TESTING VALIDITY AND RELIABILITY OF THE QUESTIONNAIRE IN SOFT SKILLS RESEARCH: A PERSPECTIVE FROM B-SCHOOL ALUMNI

Santhosh Kumar, Government First Grade College for Women
Dinesh.N, Jain Deemed to be University
Periasamy P, Jain Deemed to be University

ABSTRACT

The purpose of a survey is to use questionnaires or interviews to collect data from participants in a sample about their characteristics, experiences and opinions in order to generalize the findings to a population that the sample is intended to represent. A survey or questionnaire provides structure and standardization in the research design. It also provides the opportunity to gather large amounts of data from many respondents. A questionnaire was designed for B school alumni to study the effect of soft skills training on employability of B-School graduates in Bangalore. Measurement Model (Structural Equation Modelling - SEM) was used to establish convergent validity, discriminant validity and reliability of the above questionnaire before conducting the survey. Validity represents the capacity of an instrument/ questionnaire to ascertain what it claims to measure. Convergent validity is proven when constructs that are similar respond to one another, while Discriminant validity is said to exist if we can sufficiently differentiate two of the dissimilar constructs. Any research instrument must be totally concerned with accuracy leading to dependability, otherwise called as reliability. A reliable instrument supposes to consistently measure whatever is measured over time. The main objective of this study was to test the validity and reliability of the research instrument used to study the effect of soft skills training on employability of B-School graduates.

Key words: Questionnaire, Measurement Model, SEM, Validity, Reliability

INTRODUCTION

A study was conducted to understand the perception of B- school alumni about the importance of soft skills training and its impact on employability. The study also identified the important skill groups (core soft skills) required to enhance employability among graduates. Further various techniques and tools of imparting soft skills to students and the level of soft skills provided in B-schools were examined in the study. Data was collected through a researcher-designed survey questionnaire. The questionnaire for alumni consisted of five sections- Section A: Alumni Background/Demographics; Section B: Alumni perception about soft skills important for employability; Section C: Focused on Soft skills training evaluation; Section D: Focused on employability outcomes; Section E: Consisted open ended questions where respondents had an opportunity to indicate any other soft skills that are essential and comments where respondents felt about the relevancy of this study. An explanation on the purpose of the survey and the importance of each respondent to answer to the best of his or her ability was provided in the introductory letter. Participants were assured

of confidentiality and that responses with final results would be provided in summative rather than individual form. The instrument included specific instructions for responses that preceded each section to facilitate accuracy in responses. The target sample for this study was alumni who had undergone soft skills training at the B-schools from Bangalore University, Vishveshariah Technological University and Autonomous Universities. However, before conducting the survey, Measurement Model (Structural Equation Modelling - SEM) was used to establish convergent validity, discriminant validity and reliability of the above questionnaire.

REVIEW OF LITERATURE

- Jorg Henseler et al. (2015) in their research article observed that partial least square method (PLS-SEM) is widely used for business and social applications in data analysis. The PLS method is suitable, especially, when the sample size is low. PLS serves as a promising technique for prediction purposes where both measurement models and structural models can be assessed with regard to their predictive validity.
- S Shanmugapriya & K Subramanian (2015) studied the factors influencing quality performance in Indian construction projects using smart PLS software through measurement and structural model. The findings of the study revealed that leadership factor has the strongest effect on people factor and process factor has the strongest effect in achieving the goals of quality performance improvement in construction projects.
- Jungsun et al. (2011) analysed data using Structural Equation modeling that measured the influencing four predictor variables on criterion variable *i.e.* Intention to use e-learning modules for learners which included both young and old individuals. The findings brought out the importance of self-esteem, socialization, *i.e.*, to work in teams that are hetergenous.
- Tracy L. Lewis et al. (2008) in their study used Structural equation modeling to bring out an affinity (satisfaction with the major) was the most important factor in determining intention to leave the Computer Science major. Results indicated significantly different effects on affinity and intent to stay across gender.
- In reference to Cronbach (1951), any research instrument must be totally concerned with accuracy leading to dependability, otherwise called as reliability.

OBJECTIVES OF THE STUDY

- To test the validity (convergent & discriminant) of the questionnaire to be used in the study.
- To test the reliability of the questionnaire to be used in the study.

