IOSR Journal of Business and Management (IOSR-JBM)
e-ISSN: 2278-487X, p-ISSN: 2319-7668. Volume 19, Issue 9. Ver. VII. (September. 2017), PP 14-21
www.iosrjournals.org

Construct Validity of Employability skills for Graduate through Factor Analysis

Dr. R.R. Chavan [1]
[1](*School of Management Studies, North Maharashtra University, Jalgaon, India)*

Abstract: *Understanding the employability skills expected by employers of graduate will be of great assistance for students to transit smoothly from academic environment to professional life. This paper presents an overview of the concept of employability and survey study was carried out to develop an employability skills model for graduate students. The employability skills comprises communication skills, problem solving skills, self-management, time management skills, decision making, planning and organising, creativity/innovation skills, independent study, analytical skills, team work skills, ICT skills, leadership, honesty and integrity, self-confidence. Data were analyzed descriptively for reliability analysis (Cronbach Alpha Values), and it undertakes an exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) of the employability skills scale. The result showed that the Cronbach Alpha was on the classification of very high which was greater than 0.50. Thus, the measurement model was suitable to be used to study the employability skills acquired by students. Also, both the EFA and CFA yielded a 42-items ten factors model. The model emerged as the perfect fit on various indices. This scale could be used as a measure of employability skills among the graduate who apply for jobs in various organizations.*

Keywords: *Construct Validity, Employability Skills, Graduates, Factor analysis.*

Date of Submission: 08-09-2017 Date of acceptance: 22-09-2017

I. Introduction

In today's era of high expectations and ever changing rules of the game, Employability plays a vital role in the professional success of an individual. Today's organizations are looking for the kind of manpower which not just has the basic academic knowledge but also has the ability to bridge between their available skill sets and the elementary needs of the respective job. A fresh graduate who joins an organization has the first challenge to prove that she/he can adopt the company's cultural ecosystem and deliver performance as per the demands raised. Not just to get through the barrier of selection process but also to continue to be employed uninterruptedly, one is required to possess much more than graduate degree. Today's employee has to establish and connect with the business needs and team desires. In short, it is the employability skills which play a major role in determining the career-ability of graduates. Employability is about prospective employees gaining the skills and capacities required to enter and succeed in the labour market, and adapting to the environment to support them at work in the long run.

Today, employers are looking for more than just technical skills from the modern workforce. They are looking for people who are capable of performing various tasks and roles. Employers have been very serious in recruiting competent employees with vast experience so that they can cut short on training. Employees, on the other hand, are searching for opportunities for self-development that can expand their horizons. They receive trainings formally or informally on the job. Some are given the opportunity to perform different tasks in the form of job enlargement, job enrichment and job rotation. All these processes are expected to expand the skills and job experience of the employees. Beside these programs, informal career management practices like interpersonal relationships are also used to expose employees to new roles and perspective. Mentors who are highly experienced and skilled are assigned to guide and provide advice to employees with less experience.

II. Review Of Literature

Graduates who enter the world of work today face a number of challenges, like decreases in employment opportunities and job security, fast-changing technology and an increasing personal responsibility for continual up skilling and lifelong learning as well as keeping up with changes in their fields of knowledge (Marock, 2008; Pool & Sewell, 2007).

Insufficient supply of quality skills is one of the main impediments to further economic growth in India. The Indian economy grew more than 8% on average over the past 5 years, including the year of the unprecedented

financial crisis in 2009. However, the skill shortage is still one of the major constraints in most industries in India, (World Bank, 2009b)

Various definitions are given for the term "employability skills". Employability skills can be viewed as small set of skills that reduced from a large set of specific attributes. From Rasuls' view, employability skills can be defined as a foundation for graduates to successfully get a job and to develop their career [1]. Hillage defined employability as being capable of getting a job and fulfilling all the work in the job. Employability depends on the knowledge, skills, and attitudes of individuals and the way they use and present these assets [2]. Yorke presented employability as "a set of achievements, understandings, and personal attributes that make individuals more likely to gain employment and be successful in their chosen careers" [3].

