

Engineering Soft Skills: A Comparative Study Between the GCC Area Demands and the ABET Requirements.

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EXECUTIVE SUMMARY

Soft skills are increasingly in demand for engineers working in a globalized and highly interdependent world. The American Board for Engineering and Technology (ABET), among other accrediting boards, has reflected the importance of soft skills by demanding graduating engineers possess a set of soft skills as a condition for accrediting engineering programs from which they have graduated. This study aims to identify any discrepancies among the soft skills required by ABET and those demanded by companies in the Gulf Corporation Council (GCC) area.

Keywords – Soft skills, Engineers, ABET, Content analysis, GCC.

According to the National Academy of Engineering (NAE), *Grand Challenges For Engineering* (2008), the engineering profession had an irrevocable impact on human societies and their progress, whether through the metallurgical sciences that helped end the Stone Age, or the breakthroughs in shipbuilding technologies that helped connect the world, or through the invention of the printing press and the mechanical clock which revolutionized our daily lives. Despite all the achievements and innovations made, the challenges facing humanity and thus engineers are still many, some of which are the production of clean energy and e genetic manipulation to prevent diseases and slow down or even reverse the effect of aging (Jha, 2008).

Accreditation

Engineers are an essential pillar of human development. The need for a sustainable quality supply of this human resource is an imperative requirement for nations all over the globe. Thus, accreditation of the programs responsible for the education and development of engineers is of extreme importance. According to the American Psychological Association (APA), accreditation is both a process and a status. It is a process, since it entails that the institute or program is being recognized by an accrediting board or agency, and accordingly it is subjected to continuous self-study and outside review which jointly lead to the active search for better ways to enhance the quality of education. It is a status, since the accreditation provides public awareness of the institute or program by highlighting the fact that it has met the standards of the accrediting board or agency.

Although the accreditation process is a long and laborious path, the United Kingdom Accreditation Service (UKAS) emphasizes the importance of accrediting institutes and organizations. The gained benefits inherent in the exposure and sternness of the regulations outweigh all the costs incurred. These benefits extend to the government, by reducing the costs associated with employing specialist assessment personnel. More generally, any accreditation program aids in ensuring the competitiveness of the country's imports and exports. Accredited business and non-business firms are globally recognized for their quality and continuous improvement endeavors, and thus have better chances of standing out against rivals. Consumers, too, benefit from the high quality products and services on offer.

As of the mid-1990s there has been a global trend towards outcomes-based accreditation for undergraduate engineering programs (Shaeitwitz, 1999). This translates to degree programs being accredited based on the knowledge and skills of the students exiting the university, rather than on the number of hours dedicated to each subject. Worldwide, there exist many engineering boards for accreditation. Many of those if not most are country based but with a worldwide reaching impact and initiative. Some of them include the "Commission des Titres d'Ingénieur" (CTI) from France, "The Engineering Accreditation Board" (EAB) from the United Kingdom, The Canadian Engineering Accreditation Board (CEAB) from Canada, and the "American Board for Engineering and Technology" (ABET), naturally from America.

ABET as an entity came into existence in 1980, but its origins lay in the "Engineers' Council for Professional Development" (ECPD), which is an American professional body established in June 1932 when several engineering societies joined forces to establish a unit that was dedicated to the education, accreditation, regulation, and professional development of the engineering professionals and students in the United States. By 1947, ECPD had accredited 580 undergraduate engineering programs at 133 institutions. Currently, ABET is following up on the accreditation of over 3,100 programs at more than 600 colleges and universities worldwide. It is responsible for the specialized accreditation of educational programs in applied science, computing, engineering, and technology. It accredits specific programs of study at interested institutions, rather than the institution as a whole (ABET: *The Basics of Accreditation*, 2010). ABET is a recognized leader in accrediting engineering programs and hence has been used here as the reference for desired outcomes of engineering graduates.

Engineering Domains

According to Martin et al. (2006), technical competencies can be divided into two distinct areas, namely the 'science of engineering' and the 'practice of engineering'. The science of engineering manifested in the technical knowledge and skills get the lion's share in engineering programs in the USA, since demonstrated technical ability has always been the focus for determining whether or not a student is competent as an engineer (Sageev & Romanowski, 2001). Still, it is possible for graduate engineers to finish their university education without sufficient problem recognition and solution skills, since the open-ended design problems used in improving the students' abilities in the practice of engineering require practice and experience and improve only through time (Evans et al., 1993; Scott & Yattes, 2002).

