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Expectation Vs Performance – A Skill Gap Analysis Among Engineering Graduates

KEYWORDS: Engineering Graduates, Employers, Skill gap

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ABSTRACT *In today's changing global environment many organizations have voiced the need for new graduates of engineering programmes to have a stronger soft- skills emphasis. For example, employers need new graduates to be good communicators and to work in multidisciplinary teams of diverse cultural backgrounds and differing personality styles. Therefore, learning institutions that are able to align with industry demands to produce graduating engineers with the right kind of skills will reap substantial benefits. But unfortunately, essential non - technical skills are still lacking among engineering graduates because most engineering schools provide students with little practical experience and few application competencies. Therefore, there is a need to equip students with the skills that employers currently desire. This study aims to identify the skill gap of the engineering graduates emphasizing the importance of the required skills perceived as significant by the employers in corporate organizations recruiting engineering graduates.*

1.1 INTRODUCTION

Education is regarded as one that contributes to social, political and cultural and economic transformation of a country. The social sector of a country, namely, health, rural development, education and employment generation has assumed great significance in the new economic regime. The prosperity of any nation is intrinsically linked to its human resources. Human capital is one of the most important assets of a country and a key determinant of a nation's economic performance. Only a quality future human capital can envision development of its nation to meet the needs of the present without compromising the ability of future generations to meet their own need. Without a quality human capital, a nation will be weak as there is no human factor that is capable to embark on new initiatives and perspectives. A quality human capital comes from a quality education process. A carefully designed and well planned education system is critical to develop such human capital. For years now, employers ranging from software service providers to retail chains have been complaining how difficult it is to find fresh graduates with the skills their industries require, whether the technical acumen to trouble-shoot business processes and systems or inter-personal and conversational skills to deal with customers and colleagues. In today's changing global environment many organisations have voiced the need for new graduates of engineering programmes to have a stronger soft- skills emphasis. For example, employers need new graduates to be good communicators and to work in multidisciplinary teams of diverse cultural backgrounds and differing personality styles. Therefore, learning institutions that are able to align with industry demands to produce graduating engineers with the right kind of skills will reap substantial benefits. But unfortunately, essential non - technical skills are still lacking among engineering graduates because most engineering schools provide students with little practical experience and few application competencies. Therefore, there is a need to equip students with the skills that employers currently desire. Indeed, many employers have expressed dissatisfaction with their hired graduates, especially with respect to soft- skills (Alpern, 1997; Shtub, 1994; Tan, 1998); the hired graduates are technically competent, but they lacked the requisite soft-skills. This shows that having technical skills alone is simply not enough to get the work task running smoothly.

This study aims to identify the skill gap of the engineering graduates emphasizing the importance of the required skills perceived as significant by the employers in corporate organizations recruiting engineering graduates.

2.1 METHODOLOGY

The objectives of this study is to examine the expectations expressed by the employers concerning the skills to be possessed by the graduates, to analyze the skill gap identifying the deficiency of the engineering graduates, to provide information, opinions, and ideas to address the current and future skills requirements of the corporate organizations.

The population comprised of corporate enterprises in Tamilnadu.These companies were screened with regard to the types of projects they dealt with, to ensure that only specific types of industries were investigated such as product manufacturing, machinery/equipment, electrical and electronic, and construction. The targeted participants comprised of experienced HR managers, Managing Directors and Project Managers who had experience and technical knowledge in making judgments and opinions on the skills of the graduate to be placed. Out of 500 questionnaires only 316 questionnaires were obtained with response, due to lack of interest in answering, unfavorable company policy, lack of time, etc.

2.2 CONCEPTUAL FRAME WORK

The skills under the opinion of the respondents were grouped based on the Bloom's taxonomy, (Bloom 1956). Bloom's taxonomy suggests the existence of three dimensions of skills such :

- **Affective skills** include the manner in which we deal with things emotionally, such as feeling, values, appre-

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ciation, enthusiasm, motivations, and attitudes.
- **Cognitive skills** involve knowledge and the development of intellectual skills.
- **Psychomotor skills** encompass physical movements, coordination, and the use of motor-skill areas.

