Emotions and Interpersonal Skills for IT Professionals: an Exploratory Study

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Abstract: The development of intellectual capital of corporations represents one of the most significant challenges for today's managers, and one of the most fertile fields for business innovation, human resource management and education research. In IT field, human capital is a particularly critical issue, due to its knowledge intensive nature. In this scenario, the importance of "soft skills" in general and "interpersonal skills" is beyond any doubt. In this paper, interpersonal skills for IT workers are analyzed from the point of view of Computer Science students. The present study consisted of the analysis of the importance which students in the final year of a Computer Engineering degree place on soft skills, particularly, interpersonal skills, for their professional future. In order to achieve this objective, a questionnaire has been applied in which the various interpersonal skills have been characterized with eighteen associated behaviors. Results show two trends. On the one hand, the moderate relevance which students assign to interpersonal skills in contrast to professional practice. On the other hand, the scarce emphasis which lecturers have placed on the development of such skills in contrast to international curricular recommendations.

Keywords: Soft Skills, Interpersonal skills, Emotional competences, IT Education, IT Professionals.

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1 Introduction

People are a critical IT issue. The human dimension can be more important than the technical (De Marco & Lister, 1999; Constantine, 2001). In this scenario, the concept of social or interpersonal abilities refers to the social competencies or capacities which people possess. However, this concept, which is generally perceived as rather simple, has been captured in numerous definitions. In fact, it can be exist that there are as many authors as there are definitions of this topic. In the presence of such an abundance of

definitions, the definition of Linehan (1984) can be selected as a base for the present study. Interpersonal skills are "the complex capacity to exhibit behavior or response patterns which optimize interpersonal influence and resistance to undesired social influence (efficiency in both objectives), which simultaneously maximizes gains and minimizes the losses in the relationship (efficiency in the relationship) and maintains one's own integrity and sense of domain (efficiency with respect to oneself)". Lazarus (1973) was one of the first authors to establish the principal response or behavioral dimensions which characterize social skills from a clinical perspective:

1. The capacity to say "no".
2. The capacity to ask for favors and make requests.
3. The capacity to express positive or negative feelings.
4. The capacity to initiate, maintain, and finish conversations.

The response classes outlined above are based on the four category types proposed by Lazarus (1973). The generally accepted behavioral dimensions are as follows:

1. Make compliments (Furnham & Henderson, 1984), (Galassi & Galassi, 1977).
2. Accept compliment (Buccell, 1979).
3. Make requests (Furnham & Henderson, 1984).
4. Express love, appreciation and affection (Gambrill & Richey, 1975), (Rathus, 1975).
5. Initiate and maintain conversations (Lange & Jakubowski, 1976), (Lorr & More, 1980).
6. Defend one's own rights (Lange & Jakubowski, 1976).
7. Reject requests (Furnham & Henderson, 1984), (Buccell, 1979).
8. Express personal opinions, including disagreement (Gambrill & Richey, 1975), (Gay, Hollandsworth & Galassi, 1975).
9. Justified expression of disturbance, annoyance or anger (Lange & Jakubowski, 1976).
10. Make requests for changes in behavior (Buccell, 1979), (Michelson, Molcan & Poorman, 1986).
11. Excuse oneself or admit ignorance (Furnham & Henderson, 1984), (Gambrill & Richey, 1975).
12. Confront criticism (Lange & Jakubowski, 1976).

