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An analysis to measure the skills of university graduates of Bangladesh and its significances to the employer's demand of skill

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Abstract
Unemployment problem in Bangladesh is considered as one of the major obstacle for development and highly educated unemployed population is growing every year. Market experts are indicating that lack of skills of the graduates is causing such scenario while academicians and employers are having separate preferences over employment skills. According to this study, twenty fundamental employment skills are selected and both academicians' & employers' opinions are measured by ranking the skills according to their preferences. Three scales are created and university graduates' skills are measured by each scale. After the skill measurement analysis, it's found that the academician' and employers' skill preferences have no significant differences. So, the employers' demand for skills is not causing the high number of educated unemployed graduates. As the academicians' skill preferences is not much different than the employers', the problem may lies in the curriculum of the universities.

Keywords: Skills measurement, unemployment of Bangladesh, lack of skills, employability skills, market demand of skills.

1. Introduction
Skill measurement and analysis is a widely used tool to determine the quality of an employee of an organization. It measure the skill level and the lacking of an employee so that a development plan can be undertaken. The process of measuring skill gap is an integrated part of continuous performance appraisal of an employees. Though the uses of skill measurement and analysis is not a new concept, its implementation can be used from different perspective. As the current situation of the employment in Bangladesh can be labeled as a matter of deep concern, the lack of qualified employees is the dark side of that matter. The educational intuitions are lagging behind to meet the demand of the market [1]. The high rate of unemployed population can be caused by various reasons. In the perspective of Bangladesh; technological changes, contribution of women in labor force, demographic structure, economic conditions, production of electricity (especially in Bangladesh), immigration from rural areas towards towns and cities can be highlighted as the main problems [2]. But at the same time, there is a high needs of qualified candidates in job sector. So with the availability of high number of educated unemployed people, lack of qualified employees indicates that there is a huge skill gap among the students of Bangladesh.
In Bangladesh, the students in University are generally go through a period of 4 years for a bachelor degree and one year for a master degree in their related subjects. Other than that Higher training and professional courses can be attained but the scope is very limited and costly. So most of the university students highly depend on the knowledge and experiences they gain in their academic life. So this 5 years period plays a vital part to increase the chance of their employment. Skill measurement and analysis in this period can be a significant tool to observe, identify and plan for the development of the career of the students. So that the students can adapt with the expectations of the job markets by knowing their lacking and can increase their skills and qualities according to the demand.

1.1 Background of the Study
The employment situation of Bangladesh would not be considered satisfactory though the rate of unemployment shown a bit downward in recent periods. According to World Bank, the rate of unemployment was 5.3% in 2020 which is still a matter of deep concern [3]. On the other hand, a large number of educated unemployed people are becoming a heavy burden of the society and the number is growing every year.

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University provides the highest level of tertiary education in our country. According to University Grant Commission of Bangladesh there are total of 49 public universities, 107 private universities and 3 international universities in Bangladesh [4]. So a high number of graduates becomes available for jobs in every year. Unfortunately, the scenario is a gloomy one for those graduates. 39% of those university graduates are suffering from unemployment. And 20% of the graduates experiences at least one year of unemployment [5]. The college graduates face the bitter situation as the employment rate is only 19%. Comparing University graduates and college graduates seems normal as higher degree holds its value in job market. But when the comparison occurs between polytechnic graduates and university graduates the situation reverses. Here polytechnic graduates' employment rate rises to 49% which is higher than the university graduate.

According to experts, despite of having a large number of educated unemployed people, it's still tough for them to find suitable candidate for any jobs, as the skill level of the candidates is not satisfactory. Labor market surveys have consistently demonstrated that employers struggle to fill job vacancies for highly-skilled positions such as professionals, technicians and managers: around 69 percent of employers reported a shortage of skilled applicants for professional positions [6]. Employers in Bangladesh are seeking higher-order cognitive skills and soft skills.

After graduation 34% students faces at least 2 to 3 years of unemployment before getting any job. Also 74% students think they need further training and education to hit the job market [7].