The practice of engineering is manifested in the non-technical competencies, which include teamwork, communication, global awareness, the development of a professional and ethical attitude, and life-long learning. Good interpersonal skills play an important role in effective teamwork and high performance in the workplace (Meier et al., 2000; Lang et al., 1999). Interpersonal skills include listening skills, sharing information and cooperating with co-workers, and the ability to cope with office dynamics. The communication of technical information to diverse audiences is another critical skill. Life-long learning is a critical skill expected of graduate engineers (Meier et al., 2000). This implies the ability to adapt to changing work environments, to learn new skills, and to assess one's own abilities.

The importance of these so-called soft skills is stressed by Sageev and Romanowski (2001), who believed that the technical abilities should be a given, whereas communication and leadership truly differentiate. Accordingly, these non-technical, frequently called soft-skills, are highly required by accrediting engineering bodies such as the ABET. Teamwork and communication skills are important attributes where "competency gaps" are frequently spotted (Holcombe, 2003). Engineering graduates also seem to face a difficulty in understanding the business and economic aspects of their industry (Holcombe, 2003).

Soft Skills

Graduates have been regularly criticized by employers and educators for their lack of soft skills (Schulz, 2007). Science and engineering programs seem to be the most blamed for failing to prepare these graduates. This is partly due to the focus of engineering schools on hard or technical skills which encompasses practical or managerial processes related to an organization's core business like hardware operation and safety standards and procedures (Coates, 2006). Communication skills along with business knowledge and project management skills are primarily missed soft skills that are desired for graduates entering the business world (Schulz, 2007). Ford (2007), in the biannual examination of the graduate job market in the UK, published by the Association of Graduate Recruiters (AGR), confirms this notion by stating that employers believe that numerous graduates, although academically skilled, lack soft skills such as team work, communication, verbal and numerical reasoning (AGR, 2007). Schwanitz (1999) rated the levels of soft skills administered by a fictional fresh graduate of Mechanical Engineering extremely low with respect to that of a graduate of History of Arts.

Non-scientific academic programs in general put more emphasis on soft skills, or they are by their nature very soft skill related (Schulz, 2007). However, the increasing sophistication of the business arena is demanding more coordination and communication among various diverse entities, domains, and individuals. Accordingly, employers are demanding higher levels of soft skills from their recruits (Firth, 2011). Similarly, globalization has put pressure on universities to graduate engineers that possess expert knowledge and be able to think in terms of international, technical, social, and financial relationships (Hopp, 2000).

Defining soft skills is not an easy matter, since what might be considered a soft skill in this domain might be a hard skill in another (Schulz, 2007). Cultural awareness, for example, might be a marginal skill for a chemist but an absolute necessity for an individual working in the HR domain. Nonetheless, Whitmore and Fry (1974) defined soft skills as central job-related abilities that involve slight or no interaction with hardware and whose application on the job is fairly widespread. Soft skills play a vital role in determining an individual's personality by augmenting his/her hard skills (Schulz, 2007). Hard and soft skills collectively establish professional proficiency of an individual which sanctions a goal-oriented and situational achievement of working tasks (Kauffeld, Grote, & Frieling, 2003).

Criterion number three, "Student Outcomes," of ABET's "Criteria For Accrediting Engineering Programs" for the accreditation cycle 2011-2012, highlights eleven skills that any engineering program interested in getting accredited by ABET should help provide to its graduates. The first six of which are considered soft skills and the others are meant to be technical in nature.