Research showed that industries are seeking more than technical skills. For instance, the Australian Chamber of Commerce and Industry developed a framework of employability skills as perceived by industries, and these included the key competencies such as team work and communication, problem solving and technical skills, but also identified self-management, learning, initiative and enterprise, and also interestingly and most controversial, personal attributes such as loyalty, integrity and sense of humor, to name just a few [11].

Employability is the ability of the graduate to get a satisfying job. (Harvey, 2001). Employability Skills are those basic skills necessary for getting, keeping and doing well on a job. (Robinson, 2008). Previous literature (kemper, 1999; McMurchie 1998) suggested that hard and soft skills complement each other . Similarly, a research (Spencer and Spencer, 1993) indicated that superior performers possess both technical and appropriate behavioural skills. In simple terms, employability is about being capable of getting and keeping fulfilling work. More comprehensively employability is the capability to move self-sufficiently within the labour market to realise potential through sustainable employment. For the individual, employability depends on the knowledge, skills and attitudes they possess, the way they use those assets and present them to employers and the context (e.g. personal circumstances and labour market environment) within which they seek work. The aim of this study is to gain insight into the perception and attitude of graduate students to the employability skills that are important for their future profession and successful entrance into the labour market.

III. Factor Analysis

Factor analysis is frequently used to develop questionnaires; after all if we want to measure an ability or trait, we need to ensure that the questions asked related to construct that we intend to measure. The first thing to do when conducting a factor analysis is to look at the inter-correlation between variables. If our test questions measure the same underlying dimension (or dimensions) then we would expect them to correlate with each other (because they measure same thing). If we find any variables that do not correlate with any other variables (or very few) then we should consider excluding these variables before the factor analysis is run. The opposite is when variables correlate too highly. Although mild multicollinearity is not a problem for factor analysis it is important to avoid extreme multicollinearity (i. e. variables that are very highly correlate) and singularity (variables that are perfectly correlated). As with regression, singularity causes problems in factor analysis because it becomes impossible to determine the unique contribution to a factor of the variables that are highly correlated. Therefore, at this early stage we look to eliminate any variables that don't correlate with any other variables or that correlate very high with other variables. As well as looking for interrelations, you should ensure that variables have roughly normal distribution and are measured at an interval level. The assumption of normality is important only if we wish to generalize the results of our analysis beyond the sample collected.

IV. Methodology

A questionnaire was designed including a total of fourteen employability skills that were considered to be important at present and each employability skills has three questions. All the questions examining the employability skills of respondents were based on a five-point Likert Scale as shown in Table 3.

Table 1. Description of Likert Scale

Description
0: "Not at all"
1: "some-what good"
2: "Good"
3: "Very Good"
4: "Excellent"

A questionnaire survey was conducted among students. All respondents are UG and PG students from the selected districts of Maharashtra state. They were selected randomly to complete the questionnaires and measures were administered during regular class sessions. The researcher has coordinated with consult institution and teacher for the availability of students in their respected college. Students were briefed on the nature of the questionnaires and confidentiality was confirmed. Students were allowed as much time as they needed to complete the questionnaires, typically requiring
25 to 35 minutes.

Reliability test (Cronbach Alpha), principal component factor analysis and Confirmatory factor analysis (CFA) was performed to determine the validity and confirmatory of constructs. Cronbach Alpha coefficient was used to assess internal consistency of each scale. A principal component factor analysis was used in pilot study of this study. Factor analysis has been usually known as a statistical technique for data reduction. However, it was also useful in searching for structure among a set of variables. Particularly, the principal component factor analysis provided direct insight into the interrelationships among variables and empirical support for addressing conceptual issues relating to the underlying structure of the data (Hair et al., 2006). Further, Construct validity involves the validity of the convergent validity and discriminant validity. Convergent Validity were evaluated based on the coefficient of each item loaded significantly ($p < 0.05$) and composite reliability of a latent variables (Anderson & Gerbing, 1988; Fornell & Larcker, 1981).