In this sense, specifically with respect to the Information Technology (IT) field, interpersonal skills are considered general and necessary for professionals (Lee, 2005), and employers at international level consider interpersonal skills as a key aspect for recent graduates from the technical area (Gruba & Al-Mahmood, 2005).Taking into account the unquestionable importance of interpersonal skills, the concept of competency related to this aspect has been included in curricular initiatives in diverse disciplines. Competences, from the Latin verb "*competere*", can be defined as an individual's core skills (motives, traits, self-concept, knowledge, and abilities) that are causally related to a specific, effective criterion and/or a superior performance at work (Spencer & Spencer, 1993). The concept of competence was used by early 20th century scientific management (Taylor, 1911), and has been used in the field of human resources management since the middle seventies, due to the works by McClelland (1973). Competence at the individual

level is required for the creation of core competence, crucial for today's organizations at the organizational level (Bassellier, Reich & Benbasat, 2001). Generic competences and in particular interpersonal skills may be crucial for IT project success (Sukhoo, Barnard, Eloff, Van der Poll, & Motah, 2005) but also for a wider range of organizational contexts, including all knowledge workers (Rimbau-Gilabert, Miyar-Cruz & López-de Pedro, 2009).

Using this competence concept, within the domain of IT related degrees, curricular initiatives are being developed for the set of five fields which includes: Software Engineering (2004), Computer Engineering (2001), Information Systems (Gorgone et al., 2002), Information Technology (2004) and Computer Science (2001), which as a set have been given the generic name Computing Curricula 2005. These proposals are jointly sponsored by a committee comprised of the IEEE and ACM. In addition to the five volumes mentioned, a study is currently being realized which draws together and compares aspects of the diverse proposals (Shackelford et al., 2004). This publication emphasizes the importance of interpersonal communication, which includes aspects such as written and oral communication, presentation, interaction with clients, sales activities, and their comparison across different disciplines. With this objective in mind, minimum and maximum values from 1 – 5 on a Likert-type scale have been included for the weight which interpersonal communication should be assigned within the categories mentioned. The values presented are the following: Computer Engineering (3.4), Computing (1.4), Information Systems (3.5), Information Technology (3.4) and Software Engineering (3.4).The scores assigned indicate that considerable importance has been attributed to the interpersonal communication category across all of the distinct disciplines.

Of the five curricular initiatives mentioned, the most comprehensive analysis of interpersonal skills may be found in the volume dedicated to Information Systems (Gorgone et al., 2002). In this volume, interpersonal competencies appear as one of the elements of the second level of the body of knowledge of the discipline, within the area "Organizational and Management Concepts". The categorization of Interpersonal Skills is as follows:

- Communication skills.
- Interviewing, questioning and listening.
- Presentation skills.
- Consulting skills.
- Writing skills.
- Proactive attitude and approach.
- Personal goal setting, decision making, and time management.
- Principle centered leadership.
- Principles of negotiation.
- Fostering creativity and opportunity finding.
- Critical Thinking.
- Measurement and Interpretation of Data.
- Personal Problem Solving.

A second aspect worth mentioning is the inclusion of interpersonal skills within the set of capacities of graduates. In this case, interpersonal skills form part of the category "interpersonal, communication and team skills" and have four associated behaviors:

listening, encouragement, motivation and operating in a diverse environment. The specification of interpersonal skills both as part of the body of knowledge as well as the capacities of graduates has initiated, as a third notable characteristic, its inclusion within the programs of various subjects recommended in the curriculum for graduates of the discipline. The study which has been develop which will be described in what follows, consisted of exploring the judgments of young people regarding the importance they give to interpersonal skills in their suture professional career. The particular case under analysis in the current paper is a study directed exclusively towards IT related degrees students about to complete their degree, whose incorporation in the labor market is evident.

Traditionally, it has been assumed that the organizational practice of the IT professional does not require mayor skills in the interpersonal domain. The professional reality has demonstrated that the IT professional requires the development of skills which go beyond the management and application of a series of technical aptitudes, whether he or she is an employee, team leader or manager.

The remainder of this paper is organized as follows. Section 2 surveys the relevant literature about interpersonal skills in IT industry scenario. Section 3 describes the study performed including a description of the sample, the method, results and discussion. Finally, Section 4 concludes the paper.