- a. an ability to function on multidisciplinary teams
- b. an ability to communicate effectively
- c. a recognition of the need for, and an ability to engage in life-long learning
- d. a knowledge of contemporary issues
- e. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context

- f. an understanding of professional and ethical responsibility
- g. an ability to apply knowledge of mathematics, science, and engineering
- h. an ability to design and conduct experiments, as well as to analyze and interpret data
- i. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- j. an ability to identify, formulate, and solve engineering problems
- k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

Brief Background Information about the Workforce in the GCC

The Gulf Cooperation Council (GCC) was established on the 25th of May, 1981 as a cooperative framework joining the State of Bahrain, Kingdom of Saudi Arabia, Sultanate of Oman, State of Qatar, and State of Kuwait. The objective of the GCC, as stated in their charter, is to effect coordination, integration, and inter-connection between member states in all fields such as economy, finance, trade, customs, tourism, legislation, administration, as well as fostering scientific and technical progress, setting up joint ventures, and encouraging cooperation of the private sector (GCC Charter, 2011). Kapiszewski (2006) noted some workforce related particularities of the GCC area. Foreign workers in western European countries usually work in lower-status jobs, whereas in the GCC countries they assume primary roles in all sectors of the economy. Another interesting fact is the changing demographics of the region where the expatriate workforce have substituted the national labor force, due to many political, economical, and social forces which have rendered the Arab workers incompatible for the oil-rich economies. This change in the composition of the workforce has led many GCC states to adopt strategies, as Saudization, Omanization, and Emiratisation to help ensure local workforce employment. These strategies have not proved to be successful, as the foreign labor still constitutes the bulk of the workforce.

As such, the GCC is one of the largest markets for Arab and Asian job seekers. The discovery and development of their oil wealth and the lack of a qualified local workforce have led them to employ a large number of expatriates (Kapiszewski, 2006). According to a 2008 survey done by the GCC, foreigners constituted more than 30% of the population and occupied almost 70% of the jobs in the public and private sectors. Consequently, the nature of the GCC area and its large expatriate labor force warrants considering it for the purpose of conducting such a study.

Thus, diversity is high in the GCC area in terms of race, ethnicity, country of origin, culture, and educational background. This latter diversity seems extremely important to tackle, since unlike other regions where the majority of graduates are the products of similar educational regimes, the engineers working in the area have different educational backgrounds.

RESEARCH DESIGN AND STRATEGIES

Methodology

Quantitative content analysis was applied in this research. Thus, the research methodology section is divided according to the steps generally required by such an analytical procedure, as explained by Wimmer and Dominick (2002).

Research Questions

RQ1: What are the main soft skills currently demanded from engineers looking for jobs in the GCC area?

RQ2: Do these soft skills differ from the ones demanded by the ABET accreditation body?

Population and Sample

The research questions were answered by looking at job postings for engineers made in the GCC area. Accordingly, the top three websites on which jobs were posted were selected. These websites are gulftalent.com, bayt.com, and monstergulf.com. All strands of engineering jobs were included in the analysis, by including the word 'engineering' in our job search. This yielded a total of 4,334 job posting of which, 1674 were for Gulf Talent, 2005 for Bayt, and 665 for Monster Gulf.

A purposive sample of every third link was then taken to create the sample for the research. This created a total of 1,423 sites. One hundred twenty three of these selected links were used for the pilot study. They were extracted from the original collected sample list through the selection of every 10th site. Based on the pilot study conducted, 'adaptability' was changed to 'cultural tolerance' and 'good presentation appearance' was altered to 'presentation skills'. Some traits were also cancelled out such as 'ability to fill out job application' and 'understanding what the world is about'. Of the 1,300 remaining sites allocated for the sample, 57 of them were disregarded due to being outside the GCC area, another 86 links were also disregarded for being inaccessible by the time they were accessed for analysis, and 364 were similarly disregarded for posting the same job on more than one site. This left a total of 793 sites to be analyzed. The websites were accessed from 1st May 2011 to the 5th of July 2011.