### Analysis & Interpretation–Measurement Model (sem) to Test

Validity and Reliability of the Questionnaire

Table 1
Construct and Item Description

Constructs	Item Code	Item
Importance of Personal and Methodological skills for employability	IM2	Inter - Personal Skills
	IM3	Professionalism
	IM6	Stress Management Skills
	IM7	Problem Solving Skills
	IM8	Decision Making Skills
	IM9	Leadership Skills
	IM10	Self-Management Skills
	IM11	Project Management Skills
	IM12	Time Management Skills
	IM13	Etiquette (Professional Grooming, Manners etc)
Importance of Social skills for employability	IM1	Team Work Skills
	IM4	Presentation Skills
	IM5	Communication Skills
Institutional planning &Soft skills content	Q3e	Soft Skills Training provided by the college was sufficient for enhancing employability
	Q3f	Soft Skills needs were assessed systematically (by placement cell in the college)
	Q3g	Training objectives for each topic was fixed and implemented
	Q3h	Content was organized and easy to follow
	Q3i	Content was updated based on present industry needs
	Q3j	Soft Skills Training integrated theoretical basic concepts with real world applications (Practical Orientation)
	Q3k	Materials distributed were pertinent and useful
	Q3l	Facilities for training were satisfactory (Use of technology, seating, location etc)
	Q3m	Training was held during convenient time and place (Not affecting academic work)

	Q3n	Duration of the training program was adequate
	Q3o	Frequency or no. of training sessions was adequate
Relevance of soft skills for workplace	Q3a	Soft Skills are important for today's workplace
	Q3b	Soft Skills are as important as professional Knowledge (Hard Skills)
	Q3c	Soft Skills can be enhanced through training and practice
	Q3d	Soft Skills Training is necessary in today's competitive job market to gain employability
	Q3j	Soft Skills Training integrated theoretical basic concepts with real world applications (Practical Orientation)
	Q3k	Materials distributed were pertinent and useful
	Q3m	Training was held during convenient time and place (Not affecting academic work)
Trainer evaluation	Q3p	Soft skills trainer presented the content with clarity
	Q3q	Trainer was Knowledgeable
	Q3r	Quality of instruction was good
	Q3s	Class participation and interaction was encouraged during sessions
	Q3t	Trainer Collected the feedback at the end of the program
	Q3u	Soft Skills training given in college was according to my expectations
Impact of soft skills training on employability	OUT1	Soft Skills Training helps to enhance employability competencies in students
	OUT2	Soft Skills Training allows the opportunity to integrate classroom objectives and workplace skills

OUT3	Soft Skills Training helps to enhance the marketability of a student in the labour market
OUT4	Soft Skills Training Program has enabled me to understand what skills are valued by employers
OUT6	Soft Skills Training has helped me to improve Social Skills (Communication Skills, Team Work Skills, Leadership Skills)
OUT7	Soft Skills Training has helped me to improve Personal Skills (Stress Management Skills, Time Management Skills, Professionalism)
OUT8	Soft Skills Training has helped me to improve Methodological Skills (Decision Making Skills, Problem Solving Skills)
OUT9	Soft skills Training has enhanced Self-awareness (Awareness of one's strengths and weaknesses)
OUT10	Soft Skills Training has Improved my confidence levels and attitude
OUT12	Soft skills' training has helped me to give a better meaning for my professional and personal life
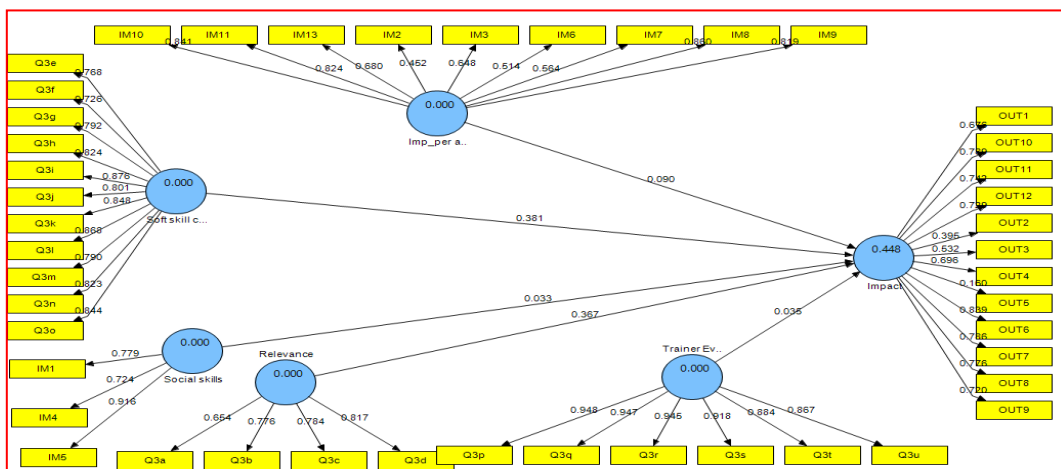
CHART 1
MEASUREMENT MODEL - PERCEPTION OF ALUMNI

