

## Validation Of Academic Intrinsic Motivation Scale In The Indian Context

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**ABSTRACT:** *The researchers validated the intrinsic motivation sub-scale of the Academic Motivation Scale AMS-28 college version developed by Vallerand et al. (1992) in the Indian context. 282 IInd year engineering students (50 girls and 220 boys) belonging from Lovely Professional University, Phagwara, Punjab and Osmania University, Hyderabad, Telangana, were the sample subjects of the study. The three dimensions of academic intrinsic motivation, namely, Intrinsic motivation to know, intrinsic motivation towards accomplishments and intrinsic motivation to experience stimulation, showed acceptable internal consistency reliability, with their Cronbach's alpha being 0.648, 0.641 and 0.691 respectively. The ordinal alpha and ordinal omega estimates of the sub-scales were 0.65, 0.66, 0.72 and 0.67, 0.7, 0.76 respectively using the Psych function of R software. The goodness of fit of the model was tested using SPSS AMOS Ver. 23 and the estimands like CMIN/DF, TLI, CFI and RMSEA had their estimates satisfying the benchmarks values except RMR. The results indicated good psychometrics of the academic intrinsic motivation sub-scale of AMS-28 in the Indian context.*

**Keywords:** *Academic Intrinsic Motivation, Academic Intrinsic Motivation Scale, Engineering Students, Ordinal Alpha, Ordinal Omega.*

### **Introduction:**

Motivation is one of the most important psychological construct in education, related to a host of other academic variables like performance, curiosity and persistence (Deci and Ryan, 1985). According to Orsini et al. (2015), one of the widely used instruments to measure Academic motivation is the Academic motivation scale 28 or AMS-28, school and college versions, developed by Vallerand et al. (1992). It is based on self-determination theory proposed by Deci and Ryan (1985) and is found to be the appropriate version of motivation for education. According to this theory, the academic motivation construct is made up of three dimensions, namely, the intrinsic motivation, extrinsic motivation and amotivation.

Intrinsic motivation consists of those activities which a student does for sake of enjoying the pleasure and satisfaction that are associated for him with the mere participation in such a task. Such a kind of motivation according to Deci and Ryan originates from the internal requirements of competence and self-determination. Vallerand, Blais, Briere and Pelletier (1989) postulated that this type of motivation is in turn made up of three types, namely, Intrinsic motivation to know, intrinsic motivation towards accomplishments and intrinsic motivation to experience stimulation.

When motivation acts as a means for meeting an end, it is extrinsic motivation and consists of three types namely, external regulation related to rewards and constraints,

identification related to valuing and judging one's behavior as important and internalizing it, and introjection related to past external contingencies based internalization of behavior.

When individuals do not take care of the contingencies between their own actions and the outcomes, it leads to a third kind of motivation known as amotivation. In this way, the AMS-28 scale consists of four items each associated with the seven sub-scales of the three types of motivation, with the responses recorded in a seven point Likert scale, where 1=Does not correspond at all to 7= corresponds exactly and 4= corresponds moderately.

Though this scale has been used in number of Indian studies (Chakraborty, 2016), its validation was not conducted in the Indian context. The present study tries to validate the important sub-scale of intrinsic motivation of the AMS-28 on the Indian subjects owing to its intimate association with the phenomenon of self regulated learning and research based on it.

## METHODOLOGY

### *Sample:*

The sample of the study comprised of 282 IInd year engineering students (50 girls and 220 boys) belonging from Lovely Professional University, Phagwara, Punjab and Osmania University, Hyderabad, Telangana. The students were selected using simple random sampling technique. Permission to administer the tool was taken from the Principals of the institutions. The cooperation of the faculty members who were taking the class, when the tool was administered was sought. The students were elaborated the purpose of the visit and exercise and their cooperation was also sought. The students took 15-20 minutes to complete and return the tool to the investigators.

### *Statistical Analysis*

Apart from the measures of central tendency, dispersion and asymmetry, the validity of the factor structure was measured using confirmatory factor analysis technique through SPSS AMOS 23.0 version. The reliability analysis of the sub-scales was done using Cronbach's alpha, Ordinal alpha and ordinal omega estimates through psych function of R software.

