Skills and Attributes of IT Graduates: Evidence from Employer's Perspective

Full Paper

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Abstract

In the past, when employers were recruiting Information Technology (IT) professionals, they were keen on hard skills to perform the job. However, recently there is a rising awareness that technical skills alone are insufficient for the success of IT professionals and they must also develop a broader set of soft interpersonal skills. This shift is primarily due to the rapidly evolving IT landscape and the widening portfolio of organization wide responsibilities expected to be undertaken by IT professionals. Therefore, it is imperative for potential IT professionals to be equipped with the most current soft skills pursued by employers. This study uses a horizon scanning of the current job market in the UK to capture a snapshot of the most in demand soft skills. In doing so, this study seeks to answer the research question: what soft skills do IT graduates need in the current market?

Keywords (Required)

Graduate, Skills, Information Technology, Employment, Employers

Introduction

In the last three decades, the emergence of Information Technology has affected our personal, social and public life and has made a significant impact on the quality of our life. IT comprises all forms of technology that are used to create, store, communicate, exchange and the use of information. Information Technology has made decisive inroads in all walks of life, in offices, factories, railway stations, airports,

communications, entertainment, education, banking, hotels, hospitals, transportation and shopping (AO'Brien and Markas, 2007). It has opened new functions in business such as web-based business processes, secured payment processes and managing business from anywhere without having to be physically present in an office or organization. The IT sector is one of the most innovative and constantly evolving to respond to demands the market by producing new tools and capabilities. While the Internet almost revolutionized information and communication technology (ICT) in the last two decades, the advancement of cloud based solutions and collaborative tools is likely to further extend the capabilities and boundaries of ICT in the next decade resulting in a widening portfolio of roles and responsibilities for IT professionals.

Indeed, these radical changes in the IT sector have affected the way organizations use IT and the working style of IT professionals. One of the major changes in the way organizations use IT was influenced by the invention of personal computers and the resulting impact it had on mainframe and mini computers and those IT professionals dealing with these technologies and infrastructure. The subsequent changes that ensued during the 1990's and 2000's have seen closer integration of the IT profession with business and how IT was viewed within the organization. Now, IT professionals are expected to deal with a wider portfolio of responsibilities in the organization and beyond (including dealing with customers and suppliers) which require a good understanding of business processes performed across the organization. This demands a set of soft skills along with technical competencies that are imperative for IT professionals to possess. While technical skills are acquired through training and education or learned on the job and are specific to each work setting or technical infrastructure and/or software applications used in the organisation, soft skills are usually a cluster of personality traits, social graces, language skills, friendliness (Deming, 2015; Liu and Grasky, 2013) and optimism that differentiate each IT professional.

When hiring IT professionals, the main focus of businesses is often on the "hard skills" that is needed to perform the job, such as years of Java programming experience (Joseph et al., 2010). However, there is a growing awareness that technical skills alone are insufficient for succeeding in IT, particularly in today's dynamic, distributed and complex workplace. Therefore, IT professionals must acquire a broader set of soft skills beyond their traditional technical skills (Joseph et al., 2010). Although during the mainframe and mini computing era IT professionals such as developers, programmers and system administrators were working on computers in the back office with very limited interaction with other colleagues, in the current IT setting there is a need for them to communicate and work more closely with colleagues across the organization spanning from marketing to finance and logistics and procurement. Todd, McKeen & Gallupe (1995) cited that organizational, functional, and managerial skills are becoming very important for most information systems (IS) professionals and successful IS professionals need to blend technical knowledge with commanding and effective soft skills.

While the constantly evolving IT landscape with its emerging technologies has reshaped the workplace and the field continues to change, the skills and competencies demanded from the IT professionals has been somewhat slow to develop (Legier, Woodward and Martin, 2013). This paper uses the job market to provide a window on the degree to which soft skills are demanded in the marketplace and to look at how those skill requirements are translated in job positions that are currently (as of January 2016) advertised in the UK. It is very important for IT graduates to understand the desired graduate attributes specified in job positions by employers as majority of graduates begin their career by successfully fulfilling these requirements advertised for their chosen jobs (Debuse and Lawley, 2009). The results of this study offers insights into graduate attributes required by employers and could be used by academic institutions to meet employer demands by responding with appropriate curriculum design.

The paper aims to answer the research question: what soft skills do IT graduates need in the current market? In order to answer this question, the paper is structured into four sections. First, it offers an overview of important soft skills for IT graduates as discussed in the literature; then, it will define the research design and methods used for the study; thereafter, it presents the results of a horizon scanning of the graduate IT job market in the UK. Finally, the paper concluded by offering a discussion and conclusion outlining both the theoretical and practical lessons from the study as well as pointing limitations and future directions.