Choice of Websites

In our search for GCC job employment websites, we ran through seven promising websites using Google web search engine. The sites are listed in random order:

- Gulf Talent (www.gulftalent.com)
- Monster Gulf (www.monstergulf.com)
- Bayt (www.bayt.com)
- Gulf Job Sites (www.gulfjobsites.com)
- Naukri Gulf (www.naukrigulf.com)
- Career jet (www.careerjet.ae)
- The Emirates Network (www.theemiratesnetwork.com)

Web metrics, implied by Alexa.com, were used to choose from the list of websites. Alexa is a California-based subsidiary company of Amazon.com that operates in the internet information provider industry. The company uses its own toolbar (Alexa Toolbar) for Microsoft Internet Explorer and integrated sidebars in Mozilla Firefox and Google Chrome to collect data on browsing activities. Such data is transmitted to Alexa.com where it is stored, analyzed, and used as basis for the company's web traffic reports. There are several reservations concerning Alexa.com. The websites deals with 3 months old data, thus the information can be outdated since many websites can change in ranking during the relatively large time frame of 3 months. Furthermore, the company can only keep track of websites accessed via web browsers that have the Alexa Toolbar installed. Even though such criticisms are leveled at Alexa.com, the website and its data remain one of the most reliable on the web.

The websites were chosen according to the following criteria:

- Traffic Rank: measures website popularity. The rank is calculated using a combination of average daily visitors to the website and the page views of the website over the past 3 months. The site with the highest combination of visitors and page views is ranked #1.
- Reputation: The number of links to the website from sites visited by users in the Alexa traffic panel. Links that were not seen by users in the Alexa traffic panel are not counted. Multiple links from the same site are only counted once.
- Bounce Rate: It represents the percentage of visitors who enter the site and "bounce" (leave the site) rather than continue viewing other pages within the same site.
- Most Visitors From: Shows the country from which the most visitors originated along with a percentage of those countries visitors in relation to the overall percentage.
- Age: displays the approximate age of a website on the Internet.

As we can see, Gulf Talent, Monster Gulf, and Bayt have the highest traffic among the seven selected websites, with Bayt ranking as 4,704 on the worldwide web traffic scene. As to reputation, Naukri Gulf has the second highest, 303 after Bayt's 764. It should be noted though that Gulf Talent and Monster Gulf have relatively high reputations, with Gulf Talent coming in at third place with 259 and Monster Gulf coming in at fourth place with 203. The bounce rate is harder to clarify, since it is used to measure the engagement of visitors. The higher the bounce rate, the less engaging the site is supposed to be.

However, this is a one sided interpretation according to Quartz Effect (a UK marketing firm) Marketing Blog, because a high bounce rate doesn't necessarily means users were intimidated by what they saw on the landing page and decided to leave. It could mean that users immediately found what they were seeking, and therefore it was unnecessary for them to explore further. This could very much be the case especially with job employment websites, where users are simply looking for the right page that contains potential jobs, and job employment websites homepage rarely contains such information. As such, an ideal bounce rate is hard to build upon in our selection.

TABLE 1
Web Metrics

Criteria	Websites						
	GulfTalent	Monstergulf	Bayt	Gulfjobsites	Naukrigulf	Careerjet	Theemiratesnetwork
Traffic Rank	17,178	16,928	4,704	174,903	17,700	100,305	63,065
Reputation	259	203	764	135	304	93	136
Bounce Rate (3months)	36.2%	49.4%	31.3%	40%	32.4%	52.9%	63.7%
Most Visitors from (3 months)	UAE (19.2%)	Saudi Arabia (30.9%)	Egypt (15.6%)	Pakistan (47.9%)	UAE (30.2%)	UAE (22.2%)	UAE (34.1%)
Age	7 years	4 years	13 years	9 years	5 years	4 years	8 years

Accessed on the 31th of May 2011, www.alexa.com

Another important aspect that influences the choice of the website is its credibility. In this case, credibility is not necessarily website based, but rather pending on the third party's credibility, which is the companies' posting employment ads. It is in no one's interest to publish fraudulent job postings, since it is both harmful to the website and the company itself. As such, the unique relationship between the job posting websites and the 3rd parties posting these jobs create a credible milieu where information is generally truthfully portrayed. Accordingly, Gulf Talent, Monster Gulf, and Bayt were the websites of choice to be checked for soft skills demanded from engineers in the labor market of the GCC area.

Content Analysis

Content analysis is possibly one of the most significant research techniques in the social sciences (Krippendorff, 2004). It has been defined as a methodical, reproducible method for compressing numerous words of text into smaller amount of content categories based on clear rules of coding (GAO, 1996). It is context responsive, capable of handling formless matter and of processing large volumes of data (Krippendorff, 2004). The latter strength makes it particularly suited to explore data on the World Wide Web, as new information grows exponentially in the digital realm (Zhang, 2005).

