

# New Competency Framework for Fresh Engineering Graduates in Bangladesh

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## **Abstract**

*As a growing nation Bangladesh requires to work on restructuring the competency framework at institutional level for the upcoming human resources in technical sector. It is important more than ever because the changing business context and a rising entrepreneurial DNA that prevail in today's employment market- employability of fresh engineering graduates in Bangladesh is not depended on demonstrating technical mastery alone. Along with core applications of different technical branches engineers now-a-days are involved in supply chain, procurement, planning and other managerial roles. That is why the past competencies required to secure a job is proven to be inadequate considering the demands of employers in 21<sup>st</sup> century. The average lead time to secure a job has increased despite of the fact that many of these fresh graduates are coming out of country's top-most engineering schools and with excellent academic background. The war for talent along with rising complexity of specialist roles across different industries demands prospective job seekers to be capable in terms of both tangible and intangible competencies. In this context it is important that both academic institutions and industries work closely to redefine the required competency framework upon which prospective engineering graduates could be developed. This study aims to narrow the gap by providing a likely competency framework (the required knowledge, skill and attitude levels), which eventually would contribute in fulfilling the rising talent demand in the market.*

**Keywords:** Competency, skills, Bangladesh, engineers, universities.

## **1. INTRODUCTION**

The economy of Bangladesh is growing in an exponential rate along with its equally impressive level of industrialization. The Asian Development Outlook 2016 (ADO 2016) report published by Asian Development Bank confirms the fact that “growth has held up in developing Asia despite a difficult external environment”. Bangladesh, being one of the 45 members of the Asian Development Bank is part of this select group of countries labeled as Developing Asia. In addition to the aforesaid positive economic indication, the war for attracting and retaining skilled industrial workforce is also at the rise. Bangladesh Bureau of Statistics (BBS) data shows 2% increase in industrial sector wages (i.e. wages given in production and construction related occupations) in the year 2015-2016 comparing to that of the year 2014-2015. All these evidences theoretically suggest a growing need of technical skills in Bangladesh's expanding economy. Therefore, the demand for engineering graduates should also be rising as more numbers of competent managers are required to lead larger number of blue color workers.

In reality, it has been observed that despite of the increased demand and growing need across different sectors, Recruitment Managers are finding it increasingly difficult to hire engineering graduates with the ‘right’ competences. A higher influx of engineering graduates still does not aid filling up vacant positions within the desired recruitment lead time. According to Esposito et al (2015), facilities and university must share common objectives in training undergraduate students. In addition, corporate grooming efforts to shape up fresh engineering intake through different development interventions (such as Campus to Corporate programs, customized trainings, and individual coaching) are also being

regularly incurred. In these above circumstances, undertaking an effort to review and understand the newly desired competencies by the employers is a demand of time, which this research aims to fulfill.

## 2. METHODOLOGY

In order to ensure triangulation of data in this qualitative research, three stratified sample sizes from a larger number of population (N=83) were selected based on the following criteria:

- i. Professionals involved in hiring fresh engineering graduates (Sample group n1)
- ii. Engineering graduates employed in different capacities but not involved in hiring decisions (Sample group n2)
- iii. Academics involved in market research/business studies (Sample group n3).

As main purpose of the research is to understand the desired competencies that employers in Bangladesh seek for in fresh engineering graduates, it is logical to direct significant effort in reaching and interviewing a wider number of industry professionals representing different organizations. Accordingly, forty three personnel (under sample group n1) having different company designations namely Chief Executive Officers, Managing Directors, Recruitment Managers, HR Consultants, Departmental Managers and independent entrepreneurs from different sectors were approached through email out of which twenty responded positively. In-depth interview method was used for data collection purpose using both face to face and telephonic interviews.

In addition, survey was conducted using a predesigned questionnaire for sample groups n2 and n3. The questionnaire contained both open ended and closed questions. Under sample group n2, twenty probable respondents were approached out of which sixteen respondents provided their feedback and four respondents were discarded due to incomplete forms. Under sample group n3, another twenty probable respondents were approached and eighteen responded back by filling up the questionnaire correctly.

The overall response rate out of the population size 63 ( $N=n1+n2+n3$ ) is thereby  $N/54$  i.e. 86%, which is an excellent response rate for qualitative research such as this one.