Literature Review

Several previous studies have investigated the changing demands of IT professionals and highlighted a variety of graduate attributes and skills sought by employers, particularly emphasizing on the importance of soft skills (Tran, 2015; Cox et al., 2013; Aasheim et al., 2009; Koppi et al., 2009; Hagan, 2004; Beard, Schwieger & Surendran, 2007, 2008; Downey, McMurtrey & Zeltmann, 2008). Cox et al. (2013) explored how information management graduates constructed their own employability. They found that exploring how graduates themselves go on to explain the value of their studies is key to understanding how to support the transition into work more effectively. Cox et al. (2013) further provided insights from their study of 13 in-depth interviews with recent graduates in a UK university and their beliefs of what soft skills are needed in the IT profession. These soft skills include self-management skills, team-working skills, problem-solving skills, communication skills and information technology skills.

In the US, a study by Aasheim et al. (2009) aimed to investigate whether the importance of various soft skills differs for entry-level IT workers who seek employment in the IT sector, as opposed to those who seek employment in other industry sectors. Based on 348 survey responses from IT managers and 238 responses from IT Workers, their study highlighted the important soft skills demanded from IT graduates which includes communication skills, teamwork skills, interpersonal skills, creative thinking skills, analytical skills, honesty/integrity, flexibility/adaptability, leadership skills, organizational skills, highly motivated and good knowledge of organisation. In another study, Aasheim, Li and Williams (2009) surveyed 350 IT managers and 78 faculty teaching in IT-related academic programs to determine whether the importance of these soft skills for entry-level IT workers is perceived differently by faculty in academia than it is by IT managers in industry. They found that there is no disconnect between faculty and IT managers with respect to the perceived relative importance of these skill categories for entry-level workers.

In Australia, Koppi et al. (2009) conducted a mixed method study and sought the opinions of 548 recent graduates of ICT in the workplace to keep IT curriculum relevant. Koppi et al. surveyed the graduates of an undergraduate IS program to determine whether the curriculum could be better aligned with their career needs through adjusting the balance between technical and business content. Their findings indicate that an appropriate strategy would stress communications skills, problem solving skills, teamwork skills, organisation of information and project management, while maintaining the existing curriculum balance between business and technical content. They also found that graduates in employment highlighted broad mismatches between the requirements of their professional work and the acquired employability skills from the university.

Hagan (2004) surveyed over 500 employers in Australia about their needs and their satisfaction with employees who had recently graduated from ICT field. The results of her study pointed out the soft skills that are highly demanded by employers includes communications skills, team working skills, problem solving skills, knowledge of organization and technical skills. Hagan (2004) further mentioned that universities should also develop closer links with employers, in order to improve their chances of finding the right balance between current technology and future directions in their teaching.

In the US, several studies including Beard, Schwieger & Surendran (2007, 2008) and Deming (2015) further addressed the concerns raised by the employers of recent graduates regarding the apparent absence of soft skills such as interpersonal skills, communication skills, team working skills, planning skills and leadership skills. They suggested the use of common social networking tools to improve communication skills and connect students to the learning process and the use of blogs to enhance written communication through the development of streams of thoughts. Furthermore, they suggested the use of social applications to be utilized in group projects for virtual meetings or to bring together students having common career aspirations.

Downey, McMurtrey & Zeltmann (2008) surveyed 153 IT professionals in the US to determine the critical skills required of new graduates in the field of IT professionals. The results of their study suggested that both technical and non- technical skills are important for entry-level hires. However, non-technical skills are considered most important, especially personal attributes: problem solving skills, critical thinking skills, team-working skills, communication skills (oral and written), creative thinking skills and technical Skills. CompTIA's (2012) also surveyed 1,061 IT managers and IT staff and indicated the most needed soft skills for IT professions that includes: strong work ethic, motivation and initiative, customer service,

flexibility and adaptability, innovation and creative problem solving, analytical skills, teamwork, communication skills and project management skills. Based on the review of the literature, this study concludes that the following soft skills are important and sought by employers: communication skills, problem solving skills, critical thinking skills, team working skills, leadership skills, creative thinking skills, interpersonal skills, analytical skills, motivation and initiative, organizational skills, planning skills, self-management, project management, honesty/integrity, flexibility, adaptability, work ethics, and knowledge of Organization and IT skills.