The value of composite reliability more than 0.70 indicate convergent validity is in a good position (Fornell & Larcker, 1981; Hair et al., 2006). Meanwhile, discriminant validity was evaluated by average variance extracted for all 14 constructs which must be less than 0.9. If the value is less than 0.9 constructs, then discriminant validity is achieved (Hair et al., 2006).

V. Research Findings

VI (a) Reliability of Instrument

Internal consistency reliability to test uni-dimensionality was assessed by Cronbach's alpha. Table 4 shows the Cronbach alpha reliability values for the variables of this study. According to Sekaran (2003), Cronbach Alpha value must be greater than 0.5. The resulting alpha values ranged from 0.547 to 0.832, which were above the acceptable threshold 0.50. We can conclude that this instrument has high reliability since Cronbach Alpha value for all variables is more than 0.5 (Table 4).

Table2: Cronbach Alpha Reliability values for the variables

Employability Skills	Items	Alpha Cronbach Value
Communication	03	0.727
Problem Solving	03	0.547
Team work	03	0.589
Planning and organising	03	0.596
Creativity/innovation	03	0.735
Independent study	03	0.723
Analytical skills	03	0.814
ICT skills	03	0.798
Self-management	03	0.598
Time Management/prioritizing	03	0.779
Decision Making	03	0.798
Integrity and Honesty	03	0.832
Leadership skills	03	0.681
Self-confidence	03	0.777

(b) Principal Component Factor Analysis (PCA)

The result obtained from the Bartlett and KMO statistics are shown in Table 3. The overall significance of the correlation matrix was found to be 0.000 (below 0.05 significance level) with Bartlett's test of sphericity value of 259.894. This indicates that the data matrix has sufficient correlation to the factor analysis. From the results, a value of 0.698 was obtained for the Kaiser-Meyer-Olkin (KMO) measure of the sampling adequacy. Hair et al. 1995[ ] present different index for KMO values (0.0-1.0) that interpret the degree of common variance such as "Don't factor" (0.00-0.49), "Miserable" (0.50-0.59), "Mediocre" (0.60-0.69), "Middling" (0.70-0.79), "Meritorious" (0.80-0.89), "Marvellous" (0.9-1.0). The KMO value 0.698 lies in the index of "middling" which is in the allowable range. From the above results, it is clear that the data sample is adequate and suitable for factor analysis.

Table 3: Results from KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.698
Bartlett's Test of Sphericity	Approx. Chi-Square	259.894
	Df	91
	Sig.	0.000

The principal component factor analysis with a VARIMAX rotation technique was used to generate the factors underlying forty two variables.

Table 4: Total Variance Explained

	Initial Eigen values and Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	13.821	32.908	32.908	6.648	15.828	15.828
2	4.312	10.267	43.175	4.465	10.631	26.459
3	3.541	8.430	51.605	3.598	8.568	35.026
4	2.769	6.593	58.198	3.525	8.393	43.419
5	2.465	5.868	64.066	3.272	7.791	51.210
6	2.137	5.089	69.155	3.011	7.169	58.379
7	1.940	4.619	73.774	2.982	7.100	65.479
8	1.435	3.417	77.191	2.839	6.759	72.238
9	1.369	3.259	80.450	2.485	5.918	78.155
10	1.200	2.857	83.307	2.164	5.152	83.307

Rotated Component Matrix[a]										
	Component									
	1	2	3	4	5	6	7	8	9	10
TW2	.667									
PO1	.591									
PO3	.563									
IS1	.859									
DM1	.804									
DM3	.789									
IH1	.729									
LS2	.656									
SC2	.514									
TW1		.519								
CI3		.669								
ICT1		.778								
ICT2		.760								
ICT3		.734								
SMS1		.516								
TMP3		.516								
LS1		.564								
AS2			.523							
SMS2			.546							
TMP2			.629							
DM2			.696							
IH2			.617							
IH3			.492							
SC3			.561							
AS3				.696						

TMP1				.759						
SC1				.525						
Comm1					.697					
PS1					.529					
PS2					.812					
PO2					.597					
PS3						.616				
AS1						.544				
LS3						-.904				
CI1							.901			
CI2							.457			
Comm2								.681		
Comm3								.811		
TW3								.666		
IS2									.518	
IS3									.890	
SMS3										.836
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.										
a. Rotation converged in 13 iterations.										