## 3. DEVELOPING THE NEW COMPETENCY FRAMEWORK

Competency encompasses knowledge, skill and attitude on a given ability or subject. Being competent implies having job specific knowledge, appropriate skill set, and the right attitude. Phrasing a competency description is very important because through a single definition all three attributes of knowledge, skill and attitude must be covered. In competency definition the ability to transfer knowledge in to workable action is referred to as skill. A person can be knowledgeable but not necessarily skilled in applying that knowledge. Similarly, a person can be knowledgeable and skilled, but might not have the necessary willingness to put his/her knowledge into work. In order to be competent, one will have to have all three of the above mentioned competency elements present.

### 3.1. Competency levels

Different levels are observed while designing competency frameworks across industries (and organizations). The levels of a competency framework vary in terms of aptitude, means and gravity. Usually organizations tend to have 3 to 7 levels for each particular competency. For the purpose of adopting a general framework (which to be used and applied for development of fresh engineering graduates across multiple sectors), a five scale rating for each competency would be most ideal

solution. Starting from the beginning, these five levels would be Negative level (Level A), Awareness level (Level B), Competent level (Level C), Expert level (Level D) and Strategic level (Level E).

Negative level implies that an individual possesses zero knowledge, skill level and attitude to adopt a particular capability or perform a specific task/subject related to that competency. The general tagline often used to describe this level of competency is 'does not know, cannot do & does not want to do'. The slightly higher level from this previous one would be Awareness level. In this level it is assumed that the said individual has sufficient idea and knowledge on the given issue/subject, but does not know how to use this knowledge and solve problems by transferring the learning into real time environment (and nor has the willingness to do so). The general tag line often used to describe this competency level is 'Knows, cannot do & does not want to do'. In reality, many of the fresh engineering graduates would demonstrate specific competencies that would belong in either of the two aforementioned levels.

The minimum desired level by employers for any particular competency would be Competent level i.e. Level C. The tagline for this particular level would be 'Knows, can do and does perform'. The later element e.g. 'does perform' is the appropriate behavioral indicator that is most sought by many of the hiring organizations. The later competency levels (Expert and Strategic levels) are going beyond performing. In the Expert level one would not only possess job specific knowledge and the required skill-set to perform the desired task, but would also have the mentality to continually develop oneself and encourage others. The highest level of the competency framework would be Strategic level (Level E) in which the individual would fulfill all the previous traits as discussed above along with enforcement of others' performance and development. Although these two later levels are also often desired by many organizations, they are seldom available readily; and organizations need to invest focused time and resource to develop incumbents to these two levels.

**Table 1. Suggested Competency levels**

<b>Competency Levels</b>	<b>Corresponding definition</b>
Level A [Not competent]	Does not know, cannot do & does not want to do
Level B [Aware]	Knows, cannot do & does not want to do
Level C [Competent]	Knows, can do and does perform
Level D [Expert]	Knows, can do, does perform + encourages others to learn & perform
Level E [Strategic]	Knows, can do, does perform + <u>ensures</u> others also learn & perform

### 3.2. Elaborating the new competency framework

Based on the data received from multiple in-depth interviews and survey questionnaire as described in the methodology section, a number of core competencies were identified for fresh engineering graduates as listed below:

1. Problem Solving
2. Financial Accumulation
3. Emotional Intelligence
4. Managing Teams
5. Technical Mastery
6. Adapting the Industry
7. Resource Investigation

General definitions for each of the identified core competencies have also been derived from the interviews with sample group n1 along with combining expert views of the authors. It is also important that apart from identifying the core competencies and defining those, each of these particular set of competencies are also divided in to five competency levels as mentioned in section 4.1. These definitions along with the proposed competency levels are listed below:

#### 4.2.1 Problem Solving

This particular competency deals with the notion of having the right skill and attitude for solving unforeseen problems and accomplishing difficult tasks by putting knowledge in to practice. The approach in problem solving needs to be proactive as well as reactive. Nowadays employers expect fresh engineering graduates to be skilled in identifying probable cause and eradicate problem elements (through innovations) even before downtime of a process/machinery takes place