Newhagen and Rafaeli (1996) highlighted five fundamental dimensions in which WWW-based communication differs from traditional media: multimedia, hypertextuality, packet switching, synchronicity, and interactivity. Unlike other media, all the five qualities are engineered and deserved descriptive examination (Newhagen & Rafaeli, 1996, p.2). The World Wide Web is a unique combination of the short lived and the long lived (Schneider & Foot, 2004). The first aspect entails that web content can exist for a short period of time, thus researchers require unique techniques to ensure that the web content can be reviewed later. Secondly, web content must be reconstructed after it is checked. Simply taking a photo of the website will not suffice, since many other functionalities are lost like multimedia, interactive, and feedback mechanism. Although not a single traditional medium can capture all these characteristics, content analysis is still one of the most popular research methods in the study of the World Wide Web (Zhang, 2005).

Thus, based on the research objectives, method suitability, and data availability, content analysis was used. Analyzing how frequently a factor appears seemed the most accurate way for gathering information, since the material to be analyzed is located only on websites.

FINDINGS

Presentation of Findings

There is no general agreement on what counts as a soft skill, however a comprehensive list of 60 different soft skills was developed by Phani (2007) and used in our work. These 60 soft skills were grouped under six categories: stamina, people/personal, legal/rules, language structure, science/essential skills, and background. Each of the 793 job postings was manually scrutinized by multiple researchers to check for mention of each of these 60 soft skills.

Tables containing the soft skills as grouped by Phani (2007) and a summary of the findings for each category are presented below. The 'Number of times found' column demonstrates the total number of sites found mentioning a particular soft skill within the 793 sites that were analyzed. The 'Percentage' column shows the percentage of the sample mentioning that specific soft skill. The tables followed by their analysis are presented first, then follows a comparison of the results with the ABET requirements to check for any discrepancies.

TABLE 2
Stamina Category of Soft Skills

Soft Skill	Number of times found	Percentage
Staying on the job until it is finished	10	1.3%
Willingness to work second and third shifts	3	0.4%
Not expecting to become a supervisor in the first six months	0	0%
Willingness to be a good worker and go beyond the traditional eight-hour day.	0	0%
Total	13	

'Staying on the job until it is finished' seems to be the most prominent soft skill demanded under the stamina category, however, this skill occupies a very small percentage when considering the whole sample. ABET makes no mention of stamina in its requirements for accreditation. Stamina, although very important, seems to refer to the ability to uphold extended physical or mental effort, which in turn is hard to measure and might lead to legal and ethical problems for the firms demanding it and some sort of exploitation for the employees undergoing it. Thus, not being mentioned by ABET and scarcely asked for by the firms is quite understandable.

This category contains the biggest number of soft skills and the highest total of cited votes, which signifies its importance. The human resource aspect of the firm is gaining more weight as a major success factor in firms. 'Communication skills with public, fellow employees, supervisors, and customers' and 'Team skills' are highly asked for by 151 and 143 job postings respectively. However, the importance of these skills is not limited to these numbers, as other related soft skills show considerable command, such as eye contact, interpersonal skills, and cooperativeness. Critical thinking skills and personal integrity are also highly demanded.

The 'Drivers license' got the highest score in this category. This seems understandable given that that public transportation is not as developed as in the western world, plus the necessity to work in remote sites or mobility across different locations oblige engineers to drive. Nevertheless, the number of times this skill is cited is still very little considering the whole sample.

TABLE 3
People/Personal Category of Soft Skills

Soft Skill	Number of times found	Percentage
Eye contact	48	6.1%
Team skills	143	18%
Courtesy	8	1%
Good attitude	28	3.5%
Safety	24	3%
Reliability	28	3.5%
Cultural tolerance	56	7.1%
Cooperativeness	52	6.6%
Flexibility	30	3.8%
Self directed	20	2.5%
Personal energy	0	0%
Personal integrity	60	7.6%
Positive work ethic	32	4%
Interpersonal skills	64	8.1%
Motivational skills	52	6.6%
Personal chemistry	0	0%
Willingness to learn	28	3.5%
Common sense	16	2%
Self-supervising	16	2%
Critical thinking skills	92	11.6%
Presentation skills	12	1.5%
Wanting to do a good job	20	2.5%
Ability to relate to coworkers in a close environment	24	3%
Commitment to continued training and learning	12	1.5%
Caring about seeing the company succeed	24	3.0%
Communication skills with public, fellow employees, supervisors, and customers	151	19%
Total	1044	