VI. Conclusion & Results

Exploratory factor analysis

To examine the dimensionality of the public leadership scales we firstly carried out an exploratory factor analysis. We included all 42 generated items in the analysis. We used principal component factoring and oblimin rotation, as this allows the factors to be correlated (Tummers, 2012; Field, 2005). We extracted ten factors with eigen values greater than one. These factors explained a total of 83.03% of the total variance. This exceeds the minimum of 60% for scale development (Hinkin, 1998). The factor structure was as we had anticipated, although forty-two items loaded on ten factors (factor loadings >.30). Therefore, these items are deleted and will not be used in further analyses. The factor loadings are reported in Table.

Table 5 Exploratory factor analysis

Item	Factor loadings									
	1	2	3	4	5	6	7	8	9	10
Comm1					.697	.312				
Comm2						.406		.681		
Comm3								.811		
PS1	.519			-.459	.529					
PS2					.812					
PS3					.354	.616				
TW1		.519	-.461					.309		
TW2	.667							.569		
TW3		.495						.666		
PO1	.591				.352				.437	
PO2		.346		.330	.597					
PO3	.563				.517					.398
CI1							.901			
CI2							.457	.329	.447	
CI3		.669					.492		.370	
IS1	.859									
IS2	.386	.401							.518	
IS3									.890	
AS1				.317	.324	.544				
AS2		.306	.523	.476		.516				

AS3				.696					.315	
ICT1		.778								
ICT2		.760		.445						
ICT3		.734			.353					
SMS1		.516		.507						
SMS2	.424		.546							
SMS3										.836
TMP1		.330		.759						
TMP2	.487		.629							
TMP3	.402	.516		.400			.369			
DM1	.804									
DM2	.395		.696							
DM3	.789			.330						
IH1	.729									.327
IH2	.499		.617							
IH3	.417		.492				.462			.366
LS1		.564					.307		.470	
LS2	.656									
LS3						-.904				
SC1				.525			.365			.383
SC2	.514			.394			.340	.316		
SC3	.386		.561							.414

Only coefficients of >.30 are presented.

Confirmatory factor analysis

Using the results of the exploratory factor analysis, we performed confirmatory factor analyses. First, we tested a first-order model in which 6 items loaded on the dimension 'accountability leadership', 7 items loaded on 'integrity leadership', 5 items loaded on 'political loyalty leadership', 7 items loaded on 'network governance' and 4 items loaded on lawfulness leadership'. To assess the model fit, we examined the comparative fit index (CFI), the Tucker-Lewis index (TLI), and the root mean square error of approximation (RMSEA). Acceptable fit is evidenced by a CFI and TLI of .90 or higher, and a RMSEA of .08 or lower (Bentler, 1990). The initial CFA showed acceptable fit indices (CFI=.932; TLI=.925; RMSEA=.064). However, the descriptive of the variables included showed that these were non-normally distributed. Therefore, we performed another CFA identifying all variables as categorical. The fit indices improved substantially (CFI=981; TLI=.979; RMSEA=.064). All items loaded significantly on the latent variables ($p<.001$) with standardized factor loadings ranging from .673 to .948. Since we conceptualize that these five variables are dimensions of the underlying public leadership behaviors construct, we also conducted a second-order CFA. All five dimensions (accountability, integrity, political loyalty, network governance and lawfulness) loaded on the latent variable 'public leadership behaviors'. The results of this test confirm the proposed structure and all fit indices are good (CFI=.980; TLI=.978; RMSEA=.065). The factor loadings of the dimensions varied between .388 and .898. The figure displayed below shows the final factor structure of the items measuring the five dimensions of public leadership behaviors:

