rule. Developed by Cattell, this method claims to retain one less than the factor where the “elbow” occurs. The “elbow” represents a break point where a substantial drop in the magnitude of the Eigen values appears (Ref. Figure 1). For testing the occurrence of the break point, successive regression lines can be applied to verify the significant difference of their slopes extended from the break point. The Screen plot shows that after the first nine components, differences between the Eigen values decline (the curve flattens), and they are less than 1.0. This again supports nine factors in the tool.

**Table 4**  
**Bartlett's Test**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.953
Approx. Chi-Square	31077.562
Bartlett's Test of Sphericity	Df Sig.
	2556 .000

## ii. Reliability and Internal Consistency

The Academic Engagement Scale (AES) developed to assess the Academic Engagement of the adolescents was distributed to the 400 samples, aged between 13-15 years to test the reliability of the tool.

For the present study, the reliability of the Academic Engagement Scale (AES) is calculated by the following methods and the results are presented in the following table:

**Table 3**  
**Reliability and Internal Consistency**

	No. of Items	Cronbach's Alpha	Spearman-Brown Coefficient	Guttman Split-Half Coefficient
<b>Part I</b>	36 <sup>a</sup>	0.928	0.864	0.864
<b>Part II</b>	36 <sup>b</sup>	0.934	0.864	
<b>Total</b>	<b>72</b>			

The above results reveal that the Academic Engagement Scale (AES) has high reliability and validity. This indicates that the AES tool has emerged as a reliable and valid tool for assessing Academic Engagement of adolescents.

## CONCLUSION

The above results reveal that the academic engagement scale has a very good reliability and validity. This indicates that the AES tool has emerged as a reliable and valid tool for assessing Academic Engagement of the adolescents.

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