Flynn & Thomasson (2006) states there are six typs of employability skills [8]. Khaled Alshare and Maysoon F Sewailem from Qatar University used those skills as an indicator to measure the skill gaps of the business students of Qatar [9]. Though the hard skills or technical skills may vary but the soft skills or people related, personal and conceptual skills is must having qualities for all jobs. So in the perspective of Bangladesh, not only the business students but all the students from university level, can be measured based on those skills.

1.2 Significancs of the study
It is a normal expectation of our university graduates that the job opportunity in Bangladesh would be high for them as they got the highest education and training in the tertiary level. Though a degree from university helps to get a higher salary but according to survey after graduation students of polytechnic and vocational studies have the highest rate of employment [10]. It's not a wonder as experts are suggesting that university graduates lack a lot of skills which is causing a high rate of unemployment with a high needs of skilled employees. The study would help to understand the current situation of the development of the university students as their skill gaps will indicate the distance they need to cover to increase their employability. They can develop a clear understanding about the job market's demand and mind set of an employer. Moreover, an employer will also able to understand the outputs from the university and the gaps between their perceptions.

1.3 Literature Review
Susan Schmidt (1997) proposed that implementing work skill awareness program in high school will help the students to plan their career accordingly. It indicates that the gap between jobs' requirements and actual output from education system is significant [11].

R. M. Metilda and N. P.C. (2016) tried to find out how business school graduates in India fits in Indian business scenario. They found that even highly trained MBA graduates are failing to cope up with the changing expectations of the market. The employers' demands are changing but the business schools are not following the trends there [12].

While Khaled Alshare and Maysoon F Sewailem (2018) conducted a skill gap analysis to find out the business students' compatibility in 21st century's business world. They listed 20 soft skills as must for business world. Those skills are: 1) Critical Thinking/Problem-solving, 2) Dealing with "real world" problems, 3) Knowledge required in their specialized area, 4) Work Ethics, 5) Analytical Thinking, 6) Technical Skills, 7) Interpersonal Skills, 8) Creative Thinking/Innovation, 9) Adaptability & Flexibility, 10) Collaboration/Teamwork, 11) Information Technology, 12) Communication Skills, 13) Decision Making, 14) Planning & Organizing, 15) Social responsibility, 16) Global Business, 17) Leadership, 18) Multicultural Awareness, 19) Professionalism,20) Voluntarism [13].

Jessica l. Blickley and kristy deiner et al, (2013) state that only completing choosing degree path is not sufficient to be compatible for the jobs which students are likely to choose. There is a discrepancy between academic training and professional needs which make it difficult for graduate students [14].

Rizwanul Islam (1980) indicates that university graduates is a major problem group in south Asian countries and Bangladesh is not so different. There is an imbalance between demand and supply of human resources in job market of Bangladesh. There is demand of graduate in job market but also there is systematic relations between unemployment and relevance of education available [15].

Flynn & Thomasson (2006) recognizes employability skills as basic/fundamental skills (technical and knowledge of the task); Conceptual/thinking skills (planning, collecting and organizing information, problem-solving); Business skills (innovation and enterprise); community skills (civic and citizenship knowledge); People-related skills (interpersonal qualities such as communication and team work); Personal skills (attributes such as being responsible, resourceful and self-confident) [16].

Savanee Sermsuka, Duankamol Triwichitkhunb, Suwimon Wongwanichc (2013) measured skill level of secondary educated workers in Thailand. They used the following skills as the skill set for the workers: a) Fundamental skills: Communicate, Manage information, Manage information, Use numbers, Think and solve problems; b) Personal management skills: Demonstrate positive attitudes and behaviors, Be Responsible, Be Adaptable, Learn Continuously, Work Safely; c) Teamwork Skills: Work with Others, Participate in Projects and Tasks [17].

