

MEETING REAL WORK DEMANDS OF THE GLOBAL ECONOMY

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ABSTRACT

The purpose of this case study is to explore the employer's perspective on the job skills required for STEM (Science, Technology, Engineering and Mathematics) based jobs. A corporate perspective is used to construct a framework for understanding the skills that affect new college graduates. A case study method is adopted involving purposeful sampling strategy of Aerospace & Defense Industry (A & D) organizations, from the Deloitte Toche Tohmatsu Limited (DTTL) 2014 Global A&D sector financial performance study. The study provides a framework for meeting real world demands and presents a model that will identify key factors in the terms of skills required for the college graduates. The model of key factors from the A & D industry will improve the alignment between employer's requirements and high-wage, high-demand jobs. The study will help fill the gap on employer's expectations and necessary skills required to compete in the global economy. By propelling change in the way that universities help prepare their graduates with the necessary skills, will ensure an enduring impact on the workforce. College graduates that develop their skills, enjoy a competitive advantage over other graduates.

Keywords: Employment Skills, Human Capital, Performance, Graduates, Stem Workforce, Aerospace & Defense Industry, Project Management.

INTRODUCTION

Meeting the demands of the global economy requires an education, that embraces the changes needed in the workforce. Carnevale, Smith, & Strohl (2013) noted that, the fastest growing occupations will be in Science, Technology, Engineering & Math (STEM), along with Healthcare Professions, and Community Services. These occupations will require higher levels of education to compete for positions.

Carnevale, Smith & Melton (2011) reflects on trends in STEM fields, that have a direct impact on innovation and productivity in the United States (US). These occupations are the highest paid in the global economy, and second only to healthcare, which is the fastest growing occupation. Half of all STEM positions are in the manufacturing, health care and construction industries.

Between 2008 and 2018, STEM occupations are expected to grow by 17 percent. STEM workers command about 27 percent more wages than the non-STEM based occupations. Meeting demands for the number of workers in the STEM occupations will be an important

component in the US economy (Langdon et al., 2011). The growing trends in innovation that use science and technology to develop breakthroughs, also require a whole new set of soft skills to work outside traditional environments (Fountain and Atkinson, 1998).

Determining the workforce attributes that predict success, creates a better alignment between the skills that employers require for high wage and high-demand jobs (Carnevale et al., 2013). Creating a talented pool of workers is important to the US labor pool. There is a lack of published research about the transition of graduates into the workforce (Finch et al., 2013; Wickramasinghe and Perera, 2010; Ball, 2003; Connor and Shaw, 2008; Holden and Hamblett, 2007). The problem is due to the lack of information available, that is specific to the factors that contribute to the success of college graduates in the Global A & D Industry.

The research will develop a framework for meeting real world demands in a global economy. The study will identify key factors, in terms of skill required of college graduates, for new positions. The model of key factors

from the A & D industry will improve the alignment between employer's requirements and high wage, high demand jobs. The purpose of this case study is to explore the employer's perspective on the skills that influence the hiring of college graduates. The following research question was defined for the present study:

What is the employer's perception of the skills required by a graduate?

1. Literature Review

It is a realistic fact that your lifetime earnings are determined by the age of 18. In 2010, STEM occupations with high school diplomas earned hourly wages of \$24.82, while Bachelor degrees earned \$35.81 and Graduate degrees earned \$40.69. The difference between the high school graduate and a graduate degree was 59.6 percentage in the hourly wage (Langdon et al, 2011). Understanding the job growth and skill requirements by employers, play an important role in employability upon graduation.

The global economy has created new skill requirements that require a higher level of interpersonal, problem solving and behavioral skills, because work involves a higher level of human interaction (Carnevale et al., 2011, Carnevale, Smith, & Strohl 2013). Hart Research Associates (2015) report reflects, written and oral communication skills, teamwork skills, ethical decision making, critical skills, and ability to apply knowledge in real-world settings as highly valued skills by employers.

Employers have the perception that, a college education will provide graduates with the skills to perform their jobs. Employers maintain that, they need graduates to have basic employability skills (Rosenberg, et al., 2012). Business executives have found that, technical skills known as hard skills is not enough to keep an individual employed. Employers rate soft skills as a critical component to entry-level success on the job. Technical skills are part of the educational curriculum, but soft skills improve the success of college graduates (Robles, 2012).

