

Benchmarking Soft Skills Among Construction Schools Graduates

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Soft skills are consistently in high demand across construction industry employers. This paper aims to benchmark the gap for soft skills among construction schools graduates using a twelve soft skills taxonomy. The authors used an importance/satisfaction survey instruments. The survey collected data from construction industry employers about the relative importance of the soft skills clusters for any new hire construction graduate and their satisfaction about the level of soft skills possessed by the same graduate. The implementation of the survey was described and the results are summarized. The survey results revealed the existence of soft skills gap among all construction students. Based on importance rating, the top three important soft skills clusters were: communication skills, workplace thinking skills and workplace ethics skills. While, based on satisfaction rating, the least three soft skills clusters were: conflict resolution and negotiation skills, stress-management skills and social-intelligence skills. The authors urge construction educators to diffuse innovative learning methods that equipped future construction generations with the proper soft skills level.

Key words: Construction, Curriculum, Soft Skill, SERVQUAL,

Introduction

Universities major task is to graduate students with the proper market skills that are highly regarded by employers and are seen to contribute to their country's prosperity. All employers are searching for a graduates with a strong mix of technical and non-technical skills. Research proves that soft skills are an important reason for employment, along with practical experience. In Construction industry, the vast majority of researchers highlight the existence of soft skills gap among construction graduates (Berg, 2016), (Schoolderman, 2016), (Dainty, 2014), (Berger, 2016), (Behling, 2015). The ambiguity of the nature skills gap among construction graduates is a major challenge for any remedial effort. Construction educators did not come to agreement about the key soft skills and how to fix the skills gap among the student (Mahasneh, 2015). The purpose of this paper is to investigate the skill gap among construction schools graduates using a pre-proposed twelve clusters soft skills taxonomy (Mahasneh, 2016).

Methodology

The survey tool has been adopted from the service quality (SERVQUAL) knowledge domain (Van Auken, 2017), (Wirtz, 2017), (Dabestani, 2016), (Mahasneh, 2017). The concept is used by the vast majority of SERVQUAL experts and scholars. Basically, the survey asks the customer (the construction industry professionals in this study) two questions about multiple variables on a previously developed list of employer requirements (the 12 soft skills + over all question in this study). The SERVQUAL experts developed the basic principles on how to design, conduct the survey and how to analyze its findings. They usually use statistical analysis to check the findings' quality. This study used all those principles. It also used a specific validation question to check the validity of the 12 soft skills clusters taxonomy.

The study proposed using the level of soft skills among construction graduates as a major indicator to achieve the study main goal. The construction industry professionals were used as an evaluator for the level of soft skills among construction graduates in entry-level positions. The survey instrument comprised of two sets of questions. The primary set had (14) questions; the first (12) question asked the respondent to rate the relative importance of each soft skills cluster with respect to career needs, and also to rate his satisfaction about the entry-level construction schools' graduate employees' ability to perform the same cluster in the job, using the same scale. The question # 13 asked them to do

the same thing for the overall twelve clusters same way. The last question in this set was (#14). It was a Yes/No question that asked the respondents about the 12 soft skills clusters. If he accept them he should answered by yes. If not, he should answer by no, and in this case the survey asks him to suggest a new cluster(s) as well as to suggest the skills that should be added to the said cluster(s).

The secondary set of questions focused on getting demographic information about the respondent and the firm that he is currently worked in. The demographic information includes the respondent gender, age, experience, his primary job function, and the geographic location for his current work. Also, it had questions on the type of his firm and its size.

Participants' population: The population for this survey was all construction employers' professionals whom can assess the soft skills among construction graduates regardless of their positions or backgrounds.

Sampling Technique: The study used stratified probable sample. The construction employers' professionals whom had accounts in LinkedIn website were used as a stratified list form the population. In order to identify the sample the researcher conduct a search on the LinkedIn website (www.linkedin.com) using the word construction as an affiliation and the filter USA as a location. This resulted in 4.8 million possible professional respondents in the United States who have a LinkedIn pages. The first 4000 were contacted by the researcher asking to connect with them. The study identified 1200 professionals as possible respondents.

Participants rating scale: Likert scale has been used; participants then rate the importance and satisfaction using one of the following expirations (Very Low, Low, Average, High, and Very High). During the data analysis, the rating has been converted so that a 5 that equaled a response of Very High, a 4 equaled a response of High, a 3 equaled a response of Average, a 2 equaled a response of Low, and a 1 equaled a response of Very Low.

Survey procedure: A draft survey has been developed and sent to the Institutional Review Board (IRB). After getting needed approvals for the IRB Protocol Management, the survey was lunched online using Virginia Tech Qualtrics website. Prior to the formal implementation of the survey, two experts from Lisa were consulted to ensure the good quality of the survey. Then, the survey was tested in a pilot administration. A LinkedIn Inmail recruitment mail was sent to each possible respondent and a follow up was conducted to each one of them after four weeks. This resulted in getting (306) respondents whom completed the survey.

The survey statistical significance: With a population of more than 4.8 million possible participants and the confidence level of the survey 95%, the confidence interval (margin of error) for the (306) respondents would be (5.6).