**Table 2. Problem Solving**

Competency Level	Competency Element	Requirement(s)
Level A [Not competent]	Knowledge	Possesses no idea in regards to formal problem solving methods and analytical tools
	Skill	Unable to use different analytical tools or problem solving approaches both formally and informally.
	Attitude	Reluctant to use formal problem solving approach and often is the cause for delay in mitigating a given issue.
Level B [Aware]	Knowledge	Familiar with basic data collection tools (e.g. Flow Chart, Activity Diagram) and methods (such as Focused Group Discussion, Brain Storming Activity etc.)
	Skill	Does not demonstrate the ability to formally analyze a problem statement, identification of solution, or documenting and recording it.
	Attitude	Reluctant to use formal problem solving approach and often is the cause for delay in mitigating a given issue.
Level C [Competent]	Knowledge	Knows and understands the applicability of different analytical tools (such as Critical Path Analysis, RCA, SWOT) and associated monitoring tools (WBS, Gantt Chart etc.)
	Skill	Always uses different analytical tools and approaches to initiate (and capture) innovations in solving an existing or future problem.
	Attitude	Possesses a profound sense of urgency with a can do attitude.
Level D [Expert]	Knowledge	Possesses formal training on problem solving and/or project management
	Skill	Proactively helps others to incorporate problem solving tools and techniques in one's day to day activity.
	Attitude	Actively encourages others to participate in solving a given problem, thus reducing lead time.
Level E [Strategic]	Knowledge	Ensure formal training or certification for other members of the team on problem solving or project management
	Skill	Ensures everyone in the team uses documented analytical tools and formally capitalizes team members' idea to solve problems.
	Attitude	Avoids reinventing the wheel and solves problem way ahead of time.

### 4.2.2 Financial Accumulation

Muradoglu & Harvey (2012) suggests that interdisciplinary research is becoming more widespread and it is likely that greater collaboration between finance and other disciplines will develop in the future.

**Table 3. Financial Accumulation**

Competency Level	Competency Element	Requirement(s)
Level A [Not competent]	Knowledge	Possesses no idea of the basic financial terminologies (such as Revenue, Net Profit, ROI, payback period etc.)
	Skill	Does not have the ability to use, interpret and analyze financial information related to the industry/organization
	Attitude	Deliberately avoids numerical values and target setting
Level B [Aware]	Knowledge	Possesses primary idea and application of common financial terminologies and metrics used in business
	Skill	Does not have the ability to use, interpret and analyze financial information related to the industry/organization
	Attitude	Talks about the importance of using numerical values and target setting but never uses numbers accordingly
Level C [Competent]	Knowledge	Completed a college/university level course in accounting or financial management
	Skill	Demonstrates ability by using, interpreting and analyzing different financial terms and metrics in own area of work
	Attitude	Makes habit of using numbers and quantifying business issues on a regular basis
Level D [Expert]	Knowledge	Inform and educate others on the usage of different financial terms and metrics for day to day business operation
	Skill	Demonstrates ability by using, interpreting and analyzing different financial terms and metrics in departmental level (forecasting, budgeting i.e. CAPEX/OPEX etc.)
	Attitude	Encourages others to use numbers and quantify business issues on a regular basis
Level E [Strategic]	Knowledge	Ensures mandatory training and certification on financial management or accounting across the team
	Skill	Demonstrates ability by using, interpreting and analyzing different financial terms and metrics used across the industry (such as industry growth, competitor analysis etc.)
	Attitude	Ensures others also use numerical values and quantify business issues to monitor and track one's own performance

### 4.2.3 Emotional Intelligence

Another important competency which has been highlighted by employers (sample group n1) and academics (sample group n2) alike during data collection phase is Emotional Intelligence (or EI in short). Being emotionally intelligent implies that a person would effectively control self-emotion and would use both emotion and cognition before deciding the immediate course of action. According to Cherniss (2010), emotional intelligence is positively associated with productivity.