Correlations and Cronbach alpha

As shown in Table, all five dimensions are significantly correlated. The correlations vary between .223 and .666. Political loyalty is somewhat less correlated with the other dimensions. According to Kalshoven et al. (2011) these correlations are similar to the correlations between other leadership measures. In order to test whether our scale is indeed multi- and not one-dimensional, we conducted a CFA in which we loaded all 29 items on one factor. The results show that all fit indices (CFI=.828; TLI=.814; RMSEA=.190) fall below the commonly accepted thresholds and thus indicate that our measure is indeed multi-dimensional. Finally, it is necessary to assess the scale's reliability by examining the coefficients of Cronbach's alpha's. All five dimensions of public leadership show sufficient reliability (>.70), as shown in the table below. Data gathered in the survey were submitted to analyses using the SPSS and the AMOS statistical packages. Initial item analysis and exploratory factor analysis revealed 28 items with poorer psychometric properties and as a result, the total number of items of the new instrument was trimmed down from 84 to 56. The more condensed 56-item SAARD Questionnaire was then subject to the following analyses:

I. Internal reliability:
The Cronbanch's alpha coefficient for the overall 42-item questionnaire was 0.96 and the mean inter-item correlation (MIC) was 0.26. The alpha coefficients of the 10 subscales/ factors ranged from 0.7 to 0.92, and their MICs ranged from 0.30 to 0.70.

II. Exploratory factor analysis (EFA)
In order to identify the factor structure underlying the remaining 56 items, an exploratory factor analysis (principal axis factoring) was done. Applying the varimax rotation procedure, a 10-factor solution was identified based on the Kaiser (eigenvalue > 1) rule and the interpretability of the factor solution, which accounted for 48.54 per cent of the item variance. From the findings, a clear, interpretable factor structure that was generally consistent with our a priori hypothesised structure was observed. For seven factors, almost all the items designed for measuring a particular generic competency area (e.g. entrepreneurship) were grouped under one and the same factor. For the other two factors, all the items designed for measuring the cognitive competence of students (e.g. critical thinking, problem solving) and group working skills (e.g. leadership, teamwork) were grouped under two general measures of cognitive abilities and working in groups respectively. For the last two factors, items designed for measuring two dimensions of healthy lifestyle: engagement in physical activity and health responsibility, were grouped under two separate factors in a sensible way.

III. Confirmatory factor analysis (CFA)
A confirmatory factor analysis with maximum likelihood estimation was then run to further test the fit of the proposed 11-factor model. As suggested by Byrne (2001), two fit indices – the Comparative Fit Index (CFI), a fit index which is relatively insensitive to the sample size, and the root-mean-square error of approximation (RMSEA) were used. In the present study, the CFI and the RMSEA of the 11-factor model were .90 and .040 (with its 90 per cent confidence interval being .039 and .042) respectively, indicating acceptable fit. And in a subsequent study conducted in August, 2006, using an independent sample of over 3,000 freshmen, a CFA was also done to cross-validate the 11-factor model, and the CFI and RMSEA were exactly the same. Thus, the proposed 11 factors were assumed.
In general, the findings stated in sections II and III have lent support to the factorial and construct validity of the 56-item SAARD Questionnaire.

IV. Known groups validity
Known groups validity was explored by testing the hypothesis that certain subgroups of the students would report higher scores on some of the subscales of the SAARD than would others. Results generated from multivariate analysis of variance/covariance (MANOVA/MANCOVA) had supported our hypotheses that those studying at a higher level (e.g. postgraduate students) would demonstrate better development in their cognitive abilities (e.g. critical thinking), and would therefore rate themselves significantly higher than those studying at a lower level (e.g. Higher Diploma year-one students) (mean scores = 79.85 vs 72.27); students studying Art and Design would also report higher scores than all other students in their development of creative thinking (mean scores = 20.05 vs 18.23) and cultural appreciation (mean scores = 21.84 vs 18.36); Business students would give themselves better ratings than all others in entrepreneurship (mean scores = 19.91 vs 19.21); and male students would report having engaged more in physical activities than female students (mean scores = 9.13 vs 7.82).