The number one skill wanted by employers was communication skills, demonstrating effective listening and oral communication as one of the most important

competencies looked for when hiring (Carnevale et al., 2013; Finch et al 2013; Carnevale et al., 2011; Pefanis & Harich, 2010; Chamorro-Premuzic et al, 2010). The second highest category was adaptability, that demonstrate problem solving and creative thinking (Carnevale et al., 2011; Finch et al., 2013; Carnevale et al., 2013; Pefanis Schlee & Harich, 2010; Finch et al., 2012; Wellman, 2010). The third most important category was applied skills completed through internship and cooperative education (Carnevale et al., 2013; Finch et al., 2013; Gault et al., 2010). The literature demonstrates a strong correlation with the top three workforce skill categories with employability upon graduation, but do not address the transition to the workforce.

Azim et al., (2010) found that, the complexity of projects in the aerospace industry contributes to the importance of soft skills. Hard project management skills like organizing, planning, managing and tracking ensures that projects stay on target. However, the project triangle of people, product and process are the three major components to the success of a job. People issues are a main factor in the importance of managing complex projects. In project management, the soft skills highlight the importance of people performing the work, that influence the project outcomes. The hard skills are important for planning the processes and soft skills are for dealing with the people. This research reflects the importance of communication, motivation, delegation, ownership, sense of achievement and leadership skills. Effective communication skills will improve interpersonal acceptance, team work, and team motivation. Responsibility, authority and delegation are important components for enhancing team spirit, sense of ownership and belonging with team. A single person cannot deal with multiple issues, so teamwork is critical. The results reflected that, soft skills were an important factor that attributes to the success of complex projects found in the Aerospace Industry.

2. Methodology

The population for this study is a purposeful sample from the DTTL 2014 Global A & D sector financial performance study. The A & D companies reported sales in excess of US \$500 million in 2013. The A & D organizations do not

Rank	Company	Revenues (US \$ MILLIONS)
1	The Boeing Company	86,623
2	Airbus Group	78,692
3	Lockheed Martin	45,358
5	General Dynamics	31,218
6	BAE Systems	26,380
8	Rolls-Royce	24,255
9	Raytheon	23,706
14	L-3 Communication	12,629
15	Textron	12,104
17	Bombardier Aerospace	9,385
18	Precision Castparts	8,378

Table 1. Website Sources for Data Collection

include government controlled entities, private companies, that do not release public filings (2014, DTTL). See Table I for website sources used for data collection.

The exploratory case study was used to determine the job skills, needed by college graduates to meet the requirements for STEM based jobs. During this research, a list of the most important skills wanted by employers was created through public sources, company websites, and social media platforms. There were only 14 companies that had current job openings for new recruits of STEM based jobs. The data were analyzed using NVivo software, that allowed for the triangulation of data from multiple sources. NVivo software was used to create the themes from the data collection.

3. Results

The skills that were noted from the current job listings reflect the employer's requirements for entry level positions. In analyzing the job openings, a detailed description of the job skills were noted from every open position. It was found that, companies were utilizing open ended behavioral questions, to determine the skill level of the candidate. Huffcutt et al., (2001), Pulakos and Schmitt (1995) in their research found that, when using behavioral description interview questions, the reliability and validity of the interview has been more positive. Table 2 presents the list of behavioral questions which further support the skills required in the industry.

In Table 3, skills analyzed from the current job listings of the companies are presented. The results of the Global A & D companies reflect that Written, Oral and Interpersonal Communication (100%), Team Player (82%), and Proactive, Problem Solving, Decision Making (82%) as the highest required skills. There were a total of nine job skills that were created from the data collection of the individual job listings.

In compiling the list of skills, it is also important to provide a better understanding of the employer's interpretation of how they are applying the requirements for the positions.

Questions

1. Describe a situation in which you were able to use persuasion to successfully convince someone to see things your way.
2. Describe a time when you were faced with a stressful situation that demonstrated your coping skills.
3. Give me a specific example of a time when you used good judgment and logic in solving a problem.
4. Give me an example of a time when you set a goal and were able to meet or achieve it.
5. Tell me about a time when you had to use your presentation skills to influence someone's opinion.
6. Give me a specific example of a time when you had to conform to a policy with which you did not agree.
7. Discuss an important written document you were required to complete.
8. Tell me about a time when you had to go above and beyond the call of duty in order to get a job done.
9. Tell me about a time when you had too many things to do and you were required to prioritize your tasks.
10. Give me an example of a time when you had to make a split second decision.
11. What is your typical way of dealing with conflict? Give me an example.
12. Tell me about a time you were able to successfully deal with another person even when that individual may not have personally liked you (or vice versa).
13. Tell me about a difficult decision you've made in the last year.
14. Give me an example of a time when you tried to accomplish something and failed.
15. Give me an example of when you showed initiative and took the lead.
16. Tell me about a recent situation in which you had to deal with a very upset customer or co-worker.
17. Give me an example of a time when you motivated others.
18. Tell me about a time when you delegated a project effectively.
19. Give me an example of a time when you used your fact-finding skills to solve a problem.