**Table 4. Emotional Intelligence**

Competency Level	Competency Element	Requirement(s)
Level A [Not competent]	Knowledge	Does not realize the importance of understanding other's emotional state.
	Skill	Does not demonstrate the ability to control & filter own emotion in changing circumstances.
	Attitude	Reluctant in listening to others' views and acting stereotypically.
Level B [Aware]	Knowledge	Aware of the verbal and visual indicators to recognize special situations and other people's emotional needs.
	Skill	Sometimes fails to demonstrate the ability to control & filter own emotions in different circumstances.
	Attitude	Catches others' words but fails to reconnect to the same emotional resonance.
Level C [Competent]	Knowledge	Trained in observing and understanding surrounding environment and human emotions either through a formal certification process (such as NLP) or through self-development initiatives.
	Skill	Demonstrates the ability to control & filter emotions in different circumstances all the time.
	Attitude	Carefully listens to other people's views and interprets correct emotion without interrupting the flow.
Level D [Expert]	Knowledge	Facilitates other's capacity development in terms of emotional intelligence by conducting formal training and coaching sessions.
	Skill	Encourages others to control & filter emotions in changing circumstances from time to time.
	Attitude	Ensures emotional catharsis by helping to release tension through individual discussion.
Level E [Strategic]	Knowledge	Ensures Line Managers and others' involvement through a systematic process to develop EI capacity across the team.
	Skill	Ensures others in the team to control & filter emotions in different circumstances from time to time.
	Attitude	Develops a process to promote active listening by ensuring formal feedback sessions between Line Managers and employees.

#### 4.2.4 Managing Teams

A significant part of this proposed competency also resolves around formation of team and leading it to the mastery of solving conflict situations as part of its own internal mechanism, thus making team leader's job easier through empowerment and delegation.

**Table 5. Managing Teams**

Competency Level	Competency Element	Requirement(s)
Level A [Not competent]	Knowledge	Has not been exposed to different team building tools and techniques along with no practical training on leadership
	Skill	Does not demonstrate the ability to handle team dynamism at all.

	Attitude	Negligent and oblivious of surrounding environment and team members' preferences
Level B [Aware]	Knowledge	Possesses some idea and personal experience in forming and handling team(s) but no formal training on teambuilding and leadership
	Skill	Fulfills the role as a team player rather than being the team leader
	Attitude	Tend to be negligent and oblivious of surrounding environment and team members' preferences
Level C [Competent]	Knowledge	Possesses a structured and well-designed formal training on handling team dynamisms and leadership
	Skill	Demonstrates effective handling of team dynamism across different levels of teams by defusing conflict situations
	Attitude	Fully aware and observant of surrounding environment and take mental note of others' behavior in different situations
Level D [Expert]	Knowledge	Shares experience and enables learning to fellow colleagues on building and leading teams
	Skill	Demonstrates proactive handling of team dynamism and eliminates any chance which could instigate a conflict situation
	Attitude	Encourages fellow team members to stay aware and observant of surrounding environment and to act as a single team
Level E [Strategic]	Knowledge	Ensures delivery of formal training/mentoring session to fellow team members on building & leading teams
	Skill	Builds a culture and practice where fellow team members are meant to resolve issues in a congenial way on their own
	Attitude	Ensures empowerment and ownership across the team

#### 4.2.5 Technical Mastery

It is generally assumed that employers (in this case sample group n1) would be in the forefront to demand technical mastery as one of the core competencies for fresh engineering graduates. Interestingly, traits or need for this particular competency were widely observed while collecting and interpreting data from sample group n2 and n3! Technical Mastery implies that a candidate is knowledgeable in his/her own area of study and also has the ability to use the learning to accomplish given tasks. Continuous learning and excellence in capacity development is also another important part of this competency.

**Table 6. Technical Mastery**

Competency Level	Competency Element	Requirement(s)
Level A [Not competent]	Knowledge	No basic idea or understanding of own area of study/subject(s)
	Skill	Does not demonstrate the capability to put theories into practices
	Attitude	No willingness to learn or experiment.
Level B [Aware]	Knowledge	Can define the common terminologies, theories and equations but does not know the practical usability
	Skill	Does not demonstrate the capability to put theories into practices.
	Attitude	Tend to learn and experiment while under pressure or in a

		supervised environment.
Level C [Competent]	Knowledge	Knows own area of subjects well and its practicability or current usage across different industries
	Skill	Demonstrates the capability to put theories into practices
	Attitude	Continuously learning and often experimenting with different ideas.
Level D [Expert]	Knowledge	Teaches others. Pursues professional certifications relevant to own area of work/study and encourages others in doing so.
	Skill	Regularly encourages others to put theories into practices
	Attitude	Instigate others by asking thought provoking questions.
Level E [Strategic]	Knowledge	Formally identifies the development needs, arrange certification courses and administer assessments as part of other's development process
	Skill	Ensures fellow team members putting theories into practices.
	Attitude	Actively coaches and mentors fellow colleagues by embracing them as one team.