TABLE 1: SKILLS GROUPED UNDER THREE FACTORS

FACTOR I Affective skills	FACTOR II Cognitive skills	FACTOR III Psychomotor skills
	Identify, formulate, and solve technical/engineering problems.	Written communication
Integrity		
Self-discipline	Design a system, component, or process to meet desired needs.	Design & conduct experiments, and analyze and interpret data.
Reliability		
Self-motivated		
Entrepreneurship Skills	Use appropriate/ modern tools, equipment, technologies.	Reading
Teamwork		
Understands and takes		Communication in English
directions for work	Apply knowledge of mathematics, science, engineering.	
assignments		Technical Skills
Willingness to learn		Verbal communication
Flexibility	Customer Service Skills	Basic computer
Empathy	Knowledge of contemporary issues.	Advanced computer
	Creativity	

In order to assess whether or not employer's characteristics have an impact on the level of importance among the skill factors such as Affective, Cognitive and Psychomotor Skills, the Kendall's rank correlation coefficient is used to determine whether the orderings of importance level in skills differ across sectors, size, and regions. The Kendall's rank correlation analysis is helpful when comparing the orderings of two or more groups. It is a non-parametric measure assessing the degree of correspondence between sets of rakings. A pair of variables needs to transform one rank order into the other. Depending on the degree of correspondence between the set of rankings, the Kendall's rank correlation coefficient lies between -1 and 1. If the value is 1, the agreement between two rankings is perfect (same orderings). If the value is -1, the ranking order is completely reversed. If the value is 0, the ordering of the two variables are independent.

A t- test is conducted to identify the satisfaction level of the Skill factors to see how well (or unwell) the engineering graduates meet employers' expectations. As the satisfaction level of the Skill factor is considered higher than that of employer's expectation, then engineering graduates seem to respond relatively better to the demand. However, if the satisfaction level for the Skill factor remains quite low then it show that employers are not satisfied.

TABLE 2: SKILLS GAPS BY THREE FACTOR SKILLS

Three Factor Skills	Average Mean score (Satisfaction)	Average mean score (Importance)	Average Skill Gap
AFFECTIVE	2.87	3.90	1.03
COGNITIVE	2.01	3.85	1.84
PSYCHOMOTOR	3.04	3.98	0.94

The average skill gap for the affective skills is substantially higher 1.03 compared to 0.94 for Psychomotor skills (a statistically significant difference at 1% level). Further, the importance level is higher 3.98 compared to3.04 in the third factor skill (also statistically significant at 1% level). This simple analysis shows that Indian employers demand more on affective and cognitive skills. It also indicates that the graduates are better at meeting the demand for psychomotor skills, but they fall short in meeting the demand for attitude and intellectual skills.

3.1 CONCLUSION AND POLICY IMPLICATIONS

Educating engineers with a comprehensive and deep set of skills that are in demand would be of tremendous importance for the employability of individual engineer and for the country's development. Large economic sectors, such as IT, infrastructure, power and water, rely critically upon engineering skills and technologies. This employer survey provides important new in sight on which specific skills are important for employers and where the graduates currently fall short. While the above is only an indicative results, it is the first empirical evidence that the Engineering education institutions does an inadequate job of developing analytical, evaluating and creative engineers. The above result highlights a crucial question for Indian engineering education; does the typical Indian engineering graduate sufficiently learn to build motivational and intellectual skills? or does the education model predominantly build only the thinking skills, such as remembering and understanding? Answer to these questions requires a larger employer survey assessing of the engineering graduates. The quality improvements in education lie within the extent of pedagogy, education policy and education management, which is out of the scope of this study. Therefore, this study only gives an outline of the potential actions to improve the skill set.

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