Marcel M. Robles (2012) tried to explain executives' perception about soft skills in work place. He identified 10 common soft skills based on executives' preference and they are as follows: integrity, communication, courtesy, responsibility, social skills, positive attitude, professionalism, flexibility, teamwork, and work ethic. He not only identified them but also defined them in details. Like Communication means oral, speaking capability, written, presenting, listening.

Courtesy means manners, etiquette, business etiquette, gracious, says please and thank you, Respectful. Flexibility means adaptability, willing to change, lifelong learner, accepts new things, adjusts, teachable. Integrity is defined as honest, ethical, high morals, has personal values, and does what's right. Interpersonal Skills means nice, personable, sense of humor, friendly, nurturing, empathetic, has self-control, patient, sociability, warmth, and social skills. Positive Attitude means being optimistic, enthusiastic, encouraging, happy, confident. Professionalism can be explained as businesslike, well-dressed, appearance, poised. Responsibility is accountable, reliable, gets the job done, resourceful, and self-disciplined, and wants to do well, conscientious, common sense. Teamwork means cooperative, gets along with others, agreeable, supportive, helpful, collaborative. Work Ethic is explained as hard working, willing to work, loyal, initiative, self-motivated, on time, good Attendance [18].

The Australian Chamber of Industry and Commerce and Business Council of Australia (2002) provided a framework for the employability skill for the future. In their report they define employability skills as 'skills required not only to gain employment, but also to progress within an enterprise so as to achieve one's potential and contribute successfully to enterprise strategic directions'. They also identified 8 generic skills for employment and they are: communication, teamwork, problem-solving, initiative and enterprise, planning, organizing, self-management, learning technology [19].

1.4 Objectives
The primary purpose of the study is to measure the skills of the university graduates of Bangladesh and the comparing their skill level with the current demand of the job market.
Other secondary purposes of the study are:
- To find out the required skill sets preferences based on the demand of the employers and academicians.
- To find out the skill level of the university graduates based on employers' preference.
- To find out the skill level of the university graduates based on academicians' preference.
- To find out the skill level of the university graduates based on academicians' and employers' joint preference.
- To justify the employers' preference on the skill level of the university graduates.

1.5 Hypothesis

H_0:	The demand of the employers on the skill level of the university graduates has no significant differences comparing others' preferences.
H_1:	The demand of the employers on the skill level of the university graduates has significant differences comparing others' preferences.

2. Methodology
Determining required skill set for a job can be varied person to person and also organization to organization. Sometimes the preferences of the required skill for a same kind of job differs according to the employers. So, to determine the skills required for the job market, previous literatures are discussed and 20 skills are selected as requirements for employment seekers.

A survey is conducted among the HR practitioners and academicians. They are asked to provide their preferences on the 20 skills which are listed from literatures. Based on the survey data, mean and standard deviations are calculated for every skills and they are ranked separately based on the preferences of the HR practitioners and academicians. Three scales for measuring skills are created and each are consisted of 210 score. All the skills are weighted maximum score based on the result. The highest ranked skill got maximum weight which is 20 and vice-versa lowest ranked skill got minimum weight which is 1. After that the delegated score for each skill is divided based on the skill level. High skilled will get the 100% of the weighted score. Moderately skilled will get 50% and low skilled will get 25% of the maximum weighted score.

A highly structured questioner is prepared for self-assessment of the graduates on the 20 skills listed before. Their responses are scored separately three times based on the skill measurement scales created before. The data from the survey is analyzed and three average scores on skills are calculated of the sample graduate students based on three rankings.

Now, we have one average score of the graduates which represent the academicians' preference on skill measurement. It is labeled as "A".

We also have another average score of the graduates which represent the employers' preference on skill measurement. It is labeled as "B".

And, at the end, we have the third average score of the graduates which represent the employers' preference on skill measurement. It is labeled as "C".

So to test the hypothesis, the average "C" needs to compare with other two averages "A" and "B" to find any significant differences. To compare the three averages, ANOVA test is used.

Here, repeated measure One Way ANOVA test is conducted and P value is calculated.