First Order Constructs	Items	Outer Loadings	Cronbach's Alpha	Composite Reliability	AVE
Table 2 **INTERNAL CONSISTENCY AND CONVERGENT VALIDITY**					
Importance of Personal and Methodological skills for employability	IM10	0.841	0.869	0.895	0.502
	IM11	0.825			
	IM12	0.68			
	IM13	0.452			
	IM2	0.648			
	IM3	0.514			
	IM6	0.564			
	IM7	0.86			
	IM8	0.819			
	IM9	0.841			
Importance of Social skills for employability	IM1	0.82	0.755	0.85	0.657
	IM4	0.66			
	IM5	0.85			
Institutional planning & Soft skills content	Q3e	0.768	0.95	0.956	0.666
	Q3f	0.726			
	Q3g	0.792			
	Q3h	0.824			
	Q3i	0.876			
	Q3j	0.801			
	Q3k	0.848			
	Q3l	0.868			
	Q3m	0.79			
	Q3n	0.823			
	Q3o	0.844			
Relevance of soft skills for workplace	Q3a	0.654	0.764	0.845	0.578
	Q3b	0.776			
	Q3c	0.784			
	Q3d	0.817			
	Q3p	0.948			
Trainer evaluation	Q3q	0.948	0.963	0.97	0.844
	Q3r	0.945			
	Q3s	0.918			
	Q3t	0.884			
	Q3u	0.867			
Impact of soft skills training on employability	OUT1	0.676	0.881	0.905	0.524
	OUT10	0.789			
	OUT12	0.743			
	OUT2	0.729			
	OUT3	0.395			
	OUT4	0.532			

OUT6	0.696
OUT7	0.839
OUT8	0.786
OUT9	0.776

Internal Consistency

Internal consistency of the constructs can be referred from the Cronbach alpha and Composite reliability values. A threshold value of 0.7 was used for confirming the reliability of the variables under consideration in the research as stated by Nunnally (1978). It was found from the table that all the sub-constructs have Cronbach values greater than 0.7. Further, to ensure internal consistency, the Composite reliability value is also considered. The Composite reliability value ranges between 0.845 to 0.970 which is also above the threshold level of 0.70. Hence, we can conclude that there are no issues relating to internal consistency.

Convergent Validity

Convergent validity can be assessed by observing the Outer loadings score and the Average Variance Extracted (AVE). The AVE value for the constructs ranges between 0.502 to 0.844 which is found to be greater than the cut-off value of 0.5 as suggested by Hair, et al., (2016). Based on the output it is confirmed that the constructs do not have any convergent validity issues.

Table 3
Correlation Matrix and Square root of AVE

Constructs	1	2	3	4	5	6
Importance of Personal and Methodological skills for employability	0.71					
Impact of soft skills training on employability	0.41	0.72				
Relevance of soft skills for workplace	0.51	0.51	0.76			
Importance of Social skills for employability	0.27	0.3	0.34	0.81		
Institutional planning & Soft skills content	0.3	0.52	0.2	0.28	0.82	
Trainer evaluation	0.29	0.49	0.31	0.25	0.6	0.92
Note: Square root of AVE is represented as bold in the diagonal format						

Table 4
Factor Loadings and Cross-Loadings

Items	Importance of Personal and Methodological skills for employability	Impact of soft skills training on employability	Relevance of soft skills for workplace	Importance of Social skills for employability	Institutional planning & Soft skills content	Trainer evaluation
IM10	0.841	0.263	0.284	0.194	0.24	0.154
IM11	0.825	0.405	0.488	0.262	0.194	0.201
IM13	0.68	0.244	0.297	0.147	0.19	0.142
IM2	0.452	0.095	0.342	0.104	0.171	0.165