## RESULTS

### **Table 1: Descriptive Statistics:**

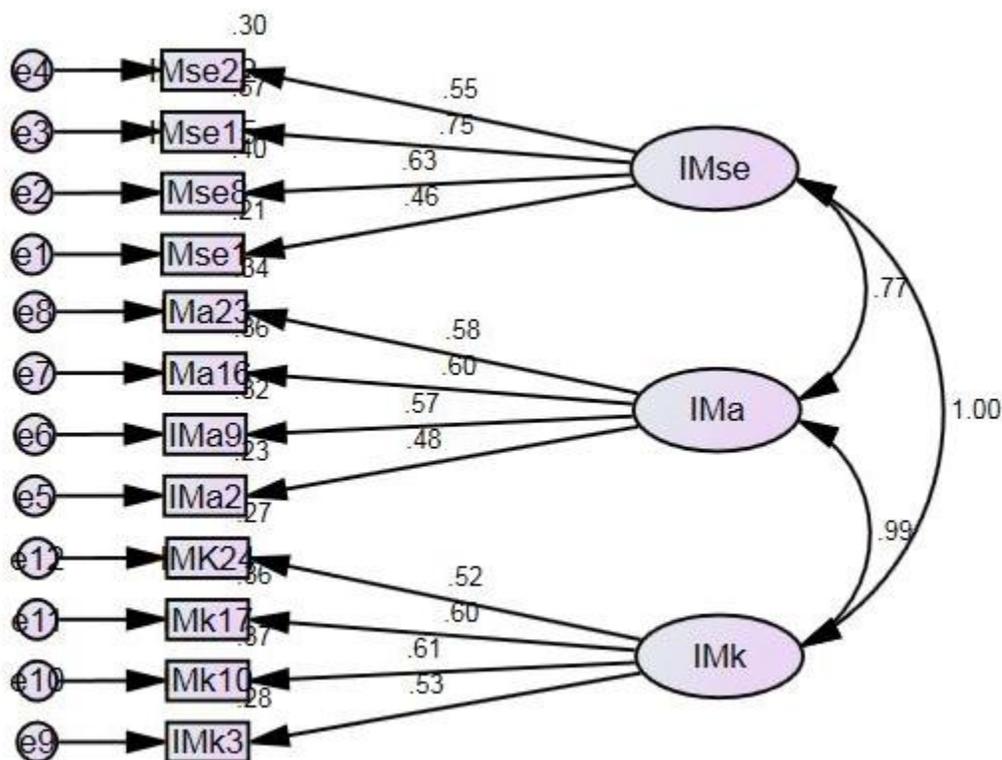
Under descriptive statistics, the measure of central tendency mean, the measure of dispersion standard deviation, the measures of asymmetry, skewness and kurtosis are reported along with their respective standard error.

#### **Descriptive Statistics**

	N	Mean		Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Statistic	Std. Error	Statistic	Std. Error
IMa2	282	4.7943	.10442	1.75356	-.436	.145	-.676	.289

IMa9	282	4.6489	.10087	1.69387	-.482	.145	-.576	.289
IMa16	282	4.7376	.09680	1.62562	-.586	.145	-.237	.289
IMa23	282	4.7660	.09615	1.61461	-.443	.145	-.583	.289
IMk3	282	4.6028	.10207	1.71400	-.413	.145	-.611	.289
IMk10	282	4.6028	.10749	1.80501	-.424	.145	-.743	.289
IMk17	282	4.6844	.09773	1.64123	-.364	.145	-.776	.289
IMK24	282	4.5532	.09843	1.65289	-.378	.145	-.529	.289
IMse1	282	3.9858	.12428	2.08702	.024	.145	-1.293	.289
IMse8	282	4.6844	.10978	1.84344	-.418	.145	-.825	.289
IMse15	282	4.6525	.11609	1.94949	-.368	.145	-1.036	.289
IMse22	282	4.5426	.10308	1.73101	-.346	.145	-.677	.289
Valid N (listwise)	282							

Figure 2: Path Diagram of AIM:



The factor loadings of the items under each of the sub-scales of intrinsic academic motivation are shown in the above path diagram. The magnitude of these factor loadings is from average to high in strength ranging from 0.46 to 0.75, indicating the effectiveness of the items in measuring their respective dimension. The inter-relationship between the dimensions of intrinsic academic motivation is also found to be strong.

Table 2: Goodness of Fit Estimates of the AIM:

Estimate	"P Value"	"CMIN/DF"	"RMR"	"RMSEA"	"GFI"	"IFI"	"TLI"	"CFI"
Standards	"> 0.05"	"<3"	"<0.08"	"<0.08"	">0.9"	">0.9"	">0.9"	">0.9"
Obtained Estimate	0.00	2.076	0.158	0.062	0.936	0.935	0.914	0.934

To check the validity of the factor structure of academic intrinsic motivation, with its three dimensions, confirmatory factor analysis, based on maximum likelihood estimator is conducted using SPSS AMOS Ver. 23.0 software. The absolute, comparative and parsimony goodness of fit estimates including p-value and CMIN/DF are reported in the study. Except RMR, all the estimates have acceptable values satisfying their desirable benchmark values, confirming the validity of the factor structure of intrinsic academic motivation of AMS-28 in the Indian context.