2 Interpersonal Skills for IT Professionals

Organizations currently use multiple IT/IS solutions to support their activities at all management levels (Trigo, Varajao & Barroso, 2009). Due to this diversity, for IT workers, professional practice must be continually revised and improved in order to adapt workers competences' to technical innovations and soft skills to evolving markets (Casado-Lumbreras et al., 2009). As a result of this, both the development and the study of the importance of soft skills represent a wide study area in the IT field. McMurtrey et al. (2008), following the works of Garner (1998) and Leitheiser (1992), it was affirmed that the most important skills for new IT professionals were soft skills. Other authors (E.g. Kovacs et al., 2006; Young, 1996) have drawn more refined conclusions, and consider that soft skills are more important than technical skills for less experienced IT personnel. In contrast, opposing views to this research (E.g. Lee et al., 2001; Koong, Liu, & Lui, 2002) state that technical skills are of a higher importance than soft skills. Finally, other works claim that technical and behavioral skills are likely to be complementary (Litecky, Arnett & Prabhakar, 2004). Leaving aside the relative importance of soft skills of professionals at any level in the IT field, the necessity to possess interpersonal skills, one of the soft skills, is without doubt, and must be a part of the future education in IT (Sanford & Sztandera, 2007). However, this reality, which IT professionals are familiar with, in confronted by the professional stereotype. This stereotype for IT professionals includes anti-social (Martin, 1998) and solitary (Craig, Paradis & Turner, 2002), to name but a few. However, this stereotype, which is found in many media such as cinema (Colomo-Palacios et al., 2007) and television (García-Crespo et al., 2008), is far from being certain. Maybe, as a result of this, many researchers report persistent gaps (from a moderate to a very serious level) between knowledge/skills that are taught in academia and those that are demanded by the IS industry since the nineties (Lee, Trauth & Harwell, 1995; Nelson, 1991; Young & Lee, 1997).

Examining at study carried out between academics and professionals in the IT field (Lee, Koh, Yen, & Tang, 2002), both groups indicate that, behind personal traits, interpersonal skills are the second most important factor for professional practice. It is also interesting to note that IS academics rate interpersonal skills, less important than IS practitioners do, while IS academics deem the variables in the IS technology area as important as or more important than IT practitioners do. This gap was already demonstrated in the 1990s (Trauth, Farwell, & Lee, 1993). Other studies in the same area (Medlin, Dave & Vannoy, 2001), however realized among IT students, indicate that technical skills are important but are not sufficient within themselves, and need to be complemented with other skills such as communication and interpersonal skills. Furthermore, other studies completed in High School environments indicate that the opinions of the students with relation to interpersonal skills are closer to the stereotype (García-Crespo et al., 2009).
Independently of the professional stereotypes of the different IT roles which the IT professional may adopt, the importance of interpersonal skills is highly notable. Feeny and Willcocks (1998) provided a detailed description of the skills in the context of the different IT roles.
To summarize, some authors indicate that universities must not only include in their curriculum the hard skills of technical expertise, but also the soft skills of interpersonal communication, intrapersonal knowledge, leadership and collaborative skills that lead to a cohesive team (Woodward, Ashby, Litteken & Zamora, 2008).

3 The importance of interpersonal skills for IT Professionals.

The present study has consisted of the analysis of the importance which students in the final year of a Computer Engineering degree place on soft skills, particularly, interpersonal skills, for their professional future. In order to achieve this objective, a questionnaire has been applied in which the various interpersonal skills have been characterized with 18 associated behaviors. The application of the questionnaire had a double objective. In the first place, to quantitatively determine the opinions of the students with respect to interpersonal skills in the context of professional life, as well as their opinion of the importance which was placed on such skills during their degree. In the second place, it was aimed to examine whether or not there were statistically significant differences in the responses according to gender. The subsequent sections detail the sample, the questionnaire applied, as well as a discussion of the results obtained.

3.1. Participants

The present study has been developed based on the participation of 92 students in their final year of a Computing Engineering degree from various universities in Madrid (Politécnica de Madrid, Carlos III de Madrid, Autónoma, Pontificia de Salamanca, Pontificia de Comillas and UNED). The sample was composed of a total of 22 women (24%) and 70 men (76%).This gender difference is caused by the uneven proportion of men versus women enrolled in the course. The average age of the students was established as 25.7 years.