IM3	0.648	0.26	0.518	0.242	0.211	0.238
IM6	0.514	0.149	0.373	0.18	0.099	0.236
IM7	0.564	0.145	0.379	0.13	0.155	0.227
IM8	0.86	0.394	0.333	0.204	0.349	0.296
IM9	0.819	0.384	0.335	0.188	0.242	0.228
OUT1	0.358	0.676	0.493	0.191	0.321	0.33
OUT10	0.283	0.789	0.228	0.185	0.364	0.319
OUT11	0.133	0.743	0.319	0.262	0.481	0.449
OUT12	0.303	0.729	0.276	0.251	0.403	0.298
OUT2	0.284	0.395	0.338	0.288	0.091	0.212
OUT3	0.31	0.532	0.287	0.234	0.09	0.185
OUT4	0.329	0.696	0.351	0.057	0.315	0.271
OUT6	0.301	0.839	0.405	0.308	0.41	0.434
OUT7	0.365	0.786	0.416	0.255	0.51	0.44
OUT8	0.24	0.776	0.284	0.135	0.513	0.467
OUT9	0.265	0.72	0.236	0.151	0.394	0.313
Q3a	0.329	0.245	0.654	0.211	0.048	0.167
Q3b	0.383	0.332	0.776	0.241	-0.029	0.067
Q3c	0.449	0.458	0.784	0.323	0.331	0.306
Q3d	0.369	0.452	0.817	0.248	0.159	0.336
IM1	0.133	0.183	0.232	0.779	0.18	0.092
IM4	0.274	0.139	0.189	0.724	0.184	0.144
IM5	0.251	0.33	0.357	0.916	0.279	0.308
Q3e	0.041	0.377	0.036	0.203	0.768	0.578
Q3f	0.188	0.328	0.099	-0.121	0.726	0.691
Q3g	0.162	0.428	0.165	0.242	0.792	0.655
Q3h	0.095	0.374	0.106	0.214	0.824	0.775
Q3i	0.367	0.501	0.119	0.276	0.876	0.66
Q3j	0.224	0.456	0.277	0.307	0.801	0.59
Q3k	0.292	0.377	0.225	0.275	0.848	0.689
Q3l	0.289	0.446	0.241	0.277	0.868	0.668
Q3m	0.234	0.389	0.235	0.175	0.79	0.731
Q3n	0.369	0.434	0.142	0.254	0.823	0.583
Q3o	0.368	0.483	0.109	0.277	0.844	0.638
Q3p	0.249	0.47	0.278	0.216	0.76	0.948
Q3q	0.282	0.486	0.314	0.244	0.747	0.948
Q3r	0.275	0.428	0.233	0.297	0.752	0.945
Q3s	0.251	0.483	0.315	0.232	0.754	0.918
Q3t	0.287	0.396	0.323	0.052	0.682	0.884
Q3u	0.262	0.422	0.242	0.351	0.726	0.867

Discriminant Validity

Discriminant validity was checked by two approaches as suggested by Hair, et al., (2016). The first approach is by comparing the outer loadings of items from one construct

with the loadings of items in other constructs. It can be noted from the cross loadings table that the items got loaded on the respective constructs, thereby, confirming the absence of discriminant validity issue. The second approach is made by comparing the square root of AVE with the constructs as suggested by Fronell & Larcker (1981). The square root of AVE represented across the diagonal must be higher than the corresponding latent variables in the respective row and column. For all the constructs, square root of AVE was found to be higher than the correlation values. Hence it can be concluded that there were no discriminant validity issues.

FINDINGS & RESULTS

Reliability and Validity of the Research Instrument

Findings from Structural Equation Modelling using SMART – PLS showed that the instrument is reliable as the internal consistency referred from the Cronbach alpha (all the sub-constructs have Cronbach values greater than 0.7.) and Composite reliability values (between 0.845 to 0.970) is meeting the threshold value. It was also found that instrument is valid as the convergent validity (AVE value for the constructs ranges between 0.502 to 0.844 which is greater than the cut-off value of 0.5) and discriminant validity (Items loaded on the respective constructs and for all the constructs, square root of AVE was higher than the correlation values) issues are absent.

Suggestions

- Researcher should study similar instruments from the literature that measure a similar construct and talk to experts using in-depth interview techniques to get input for formulating items for a questionnaire.
- Researcher should clearly define the construct of the measurement instrument.
- Researcher should conduct a pilot study to test the measurement instrument.
- Researcher should test the research instrument for validity and reliability before data collection in the study.
- Structural Equation Modelling (Measurement Model) can be used to establish convergent validity, discriminant validity and reliability with respect to the instrument.

CONCLUSION

A researcher should test and evaluate the precision and capacity of an instrument/ questionnaire to ascertain what it claims to measure before conducting the survey in order to facilitate accuracy in responses from respondents. If the questionnaire is part of the analysis, then, like any other outcome measure should be a Standardized Outcome Measure (SOM). A standardized outcome measure should be tested for measurement characteristics such as reliability (consistency of measures), validity, sensitivity and/or responsiveness. There are several tests to be conducted in order to ensure the validity and reliability of an instrument. First is the forward and backward translation or also known as cross cultural validation of an instrument, expert panel, cognitive debriefing and pretesting, confirmatory factor analysis (face validity, content validity, construct validity, convergent validity, discriminant validity etc). Further, the researcher also needs to test the reliability of the tool by conducting the internal consistency reliability and item-total and inter-item correlation. Hence, the researcher

has various tools for this purpose and Structural Equation Modelling (SEM) is one of them, which can be used for checking the validity and reliability of the instrument used in the study.

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