The survey instrument validity and reliability: Principal Component Analysis and Monte Carlo Parallel Analysis were used to examine the validity of the survey. Cronbach's Alpha was subsequently used to examine the reliability of the survey. The following are the major points in LISA's report:

- Correlations among survey items indicated that there were modest to moderate levels of overlaps across these items ($r = 0.23$ to 0.55 for importance items; $r = 0.19$ to $.60$ for satisfaction items).
- The analysis suggested that the survey measured two dimensions: satisfaction (component 1) and importance (component 2). These two components were modestly correlated ($r = 0.19$).
- Correlations between the two component scores and the two questions assessing the overall satisfaction and overall importance were calculated. The satisfaction component was substantially correlated with the overall satisfaction score at $r = 0.79$, and the importance component was substantially correlated with the overall importance score at $r = 0.71$. Cross-domain correlations were low ($r = 0.18$ and 0.16 , respectively).
- It is important to note that such analyses in no ways suggested that the 12 theoretical clusters were practically redundant or meaningless."

Participants Characteristics: The survey was sent to 1200 possible participant. 306 participants complete the core 12 questions (the important/ satisfaction questions), with a response rate of 25.5%. All of them had completed the first set of questions; however, few of the participants quite during answering the second set of questions (Part 2). The following are a summary for the participants' characteristics whereas (N) represents the number of participants who complete a particular survey question. The participant have a strong approximation to the population in terms of gender, age, experience, positions, type of their organization, size or their organization and geographical location. The following table 1 summarized those characteristics based on the participants response to the survey second set of question:

Table 1: Over View of Participants Characteristics

Category	Subcategory	Number	Number of participants
Respondent Gender	Female	267	N = 300
	Male	33	
Respondent Age	Under 25	3	N = 286
	25-34	45	
	35-44	88	
	45-54	77	
	55 and over	76	
Respondents Years of Experience	15 years and more	225	N = 298
	10-14 years	37	
	5-9 years	25	
	Less than 5 years	11	
A/E/C Type of Organization	General Contractor	91	N = 303
	Construction Management	73	
	Design Build Firm	34	
	Specialty Contractor	32	
	Design Firm	20	
	Others	35	
Size of Organization	Under 10	28	N = 303
	10-24	32	
	25-49	20	
	50-99	26	
	Over 100	197	

Results

The purpose of the industry survey was to measure the soft skills gap magnitude. The 12 soft skills clusters were used to accomplish this objective. Table 1 indicates the respondents' rate for the importance and satisfaction of each soft skills cluster as well as for the overall 12 clusters. The rating satisfaction varied from (2.87 to 3.44), while the overall rating for the 12 cluster satisfaction was (3.21). On the other hand, the importance rating varied from (4.48 to 3.62), while the overall rating for the 12 cluster Importance was (4.18).

Table 2: The survey results, n=306

Code	Cluster	Satisfaction Mean	Importance Mean
C1	Communication skills	3.23	4.48
C2	Workplace thinking skills	3.34	4.45
C3	Conflict resolution and negotiation skills	2.87	4.14
C4	Teamwork and collaboration skills	3.30	4.15
C5	Stress-management skills	3.06	4.09
C6	Workplace professionalism skills	3.22	4.12
C7	Workplace productivity skills	3.25	4.03
C8	Workplace ethics skills	3.44	4.40
C9	Workplace diversity skills	3.38	3.62
C10	Planning and organizing skills	3.26	4.25
C11	Self-intelligence skills	3.29	3.98
C12	Social intelligence skills	3.12	3.95
OA	Overall 12 Clusters	3.21	4.18

Note: n = 306. Values are based on a scale where 1 = "very low", 2 = "low", 3 = "average", 4 = "high", and 5 = "very high."

The survey satisfaction/importance means values for all (12) soft skills clusters were plotted using a web Rader chart type. Figure (10) denoted that the smallest gap between satisfaction and importance existed in workplace ethics skills. On the other hand, the largest gap existed in conflict resolution and negotiation skill.

The importance means values for the 12 soft skills clusters with respect to the respondents career needs were plotted in a bar chart after sorting the values from the highest to the lowest. As indicated in the figure (1), the survey results show that the top three soft skills clusters in importance rating were: Communication skills, Workplace thinking skills, Workplace ethics skills.

On the other hand, the survey results show that the least three soft skills clusters in importance rating were: Workplace diversity skills, Social-intelligence skills, Self-intelligence skills