Table 2. List of Behavioral Questions

Soft Skills	Percentage
Written, Oral Presentations, Interpersonal Communication	100%
Team Player	82%
Proactive, Problem Solving, Decision Making Ability	82%
Ability to Synthesize, Gather Data	64%
Leadership	64%
Self-Motivated, High Self Confidence	55%
Customer Focus	45%
Negotiation Skills	45%
Adaptability	27%

Table 3. Soft Skills Required

An overview from the data analysis is provided below.

- Good Oral and Written Communication skills allow the candidate to interface with a multidisciplinary team. The Interpersonal Skills will enable the candidate to succeed in a technically challenging environment. Oral Presentations reflect the ability to effectively compile and shape the analysis for strategy.
- Analytical skills provides the ability to collect, organize, synthesize, and analyze data, also to summarize findings, develop conclusions and recommendations from appropriate data sources, which allows for sound decision making.
- Leadership skills should support the ability to functionally control a multidisciplinary team. It makes an effort to work effectively with group members, establish and maintain the productive working relationships by involving other members as appropriate and thanking them for assistance and establishing a good working relationship with the customer and the ability to focus on their needs.
- Self Motivated individual might have a High Level Self Confidence, which is displayed through their ability to independently determine and develop an approach to a solution, strong sense of accountability and integrity.
- Change management that tries to encourage group members to question the established work processes, tries to challenge fellow workers to ask “why” until an underlying cause is discovered, and works with groups to promote a proactive approach for continuous improvement actions and alternatives. Adaptability will

allow the candidate to succeed in a challenging environment.

The summary of skills from the current job listings provides college graduates, a better understanding of the employer's perception to the skills necessary for success upon graduation in the job market, for STEM occupations. Universities can ensure that, the objectives of their programs meet the perceptions of the employers. Some of the skills can be greatly improved by students participating in internships and coops. Employer's look heavily upon experience through activities outside of the classroom, which allows the student to transfer their knowledge to the real world experiences (Carnevale et al., 2013; Finch et al., 2013; Gault et al., 2010).

Conclusion

The study analyzed the hard and soft skill requirements for the STEM based jobs, that will ensure the future success of a new job applicant. The results of the study support the previous research (Carnevale et al., 2013; Finch et al., 2013; Carnevale et al., 2011; Pefanis & Harich, 2010; Chamorro-Premuzic et al., 2010; Finch et al., 2012; Wellman, 2010) findings that, the most popular skills were Written, Oral Presentations, Interpersonal Communications, Team Player, and Proactive, Problem Solving and Decision Making Ability.

The results of the job skills analysis showed that both “The Boeing Company” and “General Dynamics” required all nine of the job skills for their current positions. While Airbus, BAE, and Precision Castparts required seven of the nine job skills in their job listings. L-3 Communications required only one of the job skills in the job listings.

In response to the research questions, the results suggest that, there are nine important job skills that the employers from the Global Aerospace and Defense Industry are looking for in their new recruits, for STEM based jobs. Hard skills are expected from the course of study, but soft skills are becoming the necessary requirements by employers to ensure the hiring of employees that will fit the culture of their organizations. Effective communication skills were regarded as the most sought after skill. It is clearly demonstrated in the findings that, the ability to work as a

team player to analyze and effectively determine a solution to a problem through data collection and analysis, is an important skill of a successful candidate.

The study illustrates that, the revealed preferences of Global Aerospace & Defense companies towards job skills can be extracted from their job listings. It is important to conduct further analysis, to study how well graduates perform during their first year of employment with the A & D companies. Further research should include a similar aspect of analysis on other industries to examine whether the Global Aerospace & Defense Industry findings hold.

Understanding the job skills required for long-term success ensures that, universities satisfy all the stakeholders. Further researches can be done to design a model of job skills that will ensure success of new job applicants in the workforce. The model would ensure that universities are meeting the demands of the employers to fill the high-wage, high-demand jobs in the global economy. College graduates that develop their skills, enjoy a competitive advantage over other graduates.

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