Research Methodology

The main aim of this study is to identify the vital soft skills for IT graduates as observed by the literature against the job market. To pursue this aim, this study is carried out in two stages. The first stage involved conducting a comprehensive and broad literature review to investigate graduate attributes/skills in the IT sector. This literature review enabled the authors to identify a list of key attributes and competencies required by employers of IT graduates as found by various researchers in studies conducted in different countries. Subsequently, the second stage of this study compared the results of the literature with those from the job market through a horizon scanning of job advertisements in the IT sector (during December 2015). A top ranking online recruitment site (reed.co.uk) was searched for ICT related jobs; the main purpose of this was to identify the graduate attributes listed under these advertised job positions. Reed.co.uk has been recognized as UK's most visited, biggest and best-known career site (Onrec, 2010; Reed, 2015). Therefore, of the many available job search engines, Reed.co.uk was identified as the search engine to be used within this study to understand employers' graduate skill requirements in the field of ITr. This study was carried out in the December of 2015, and 286 ICT related positions were retrieved. The results were based on the jobs posted in the last two weeks of November 2015 as Reed.co.UK only allows searching for jobs posted in the last two weeks. Furthermore, a filter for graduate jobs was applied, and the job engine was searched for vacancies across ICT related positions. After scanning the jobs, only 153 vacancies out of the 286 were advertised for graduate level roles. The short listed vacancies were observed for their required graduate attributes and cross compared with the list of identified graduate attributes from the literature review.

Graduate Attributes demanded by the Job Market

This study conducted a search for current graduate skills being required by employers in ICT firms to meet their business needs. The results highlighted that the filtered 153 ICT vacancies were for the positions of graduate IT consultant, technical support consultant, ICT/ computer science teacher, business and ICT teaching assistant, IT technician, IT office assistant, IT analyst, and ICT technician. These positions had the following set of skills in common that were expected out of graduates - excellent communication skills, excellent presentation skills, high standards of personal presentation, relevant work experience, flexibility, pro-active approach, self-motivation, can do attitude, strong team-working skills, track record of balancing priorities and working to strict timescales, good behavior management skills, ability to use own initiative, mature and hardworking individual, ability to work independently, good prioritization and time management skills, excellent IT skills, proactive approach, willingness to learn new skills and pass on knowledge, adaptability, ability to be accurate and methodical, approachable personality. Table 1 presents the most commonly mentioned graduate skills that were recorded for how frequently they are demanded across different ICT job positions.

A total of 16 graduate attributes were found to be in more demand by employers, with some of them being widely identified, such as teamwork (n = 149), communication (n = 127), planning & organizing (n = 102), problem solving (n = 58), initiative & leadership skills (n = 55), adaptability (n = 44) and flexibility (n = 31). Attributes such as time management and self-motivation were mentioned 28 times each. Furthermore, working under pressure and client focus was mentioned 16 times each and conflict management was identified 13 times. The remaining attributes identified in the table are mentioned less than 10 times.

Table 1: *Graduate skills sought by employers*

Ranking	Graduate Skills/IT Jobs	Graduate IT Consultant	Technical Support Consultant	IT Analyst	Business and ICT Teaching Assistant	IT Technician	IT Office Assistant	ICT/ Computer Science Teacher	ICT Technician	Total Frequency
2	Teamwork	33	6	39	29	20	8	3	11	149
1	Communication	21	1	8	45	31	4	5	12	127
3	Planning & Organizing	33	22	5	16	4	12	8	2	102
4	Problem Solving	1	5	9	4	10	22	0	7	58
5	Initiative & Leadership	1	16	21	9	0	0	4	4	55
6	Adaptability	3	9	21	3	2	0	4	2	44
7	Flexibility	0	7	9	15	0	0	0	0	31
8	Time Management	0	24	0	4	0	0	0	0	28
9	Self Motivation	0	0	14	0	0	0	9	5	28
10	Working under pressure	0	0	14	2	0	0	0	0	16
11	Client focus	0	14	0	0	2	0	0	0	16
12	Conflict Management	0	5	4	0	0	4	0	0	13
13	Drive	0	0	3	0	2	0	0	0	5
14	Negotiation	0	0	2	0	0	0	3	0	5
15	Applying academic knowledge	0	0	0	2	0	0	0	0	2
16	Commercial Awareness	0	0	2	0	0	0	0	0	2

Discussion

This study maps the skills identified in the literature with the skills demanded by prospective employers in their advertised positions in the field of IT. Table 2 presents the list of graduate attributes from mapping both the literature review and advertised positions from employers across the ICT sector. The outcome of this study reveals that graduate attributes identified in the recent literature closely correspond to most of the attributes desired by employers in the current job market. However, a careful look into the two parts of this study reveals that some of the attributes considered important by the prospective employers have not been recorded by the present literature on graduate skills. These might also be the skills that have remained untapped and not received their due attention by education institutes in their attempt to make their new graduates work ready. Scanning the statements from recruiters and vacancies advertised for ICT related jobs reveals that the available literature fails to acknowledge the importance of the following essential skills in demand across the job market - working under pressure, client focus,

conflict management, drive, negotiation and applying academic knowledge. Furthermore, job market fails to acknowledge the importance of the following vital skills that are frequently commended by former studies in the literature - critical thinking skills, creative thinking skills, interpersonal skills, analytical skills, project management, honesty/integrity, work ethics and IT skills.