**Table 3: Reliability Analysis of AIM:**

S.No.	Dimension	Item	Cronbach's Alpha	Ordinal Alpha	Ordinal Omega
1.	IM_A	23	0.641	0.65	0.67
2.		16			
3.		9			
4.		2			
5.	IM_K	3	0.648	0.66	0.7
6.		10			
7.		17			
8.		24			
9.	IM_SE	1	0.691	0.72	0.76
10.		8			
11.		15			
12.		22			

The steps to follow in order to estimate the polychoric correlation matrix based ordinal alpha and ordinal omega in R/RStudio are shown below:

1. Import the data file in RStudio console using *Import Dataset*.
2. Install the package *Psych*
3. Library *Psych* # for activation of the package#
4. Polychoric(datafilename)
5. Exampdata<-polychoric(datafilename)
6. Alpha(example\$rho) # to estimate ordinal alpha
7. Omega(example\$rho) # to estimate ordinal omega

All the three sub-scales under academic intrinsic motivation have acceptable reliability estimates, close to 0.7, equal to and above it.

**Discussion:**

The academic intrinsic motivation scale is a tool of foreign origin though used regularly in research in the Indian context. It is popularly used to measure intrinsic motivation in studies as part of the research in self regulated learning. However, there is a dearth of research studies establishing the validity of the factor structure of this famous scale in the Indian context. Such a study is pertinent as part of standard discourse owing to the difference in culture (Yasir, 2016) between the country of origin and the country of administration. The present study found the

estimates measuring the goodness of fit of the factor structure of the three sub-scales of academic intrinsic motivation scale of AMS-28 to be having acceptable magnitudes satisfying their desired benchmarks, except the estimate RMR.

With regard to reliability study, the reporting of the Cronbach's alpha for sub-scales (Cronbach, 1951, Sijtsma, 2009) is an erroneous practice for multitude of reasons. Firstly, this estimate represents the internal consistency reliability of the items, provided the conditions of tau-equivalence are satisfied. Otherwise, this measure of reliability underestimates the true reliability of the scale between 0.6 to 11 percent (Green and Yang, 2009) depending upon the extent to which the violation of the assumptions of tau-equivalence took place (Komaroff, 1997; Zimmerman et al., 1993; Graham, 2006, Peters, 2014). These assumptions include unidimensionality, equal factor loadings of all the items and normality of data. In practice, none of these assumptions are satisfied (Teo and Fan, 2013).

The limitations of Cronbach's alpha are addressed by McDonald's Omega (McDonald, 1999, 2013). But, even this estimate makes use of Pearson's Correlation matrix in the estimation of the reliability index by treating the responses of the scale to be of an interval. In reality, the psychological scales use Likert scales for registering the responses of the subjects for different items which are ordinal in nature (Flora and Curran, 2004). Owing to this reason, the correlation matrix estimation should be based on polychoric correlation instead of Pearson's product moment correlation (Gadermann et al., 2012). This in turn results in estimation of alpha and omega for ordinal responses (Zumbo, Gadermann and Zeisser, 2007; Zinbarg et al. 2005).

Availability of free softwares, like R (R Core Team, 2016) and MPlus (Muthen and Muthen, 2017) in the recent times has made it possible to estimate these alternative and closer to reality estimates of reliability (Viladrich, Angulo-Brunet and Doval, 2017).

The underestimation of the true reliability of the three sub-scales of academic intrinsic motivation with ordinal responses of AMS-28 scale is apparent. While the Cronbach's alpha of the three scales are 0.641, 0.648 and 0.691, its ordinal counterpart is 0.65, 0.66 and 0.72 respectively. Even better estimates of ordinal omega for the three sub-scales are reported at 0.67, 0.7 and 0.76. It implies that the three sub-scales have sufficient reliability estimates, but can get labeled as possessing moderate reliability estimates when reported using the popular Cronbach's alpha.

The three sub-scales, with their established psychometrics through the present study, can now be used in the research of self regulated learning without any statistical hindrance. Also, the present study seeks to establish a precedence in the usage of the free statistical program R and its multitudes of functions to calculate several statistical estimates. This is true especially, in the proper measurement of the reliability of scales which are validity in the routine basis, but using faulty estimates like Cronbach's alpha. Its popularity and the lack of awareness of freely available softwares which estimate the alternate measures of reliability is a sorry state of affairs, not only in India but in foreign countries as well.

### **Limitations:**

The present study has low sample size and further studies must be conducted with larger sample sizes. Though the factor loadings of the items are fairly strong, they need further confirmation through the replication of the studies in other culturally diverse states of our country. Further studies can also be replicated by administering the tool on subjects from other professional and academic courses populations.

### **Conclusion:**

The academic motivation scale AMS-28 by Vallerand et al., is a famous tool to measure the three types of motivation related to studies. The present study validated the intrinsic academic motivation scale in the Indian context and established the proper reliability of the sub-

scales by considering the ordinal nature of Likert-scale based responses of the scale. The good psychometrics of the sub-scale obtained through this study validates the use of the scale in its present form without any alteration on the Indian students at tertiary level.

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