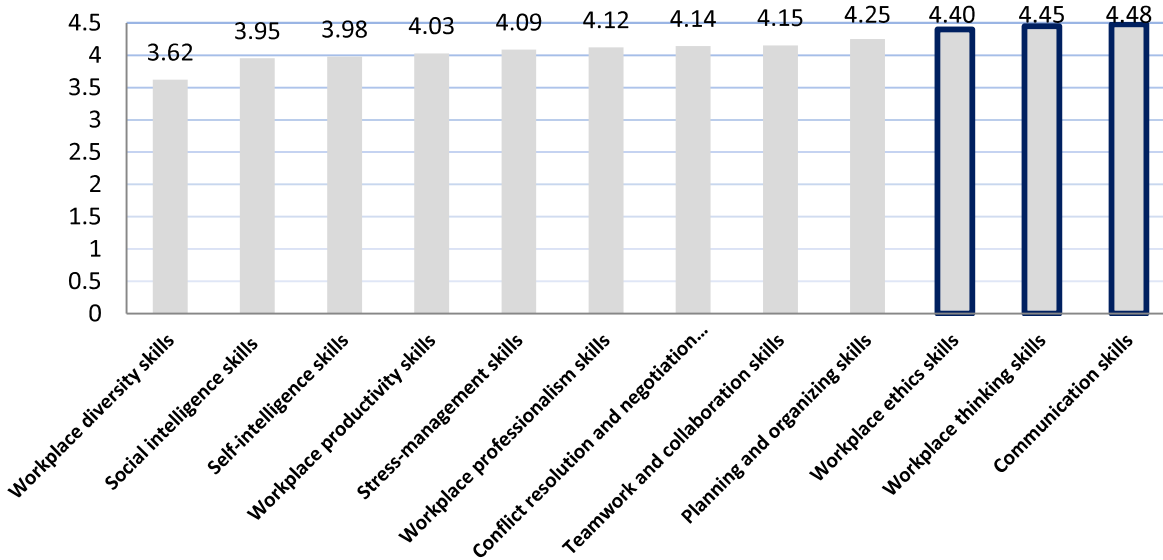


Figure 1: The 12 clusters ranking based on the respondents importance rating

Consequently, the satisfaction means values for (how satisfied the respondents are with their entry-level employees' ability to apply the skills within the cluster(s) on the job) were plotted in a bar chart after sorting the values from the

highest to the lowest. As indicated in the figure (2), the survey results show that the least three soft skills clusters in satisfaction rating were: Conflict resolution and negotiation skills, Stress-management skills, Social-intelligence skills. On the other hand, the survey results show that the top three soft skills clusters in satisfaction rating were: Workplace ethics skills, Workplace diversity skills, Workplace thinking skills.

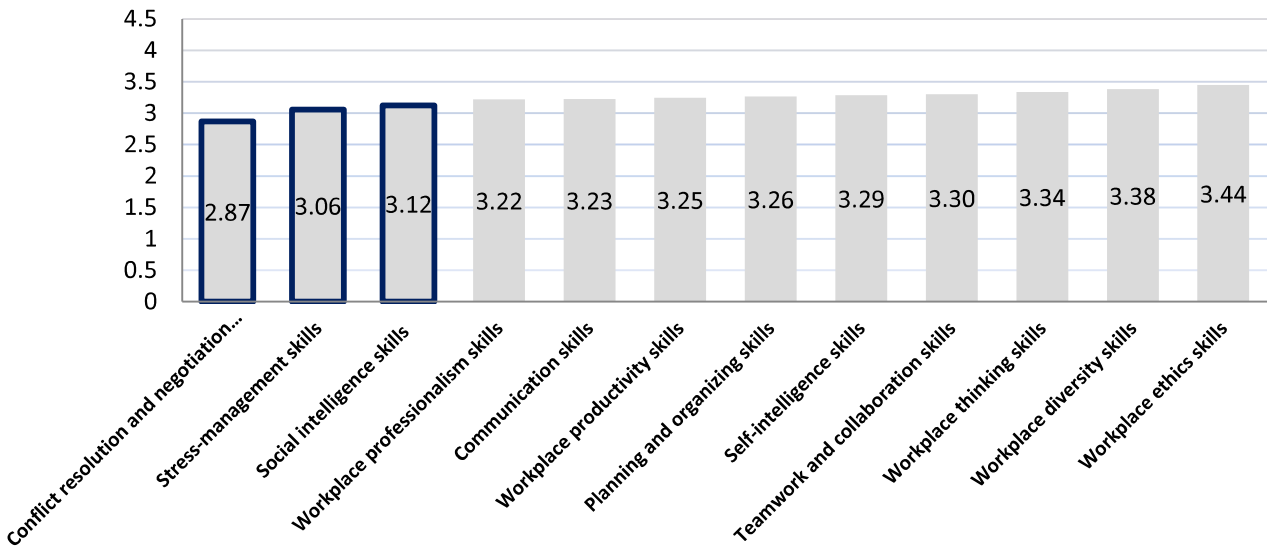


Figure 2: The 12 clusters ranking based on the respondents satisfaction rating

Conclusion

This paper summarized the effort to measure the soft skills among construction schools graduates using a twelve soft skills taxonomy. The results clearly indicate the existence of the soft skills gap among all construction schools graduates. The paper comes out with quantitative information about the importance and satisfaction rates for the 12 soft skills clusters. The quantitative rates will help other researcher to better understand the nature of soft skills gap so that they can identify areas for improvement among students to design more efficient courses. Also, develop a standardized set of processes and metrics to tackle and reduce the gap magnitude.

The authors urge construction educators to diffuse innovative learning methods that equipped future construction generations with the proper soft skills level. Authors intend to monitor the construction schools graduates soft skills performance. Moreover, they will develop more accurate tools to measure the soft skills gap among the students.

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