3.2. Questionnaire

The questionnaire was comprised of 18 questions or items which describe behavior or competencies. These items collectively formed the category "Interpersonal Skills". The items selected for inclusion in the questionnaire were chosen based on the integration of 12 response classes, which are generally accepted as basic social skills in the Psychology field, with other items whose descriptions are more oriented towards a work environment. The respondents were requested to indicate the importance of the skills using a Likert-type scale, on which the value 1 indicated "of no importance", and the value 4 indicated the opinion "very important". Additionally, the students were elicited for their perceived importance of the different skills in the context of their academic career, based on what was communicated to them by their lecturers. The scale described above was also used to indicate scores in this case.

3.3. Results and discussion

With the objective of determining the scores obtained for each element, an average and standard deviation was calculated for the results obtained in relation to the relative importance of the scores. The results are demonstrated in Table1.

Table 1. Average and Standard Deviation of the perceived importance of Interpersonal Skills elements.

Element	Average	Std Dev.
Capacity to accept compliments	1.55	0.58
Capacity to make compliments	1.60	0.54
Capacity to express annoyance, discomfort or anger in a justified way	1.68	0.57
Capacity to recognize the emotions of others	1.84	0.77
Capacity to express appreciation or affection	1.85	0.77
Capacity to reject requests of other people	1.85	0.78
Capacity to perceive the reactions of others to our own actions or opinions	1.88	0.81
Capacity to admit ignorance about something	1.98	0.81
Capacity to request a change in the behavior of another person	2.00	0.80
Capacity to accept the help of others	2.00	0.85
Capacity to take into account the opinions of others	2.05	0.91
Capacity to make one's opinion be heard	2.18	0.95
Capacity to express personal opinions, including disagreement	2.20	0.97
Capacity to make requests in an adequate fashion	2.22	0.84
Capacity to excuse oneself	2.25	0.94
Capacity to accept constructive criticism regarding one's own behavior	2.27	0.96
Be capable of listening with attention	2.46	0.87
Capacity to initiate and maintain conversations	2.48	0.84

Examining the results, it is possible that the stereotype of the IT professional has distorted the importance of the competences for the students in a similar effect to the influence of this stereotype on the rest of society. Several studies have identified the stereotypes of IT Professionals (E.g. Martin, 1998; Craig, Paradis & Turner, 2002; Gurer & Camp, 2002) and their impact in the environment of cinema (Colomo-Palacios et al., 2007) and television (García-Crespo et al., 2008). These stereotypes accentuate negative characteristics of professionals such as anti-social or solitary, to name but a few.

Additionally, Table 2 below displays the results of the perceived importance by the students of the skills, but in relation to the emphasis placed on such skills during their university career:

Table 2. Average and Standard Deviation of the perceived importance of Interpersonal Skills elements during higher education degree.

Element	Average	Std Dev.
Capacity to accept compliments	1.24	0.43
Capacity to make compliments	1.26	0.44
Capacity to express annoyance, discomfort or anger in a justified way.	1.28	0.45
Capacity to recognize the emotions of others	1.14	0.35
Capacity to express appreciation or affection	1.17	0.38
Capacity to reject requests of other people	1.70	0.64
Capacity to perceive the reactions of others to our own actions or opinions	1.33	0.52
Capacity to admit ignorance about something	1.52	0.58
Capacity to request a change in the behavior of another person	1.30	0.46
Capacity to accept the help of others	1.47	0.64
Capacity to take into account the opinions of others	1.90	0.88
Capacity to make one's opinion be heard	1.95	0.87
Capacity to express personal opinions, including disagreement	1.95	0.87
Capacity to make requests in an adequate fashion	1.62	0.74
Capacity to excuse oneself	1.26	0.44
Capacity to accept constructive criticism regarding one's own behavior	1.29	0.46
Be capable of listening with attention	2.18	0.89
Capacity to initiate and maintain conversations	2.39	0.91

An initial analysis of the scores, examining both the importance of the skills in general, as well as the emphasis placed on the skills during university studies, indicates the discrepancy between both analyses. However, it is interesting to note that the "Capacity to initiate and maintain conversations" is the most valued capacity, and additionally, the capacity which students considered was assigned the most importance during their entire third level career. It is evident that almost all of the skills demonstrated low scores in relation to the attention they were given during students' university studies. Consequently, there is a large gap between the importance of the skills for the students,

and the perceived importance which was placed on such skills during their academic career.