If P value is less than significant value or $\alpha = 0.05$, H_0 will be rejected and we can say A, B and C is not equal or there is significant differences between these three means.

If H_0 is rejected, further Post HOC analysis is conducted to test H_1. Pairwise comparison of means are analyzed to find out if C has any significant differences than A and also against B.

All the data is tabulated and analyzed using SPSS software from IBM. Both questionnaires are prepared in MS word software. For the better understanding, both questionnaires have Bangla and English version.

Table 1: Employability skills

Sl.	Name of the Skills
1.	Technical and knowledge of the task
2.	Problem-solving
3.	Planning & organizing
4.	Innovation
5.	Entrepreneurship
6.	Communication skills
7.	Decision making
8.	Social responsibility
9.	Leadership
10.	Work ethics
11	Use numbers
12	Positive attitudes and behaviors
13	Team work
14	Courtesy
15	Adaptability
16	Responsibility
17	Learning technology
18	Information technology
19	Manage information
20	Multicultural awareness

2.1 Data Source and Collection Method
As the study required both primary and secondary data, data collection method had been different for each type of data.

We used secondary data to select the skill set of the job-requirement. For that, several articles, journals and academic books are used as a source. Primary data collected from two surveys are used to create the skill measuring scales and finding the skill level of the graduates.

Data for first survey is collected through online interviews. HR practitioners and academicians are contacted through E-mail. A link of Google form is attached in the E-mail which represent the questionnaires.

Face to face interview and online interview is conducted for the second survey to conduct the self-assessment skill measurement test.

2.2 Population and Sample Size
The target population for the study is the graduates who have experienced at least 4 years of Bachelor degree in any university in Bangladesh.

For first survey, 20 academicians and 20 HR practitioners are taken as sample. And for second survey, 100 graduates are selected randomly as sample from different universities.

Table 2: Demography of the Sample.

University Type	Sample Size
Public University	40
Private University	50
International University	10
Total	100

2.3 Limitation of the study
Though the research was designed very carefully, there is always scope of further development. Selecting sample of graduate can be redefined. After graduation many graduates got employment, which may affect their skill level. Some of them continue developing their skills while many of the graduates only relying on the skills they got from their university.

Also there is scope of larger study, we consider the population other than the university students. A bigger population and larger sample may make differences into the skill preferences.

Another major limitation is self-assessment survey of the university graduate. As they are conducting their own skill measurement, there is high probability of biasedness. Designing questionnaire should have done in a way that the biases could be reduced.

3. Analysis and Findings
Based on the academicians' preference skills are ranked as below. We found that communication skills is ranked first with the highest mean value 2.75 and standard deviation of 0.44262. On the other hand decision making came last with the lowest mean value of 1.50 and standard deviation of 0.512989.

Table 3: Skill Ranking Based on Academicians' Preference

Skills	Mean		Std. Deviation
	Statistic	Std. Error	Statistic
Communication skills	2.75000	.099340	.444262
Technical and knowledge of the task	2.45000	.169752	.759155
Responsibility	2.35000	.150000	.670820
Leadership	2.20000	.171679	.767772
Social responsibility	2.15000	.195677	.875094
Entrepreneurship	2.15000	.181731	.812728
Work ethics	2.05000	.153469	.686333
Problem Solving	2.05000	.169752	.759155
Innovation	2.00000	.191943	.858395
Team work	2.00000	.191943	.858395
Planning & organizing	1.90000	.190567	.852242
Multicultural awareness	1.85000	.166623	.745160
Adaptability	1.80000	.200000	.894427
Use numbers	1.75000	.160181	.716350
Information technology	1.70000	.179179	.801315
Courtesy	1.60000	.133771	.598243
Learning technology	1.55000	.153469	.686333
Positive attitudes and behaviors	1.55000	.114133	.510418
Manage information	1.50000	.153897	.688247
Decision making	1.50000	.114708	.512989

After that, based on employers' preference from survey data, skills are again ranked as below. Here, communication skills still ranked first with mean value of 2.950 and standard deviation of 0.223607. But social responsibility came last with mean value of 1.300 and standard deviation of 0.470162.