VII. Conclusions and Implications

In conclusion, results generated from (i) internal reliability analysis; (ii) exploratory factor analysis; (iii) confirmatory factor analysis; and (iv) known groups validity analysis indicate that the 42-item Questionnaire is a reasonably, valid and useful instrument for measuring the all-round development of students, and it is worthy of additional use and testing. It has a relatively comprehensive coverage of major dimensions of various employability skills mainly into behavioural skill items, while at the same time remains reasonably concise and user-friendly.

The SQES Questionnaire is designed for producing general profiles of all-round development of students along various areas of employability skills. Despite the fact that the results of this study are encouraging, more work is required to further examine the construct validity of the SQES by correlating its scores with, for instance, scores achieved in standardised tests with similar content or scores achieved along relevant performance indicators used in the job setting after graduation.

References

[1]. Anderson, J., & Gerbing, D. (1988). Structural equation modeling in practice: A review and recommended two step approach. Psychological Bulletin, 103(3), 411-423.
[2]. Fornell, C., & Larcker, D. (1981). Evaluating structural equation models with unobserved variable and measurement error. Journal of Marketing Research, 18, 39-50.
[3]. M.S. Rasul, R.A. A. Raul, A. N. Mansur, and A.P. Purvanasvaran, (2012), "Employability Skills Assessment Tool Development," Journal of International Education Studies, Vol. 5, no. 5, pp. 43-56. http://www.ccsenet.org/ies
[4]. J. Hillage, and E. Pollard, Employability: Developing a Framework for Policy Analysis, Research Brief, Department for Education and Employment (DfEE), London, No. 85, 1998.
[5]. M. Yorke, and P. Knight, Employability in Higher Education, learning and Employability Series one. ESECT:LTSN, 2006. http://www.heacademy.ac.uk/resources/detail/employability/Learning_and_employability_series_1
[6]. Harvey, Lee (2001), Employability and Diversity, Centre for Research and Evaluation, Sheffield Hallam University.
[7]. Kemper, C. L. (1999), EQ vs. IQ, Communication World, 16(9), 15-19.
[8]. McMurchie, L. L. (1998), Careers can rise or fall with EQ. Computing Canada, 1(9), 1821.
[9]. Robinson, J. P. (2008), An Assessment of the Employability skills needed by Graduates in the College of Agriculture, Food and natural Resources at the University of Missouri, Journal of Agricultural Education 100 Volume 49, Number 4, 2008.
[10]. Spencer, L. M., & Spencer S. M. (1993), Competence at work, New York, Wiley Publications.
[11]. Marock, C. (2008). Grappling with your employability in South Africa. Pretoria: Human Sciences Research Council.
[12]. Pool, L., & Sewell, P. (2007). The key to employability: Developing a practical model of graduate employability. Education and Training, 49(4), 227–289. http://dx.doi.org/10.1108/00400910710754435
[13]. Australian Chamber of Commerce and Industry & Business Council of Australia. Employability skills for the future. 2002. http://www.acci.asn.au/text_files/reports/Employability_Skills.pdf
[14]. Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). Multivariate data analysis. New Jersey: Pearson International Edition.
[15]. Sekaran, U. (2003). Research Methods for Business: A Skill Building Approach (2nd Edition). New York: John Wiley & Sons, Inc.

IOSR Journal of Business and Management (IOSR-JBM) is UGC approved Journal with Sl. No. 4481, Journal no. 46879.

Dr. R.R. Chavan . "Construct Validity of Employability skills for Graduate through Factor Analysis." IOSR Journal of Business and Management (IOSR-JBM) , vol. 19, no. 9, 2017, pp. 14–21.