TABLE 4
Legal/Rules Category of Soft Skills

Soft Skill	Number of times found	Percentage
Follow rules	20	2.5%
Drivers license	24	3.0%
Being drug free	0	0%
Reporting to work on time	0	0%
Ability to follow regulations	8	1.0
Willingness to take instruction and responsibility	20	2.5%
Willingness to be accountable	12	1.5%
Total	84	

TABLE 5
Language Structure Category of Soft Skills

Grammar	100	12.6%
Writing skills	131	16.5%
Basic spelling and grammar	135	17.0%
Reading and comprehension	131	16.5%
Demand for English	167	21.1%
Demand for French	3	0.4%
Demand for Arabic	32	4.0%
Two or more languages spoken	65	8.2%
Total	764	

TABLE 6
Science/Essential Skills Category

Soft Skill	Number of times found	Percentage
Math	32	4%
Advanced math	16	2.0%
Knowledge of fractions	4	0.5%
Ability to measure	8	1.0%
Use of rulers and calculators	36	4.5%
Ability to make production quotas	44	5.5%
Basic manufacturing skills training	20	2.5%
Awareness of how business works	60	7.6%
Ability to read and follow instructions	16	2%
Ability to listen and document what you have heard	4	5%
Total	240	

The language structure category shows the 'Demand for English' to be the most prominent sub-category with more than 21% of job postings demanding it. This comes in stark contrast to the 'Demand for French' and the 'Demand for Arabic' with only 0.4% and 4% of postings claiming these, respectively. This asserts the supremacy of the English language in the business world. 'Basic spelling and grammar' comes next in importance, although it is quite normal for any engineer to have basic knowledge of these.

Although cited as a soft-skill category by our adopted source for soft-skills, these are considered technical skills under ABET. The 'Awareness of how business works' skill seems to be the most highly demanded by 60 sites, followed by the 'Ability to make production quotas' demanded by 44 sites.

TABLE 7
Background Soft Skills Category

Soft Skill	Number of times found	Percentage
Good reference	16	2%
Good attendance	0	0%
Total	16	

The background category had only two soft skills, which minimizes its standing among other soft-skill categories. ‘Good reference’ was requested by a meager 2% of the job postings, yet this still reflects the importance of affiliations and relations in the GCC area where the high-context Arab culture highly prevails. Nevertheless, one could wonder whether ‘Good reference’ is a soft skill in the first place.

Analysis of Findings

With respect to the first research question about what soft skills are currently demanded from engineers in the GCC, the ‘Demand for English’ took the lead role with 21.1% of the sites demanding it, followed by ‘Communication Skills with public, fellow employees, supervisors, customers’, and ‘Team skills’ with 19% and 18% of the sites proclaiming these respectively. However, the importance of these latter two should not be limited to these figures. ‘Interpersonal skills’ and ‘Eye contact’ accounting for 8.1% and 6% respectively both add to the heated demand for communication skills. Similarly, ‘Cooperativeness’ accounting for 6.6% back up the already sizzling demand for team work. ‘Cultural tolerance’, ‘Motivational skills’ and ‘Personal integrity’ came in close with each being requested by around 7% of the job postings. ‘Critical thinking skills’ topped these by proclaiming its place with 12% of the sites. ‘Drivers’ license’ and ‘Staying on the job until it is finished’ asserted their leading places in their own categories.

In terms of categories of soft skills, people (personal) category came in first place, language structure ranked second, science/essential skills ranked third place whilst fourth place was proclaimed by the legal category. Background and stamina categories came in fifth and sixth place, respectively.