From the perspective of gender differences, the average displayed by the groups of the relative importance of the skills in Table 1 was almost always higher for the female category. In order to measure the level of statistical significance of this difference, the researchers applied the Students' T test. This statistical method, comparison of two means, was used to carry out one-way between-groups analysis of variance (ANOVA). The level of statistical significance was set at 0.05.Table 3 displays the competencies which demonstrate statistically significant differences between both groups:

Table 3. Significant differences between the importance of elements according to gender.

Element	Test
Capacity to recognize the emotions of others	(t(21)= -2.21, p<.05)
Capacity to express appreciation and affection	(t(21)= -2.434, p<.05)
Capacity to reject requests from others	(t(21)= -3.215, p<.05)
Capacity to perceive the reactions of others to one's own acts or opinions	(t(21)= -3.306, p<.05)
Capacity to admit ignorance about something	(t(21)= -2.978, p<.05)
Capacity to elicit a change in the behavior of another person	(t(21)= -2.978, p<.05)
Capacity to accept the help of others	(t(21)= -2.978, p<.05)
Capacity to take into account the opinions of others	(t(21)= -3.071, p<.05)
Capacity to make requests in an adequate fashion	(t(21)= -2.628, p<.05)
Capacity to excuse oneself	(t(21)= -2.090, p<.05)
Capacity to accept constructive criticism about one's own behavior	(t(21)= -2.090, p<.05)
Be capable of listening with attention	(t(21)= -2.731, p<.05)
Capacity to initiate and maintain conversations	(t(21)= -2.731, p<.05)

Examining the table displayed above, it can be seen that female students are more sensitive to the importance of interpersonal skills than male students, as significant differences emerged between both samples. This outcome supports the results of previous studies which indicate that as a general rule, women have abilities superior to those of men in expressing and communicating emotions towards others, as has been demonstrated by numerous authors being the work of Schwartz, Brown and Ahern (1980) one of the most significant works in this field.

4 Conclusions and future work

According to Lytras (2007), teaching must find a balance between delivering state of the art knowledge and motivating people to apply their soft skills. But in spite this balance is a fact for IT professionals, IT Students are not aware of this importance. Summarizing the results of the current study, the findings indicate that the opinions of students and thus future IT professionals do not correspond to the proposals in curricular initiatives, nor to the increasing importance assigned to interpersonal skills in a professional environment. While young people principally minimize the importance of emotional competencies

except for those which could be considered communication competencies in a more strict sense, academic and professional literature is attributing increasingly greater importance to emotional competencies. It can be concluded that likewise, the students generally do not perceive the importance placed on such skills during their university studies.

In this environment, institutions and teaching professionals in Engineering disciplines should foster the awareness, learning and development of these key competencies for successful professional performance, even prior to the implementation of such recommendations in practice. It can be affirmed that both professionals as well as lecturers are not effectively communicating the professional reality of the IT professional. In order to achieve this, both professional associations as well as those in the academic field should be encouraged to establish effective communication and education measures to obtain the outcome that students, on the one hand, receive improved training in social competencies, and on the other hand, perceive these competencies with high esteem for a professional role. If students should be fully exposed to all the complexity which surrounds the job of an IT professional (Shaw, Woodford & Benwell, 2007), we also suggest that university classes should go beyond just teaching techniques by providing students with tools whilst they value and develop interpersonal skills in learning environments in which such skills are crucial for project success.

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