#### 4.2.6 Adapting the Industry

One of the most crucial competency for any fresh engineering graduate as proposed in the new framework is Adapting the Industry.

**Table 7. Adapting with Industry**

Competency Level	Competency Element	Requirement(s)
Level A [Not competent]	Knowledge	Possesses no idea about recent industry trends and customer demands.
	Skill	Does not demonstrate the ability to be flexible and agile in particular way of working or thinking even if there is a need
	Attitude	Stereotyped and holds an obnoxious attitude towards job sector
Level B [Aware]	Knowledge	Aware about recent industry trends but fails to see the implication on own area of work or subject
	Skill	Takes significant amount of time or goes through difficulty to change existing way of working even if there is a need.
	Attitude	Demonstrates the tendency to be idealistic and often compares industries in terms of working condition or values
Level C [Competent]	Knowledge	Stays one step ahead from others in regards to industry update and knows how new trends would shape work.
	Skill	Adaptive and changes own way of working to meet changing customer requirements.
	Attitude	Receptive. Accepts reality in the way it is.
Level D [Expert]	Knowledge	Actively inform others about the trends and technology that are constantly taking place in the industry.
	Skill	Demonstrates agility and encourage others to embrace the same.
	Attitude	Acts as the change catalyst and welcomes diversity.
Level E	Knowledge	Develops a formal mechanism to facilitate knowledge



[Strategic]		sharing between different stakeholders in the industry.
	Skill	Ensure members in the team adapt to changing business demands without interruption productivity.
	Attitude	Focused, calm and appreciative to surrounding work conditions.

#### 4.2.7 Resource Investigation

Resource Investigation encompasses effective communication, presentation and research capabilities, thus helping Management to reach to a balanced decision.

**Table 8. Resource Investigation**

Competency Level	Competency Element	Requirement(s)
Level A [Not competent]	Knowledge	Possesses no basic idea on research methodology.
	Skill	Does not demonstrate the ability to identify genuine information sources to gather data on a given topic/issue.
	Attitude	Remains introvert even when instigated.
Level B [Aware]	Knowledge	Familiar with certain terms and types of research but cannot distinguish which approach or methodology to use in what context.
	Skill	Compiles information only from a single source, which was directed and bestowed upon.
	Attitude	Occasionally engages in spontaneous and meaningful conversation.
Level C [Competent]	Knowledge	Knows about the difference and applicability of different research types and data collection methods.
	Skill	Collects information from multiple genuine sources through effective communication and investigative research(s) on the given topic/problem.
	Attitude	Inquisitive and proactively develops networks.
Level D [Expert]	Knowledge	Successfully completed a university/college level course on Research Methodology or Report writing.
	Skill	Demonstrates the importance of using multiple sources and compare information before presenting to Management.
	Attitude	Critical in evaluating information.
Level E [Strategic]	Knowledge	Ensures mandatory training/certification of other team members on research methodology or report writing.
	Skill	Develops a system of both way information flow and availability of data across the organization.
	Attitude	Extrovert and always gives attention to details.

## 4. CONCLUSION

The research results in development of a balanced competency framework consisting of seven separate competencies for fresh engineering graduates in Bangladesh, which coalesces both technical and business competences on a five point rating based framework. Adopting this new competency framework for fresh engineering graduates would enable universities and certification institutions to customize, design and develop course curriculum in alignment with real-time industry requirements. A growing need to modify the existing exam based assessment style of final year engineering graduates

have also been felt and suggestion is being made to shift from content based exams to competency based assessments across Bangladesh. Further research to validate the proposed competency framework with a higher number of population size is strongly recommended.

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