When both employers' and academicians' preferences are considered jointly we find the following ranking of skills.

Table 5: Skill Ranking Based on Joint Preference

Skills	Mean		Std. Deviation
	Statistic	Std. Error	Statistic
Communication skills	2.85	.057	.362
Responsibility	2.43	.094	.594
Problem-solving	2.43	.113	.712
Work ethics	2.30	.109	.687
Technical and knowledge of the task	2.23	.121	.768
Information technology	2.08	.136	.859
Team work	2.00	.101	.641
Positive attitudes and behaviors	1.93	.104	.656
Leadership	1.92	.140	.888
Learning technology	1.90	.138	.871
Innovation	1.90	.106	.672
Use numbers	1.85	.111	.700
Entrepreneurship	1.85	.116	.736
Courtesy	1.83	.107	.675
Social responsibility	1.73	.129	.816
Planning & organizing	1.68	.115	.730
Multicultural awareness	1.67	.115	.730
Adaptability	1.62	.117	.740
Decision making	1.45	.080	.504
Manage information	1.40	.093	.591

The three scales of skill measurement are as follows with the scores weighted for each skill.

Table 4: Skill Ranking Based on Employers' Preference

Skills	Mean		Std. Deviation
	Statistic	Std. Error	Statistic
Communication skills	2.95000	.050000	.223607
Problem-solving	2.80000	.091766	.410391
Work ethics	2.55000	.135239	.604805
Responsibility	2.50000	.114708	.512989
Information technology	2.45000	.169752	.759155
Positive attitudes and behaviors	2.30000	.127733	.571241
Learning technology	2.25000	.203586	.910465
Courtesy	2.05000	.153469	.686333
Technical and knowledge of the task	2.00000	.162221	.725476
Team work	2.00000	.072548	.324443
Use numbers	1.95000	.153469	.686333
Innovation	1.80000	.091766	.410391
Leadership	1.65000	.208693	.933302
Entrepreneurship	1.55000	.114133	.510418
Multicultural awareness	1.50000	.153897	.688247
Adaptability	1.45000	.114133	.510418
Planning & organizing	1.45000	.135239	.604805
Decision making	1.40000	.112390	.502625
Manage information	1.30000	.105131	.470162
Social responsibility	1.30000	.105131	.470162

Table 6: Skills Measurement Scale (Academicians' preference)

Skills	Maximum weighted Score	High (100%)	Moderate (50%)	Low (25%)
Communication skills	20	20	10	5
Technical and knowledge of the task	19	19	9.5	4.75
Responsibility	18	18	9	4.5
Leadership	17	17	8.5	4.25
Social responsibility	16	16	8	4
Entrepreneurship	15	15	7.5	3.75
Work ethics	14	14	7	3.5
Problem Solving	13	13	6.5	3.25
Innovation	12	12	6	3
Team work	11	11	5.5	2.75
Planning & organizing	10	10	5	2.5
Multicultural awareness	9	9	4.5	2.25
Adaptability	8	8	4	2
Use numbers	7	7	3.5	1.75
Information technology	6	6	3	1.5
Courtesy	5	5	2.5	1.25
Learning technology	4	4	2	1
Positive attitudes and behaviors	3	3	1.5	0.75
Manage information	2	2	1	0.5
Decision making	1	1	0.5	0.25

Table 7: Skills Measurement Scale (Employers' preference)

Skills	Maximum Weighted Score	High (100%)	Moderate (50%)	Low (25%)
Communication skills	20	20	10	5
Problem-solving	19	19	9.5	4.75
Work ethics	18	18	9	4.5
Responsibility	17	17	8.5	4.25
Information technology	16	16	8	4
Positive attitudes and behaviors	15	15	7.5	3.75
Learning technology	14	14	7	3.5
Courtesy	13	13	6.5	3.25
Technical and knowledge of the task	12	12	6	3
Team work	11	11	5.5	2.75
Use numbers	10	10	5	2.5
Innovation	9	9	4.5	2.25