As to the second research question about any differences between the standards demanded by the ABET and those demanded by employers in the GCC area, several points are worthy of being mentioned. The first five soft skills demanded by ABET are greatly demanded by employers in the GCC area, although they came under different headings and with some modifications. The ‘ability to function in multi-disciplinary teams’ was defined as ‘team skills’ in this research, and it seems to be in high demand as 18% of the companies are demanding it. However, it is worth noting that multi-disciplinarity demanded by ABET is more precise than team work, as it demands team work among individuals coming from different disciplines and not just among people working under the same capacity. The ‘ability to communicate effectively’ under ABET came as ‘communication skills with public, fellow employees, supervisors and customers’ and it was in high demand by 19% of the companies, not to mention the interpersonal skills and the eye-contact demanded by more than 8% and 6% respectively.

The ‘recognition of the need for, and an ability to engage in lifelong learning’ sub category was replaced by the ‘commitment to continued training and learning’ and ‘willingness to learn’. These are not widely demanded by the market as a mere 1.5% and 3.5% of the employers demanded them, respectively. ABET seems to be forward looking and strategic when it comes to the demanding of the lifelong learning subcategory, as this latter criterion stresses the longevity and continuity of the firm. The ‘knowledge of contemporary issues’ and the ‘broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context’ sub categories could be lightly satisfied and indirectly linked to the ‘critical thinking skills’ demanded in this research, which received 11.6% of the employers’ votes. In conclusion, most of the soft skills demanded by ABET were highly relevant to the demands of the employers in the GCC market. ABET’s requirements, though, were more accurate as in the case of demanding multi-disciplinary skills, more strategic as in the case of demanding lifelong learning, and more contemporary and understanding of interdependency among events and domains.

‘An understanding of professional and ethical responsibility’ was the sixth and last soft skill demanded by ABET. None of the soft skills demanded by the GCC area match this higher level skill demanded by the ABET. The GCC market places great emphasis on ‘drivers’ license’ and the mere ‘willingness to take instruction and responsibility.’ This latter skill demanded by employers do not rise by any means to the standards set by ABET, since ‘professional and ethical responsibility’ encompasses much more than rule following. The three building blocks for any type of professionalism are select knowledge, genuine concern for the clients, and the right to take the decisions one sees suitable (Bottery, 1996). These principles of professionalism intersect with the demanded aspect of responsibility but outweigh that of submission to instructions.

ABET has no accreditation demands regarding language structure, since this is inherent. ABET accredits schools presumably following the American system and one cannot communicate without knowledge of English within this system. However, the ‘demand for English’ was the most demanded skill among all the other skills and across all the categories in our study. Employers’ high demand for the English language is greatly understandable when employing such a culturally and

educationally diverse workforce, as explained in the review of literature. A common language is highly needed under the circumstances, and English is the language of choice in today's business world without any close competition.

ABET's five last skills are technical rather than soft, and thus they lie beyond the scope of this paper. In other words, they correspond to the science of engineering rather than to the practice of engineering as already explained in the literature review. Whereas, the list of skills under the science category adopted in our research is truly soft skill related as all of its criteria land on the boundaries of the core science part, and thus they augment and supplement the engineering science. Collectively, effective listening, proper documentation, and business awareness skills among other skills in this category received a sum of 240 votes from 793 sites, and thus their significance should not be underestimated.

CONCLUDING REMARKS

This study has tried to highlight the major soft skills demanded from engineers seeking employment in the GCC area. These were compared with the soft skills demanded by the ABET to check for any discrepancies between the expectations of the accrediting bodies and the professional fields. Although the 60 soft skills identified and checked for in this study outnumber those required by the ABET, these latter ones seem to be more strategic, contemporary, interdisciplinary, and considerate of interdependencies. This was not surprising, since accreditation requirements are made to be enduring and guiding in nature rather than specific and bounding. No major discrepancies were spotted except for that of the English language which was greatly demanded by employers in the GCC area but was considered inherent by ABET. With globalization, a common communication medium seems to be indispensable, especially in such a diverse workplace as the GCC. Communication skills and team skills were rightly stressed by the ABET, since they were highly demanded by the workplace.

A similar study could be conducted at specified points in the future to check for any uprising inconsistencies between accreditation demands and real market demands. This research could also be considered a stepping stone for deeper research that could be carried out in the future with employers themselves in order to consider their own points of view regarding the challenges faced with fresh engineering recruits.

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