This study shows that there are several gaps in what employers expect and what the literature has so far identified as important skills for ICT graduates. In this respect, universities have to do more to align their programs and approaches to learning and teaching to ensure that vital skills demanded by the market are catered for. This can be done both through curriculum development and through additional programs of employability that incorporate employability skills that are commonly sought after for ICT graduates by employers. Such programs can encapsulate essential soft or interpersonal skills to basic technical skills such as the use of essential Microsoft Office applications to more complex skills such as programming and/or the use of market leading software applications.

From a conceptual perspective, this paper has contributed to existing knowledge by identifying the key soft skills both from the literature and job market in the IT field. From a practical perspective, this study has highlighted that for higher education institutions and universities, curriculum development should be directed towards attributes that are expected of graduates and are relevant to the needs of the market and industry. This study suggests that the academic community should expand its horizon in line with the current policy debates on diversifying and embedding both soft-interpersonal and more harder-applied skills in IT graduate programs. There are several limitations that should be acknowledged when interpreting the findings of this study. Firstly, the results are based on secondary data analysis of the current job market in the IT field, and any generalization of these findings should only be made after collecting more data from employers. Secondly, this study mainly emphasized soft skills and more research is needed to identify technical skills required from IT professionals. Thirdly, the study only presents a snapshot of the skills and attributes sought after by employers at a given moment in time (in the case, December 2015) and more longitudinal studies are needed to capture a holistic view of the skills and attributes that are vital for the IT field.

Table 2: *Literature Vs job market list of graduate attributes*

Graduate Attributes	**Literature**	**Job Market**
Team Working Skills□	◆	◆149
Communication Skills	◆	◆127
Planning & Organising Skills	◆	◆102
Problem Solving Skills□	◆	◆58
Leadership and Initiative Skills	◆	◆55
Adaptability	◆	◆44
Flexibility	◆	◆31
Motivation	◆	◆28
Self & Time Management	◆	◆28
Working under Pressure	❖	◆16
Client Focus	❖	◆16
Conflict Management	❖	◆13
Drive	❖	◆5
Negotiation	❖	◆5

Applying Academic Knowledge	❖	◆2
Commercial Awareness	◆	◆2
Critical Thinking Skills□	◆	❖
Creative Thinking Skills	◆	❖
Interpersonal Skills	◆	❖
Analytical Skills	◆	❖
Project Management	◆	❖
Honesty/integrity	◆	❖
Work Ethics	◆	❖
IT Skills	◆	❖

LEGEND: ◆ = Mentioned, ❖ = Not Mentioned

Conclusion

With an evolving employment market that is trying to keep pace with rapid changes taking place in information and communication technology field, graduates and professionals seeking employment need to be equipped with a variety of skills to succeed in the word of employment. A review of literature and the job market through advertised vacancies in the UK shows that education institutes will face a continuing challenge to cater to job market needs. Issues concerning graduate employment worry employers, as current entry-level applicants are severely falling short of employability skills. Whilst some researchers blame the lack of research in undergraduate education, others blame the absence of sufficient research on tactics and strategies for instilling both soft interpersonal skills as well as the practical applied skills in undergraduate students (Azevedo et al., 2012; Jones et al., 2013; Stone et al., 2013). Studies have found that well-groomed soft skills greatly impact employability, as the recruiting teams weigh these skills highly whilst employing new graduates (Daud et al., 2010; Finch et al., 2013).

It is also important to understand the extent to which the graduate employers are willing to accept ownership, responsibility, and risks associated with investing in training of new recruits. If employers are not willing to participate and play an active role in the solution, they will continue to be a part of the problem, and offer no useful perspective on the idea of graduate work readiness. At the same time, new graduates themselves will have to own responsibility and focus on acquiring basic skills such as communication, timeliness, and ability to work under pressure. Presently, the advancements in ICT highlights the need for a continuous learning process for both prospective employees and employers. In this context, industries and academia together with government policy makers should be working together to develop and implement policies to nurture and support professional development during graduate education and thereafter.

The focused literature review undertaken in this study suggests that methods used to identify graduate attributes and skills are the same across the ICT discipline. Moreover, there is a lack of consistency in the classification of graduate attributes across current literature resulting in overlaps and a surfeit of attributes. As evident from the comparison done in this study between the conceptual (literature) and practitioner (employer) perspectives, gaps and challenges will have to be constantly assessed, and advances in knowledge and research will have to be aimed at establishing consistency in defining graduate attributes as well as the means of incorporating these into graduate programmes. However, academic institutions are yet to devise successful and fully sustainable methods of embedding graduate skills training within their regular IT taught programmes in the interest of future graduate employability. In this respect, there is a need for closer collaboration amongst education institutes and industry where employers should play a more proactive role in helping universities to identify, design, deliver and develop in-demand graduate attributes and skills in the IT field.

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