Leadership	8	8	4	2
Entrepreneurship	7	7	3.5	1.75
Multicultural awareness	6	6	3	1.5
Adaptability	5	5	2.5	1.25
Planning & organizing	4	4	2	1
Decision making	3	3	1.5	0.75
Manage information	2	2	1	0.5
Social responsibility	1	1	0.5	0.25

Table 8: Skills Measurement Scale (Joint preference)

Skills	Maximum Weighted Score	High (100%)	Moderate (50%)	Low (25%)
Communication skills	20	20	10	5
Responsibility	19	19	9.5	4.75
Problem-solving	18	18	9	4.5
Work ethics	17	17	8.5	4.25
Technical and knowledge of the task	16	16	8	4
Information technology	15	15	7.5	3.75
Team work	14	14	7	3.5
Positive attitudes and behaviors	13	13	6.5	3.25
Leadership	12	12	6	3
Learning technology	11	11	5.5	2.75
Innovation	10	10	5	2.5
Use numbers	9	9	4.5	2.25
Entrepreneurship	8	8	4	2
Courtesy	7	7	3.5	1.75
Social responsibility	6	6	3	1.5
Planning & organizing	5	5	2.5	1.25
Multicultural awareness	4	4	2	1
Adaptability	3	3	1.5	0.75
Decision making	2	2	1	0.5
Manage information	1	1	0.5	0.25

All the 100 university graduates are self-accessed based on these skills and each of their skills are measured based on these three scales. After that we find the mean and standard deviation of academician's preference, employers' preference and joint preference. We can find that there is not so much different in the mean value and standard deviation for all of the three preferences.

Table 9: Mean & SD of Skill Preferences

Skills Preference	Mean	Std. Deviation	N
Academician	129.78250	19.368361	100
Joint	129.33000	19.580831	100
Employer	129.27750	19.593853	100

So we performed repeated measures one-way ANOVA test to compare all three means. Here we find that, under all four criteria, the p value > α=0.50. Which means there is no significant differences between A, B & C. All the preferences are acceptable to measure the skills of the university graduates.

Table 11: Pairwise Comparison of Mean

Table 10: One Way ANOVA Test (Within-Subjects Effects)

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
SKill_preference	Sphericity Assumed	15.418	2	7.709	.306	.737
	Greenhouse-Geisser	15.418	1.148	13.428	.306	.613
	Huynh-Feldt	15.418	1.153	13.372	.306	.613
	Lower-bound	15.418	1.000	15.418	.306	.581

So, based on the result from repeated measures one-way ANOVA test, the H_0 cannot be rejected and further hypothesis test conducting is not needed. So no Post-HOC analysis is not conducted.

As part of the ANOVA test, pairwise comparison of mean is analyzed and it is found that C has no significant differences against A and also against B. In the following table, we can see that C or 3 is compared with A or 1 and B or 2. And in both comparison the significant value or p is larger than α or 0.50.

(I) SKill_preference	(J) SKill_preference	Mean Difference (I-J)	Std. Error	Sig.ᵃ	95% Confidence Interval for Differenceᵃ	
					Lower Bound	Upper Bound
3	1	-.505	.945	.594	-2.381	1.371
	2	-.053	.379	.890	-.805	.700

So, it can be stated that employers' skill preference is not significantly different than academicians' preference and joint preference.

4. Conclusion
As the study found, the skill preferences between employers and academicians has no differences, the issue of unemployment due to lack of skills among the university

graduates needs further study. According to the result of the study, employers' demand of skills is justifiable and also similar to the academicians' preference. In that case, we suggest that, the implication of academicians' preferences of employability skills is not represented in the current curriculums of the universities of Bangladesh. The development of curriculums is a continuous process and the process lags behind the trend of market demand. So, even though, academicians meet at the same point with the employers, their effort is not converting into the desired output due to the lacking in the curriculum.

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