

PROFESSIONAL COMPETENCIES IN PROFILE OF CTU GRADUATES

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Abstract

Based on the authors' research cooperation, the aim of the paper is to analyse and compare the requirements for the competencies of CTU graduates, mainly their technical professions and partially as employees and from the perspective of their employers, with the entitlements that are imposed on human resources and on the engineers themselves. The research centres at technical, managerial, economic, project and team competencies and their level demanded for positions that require predominantly university education, as gained at the Czech Technical University in Prague (CTU), the largest technical university in the Czech Republic. We interpreted one small partial result of sociological longitudinal research at CTU that focused on CTU graduates satisfaction with their competencies being received during the time of studies at university and opinion and demands of their employers. Quality of human resources in the industrial companies and employers' needs are professional-quality of technical education and practical and social skills of employees. The research results carried out among employers confirm the high quality of technical knowledge and weaknesses in economic knowledge, practical and social skills.

Key words: competencies, human resource, engineer, CTU graduates

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Introduction

Competency as one of the most important parts of human capital, or human capital management respectively, is perceived by some authors as a part of the currently used term „People Management“, just because people are the greatest asset of the company, which generates profit. The human capital is defined in the Czech expert literature as a summary of inborn and acquired skills, knowledge, abilities, experience, talents, habits, motivation and energy which people have and that during a certain period can be used to manufacture the

products. The concept of human capital is used principally in connection with the issue of competencies (Bosch-Sijtsema & Henriksson, 2014).

During the last twenty years, the terms Human resources management or Human capital management acquired a synonym and the literature used the term "management by competencies". Hroník (2007) defines competencies as a bunch of knowledge, skills, experience and qualities that supports the achievement of goals. Lee (2010) added that it is highly advisable to follow the high-performers' competencies in order to identify the crucial competencies out of the "bunch" and that competency models vary from industry to industry and from country to country. Yang, Huang and Wu (2010) suggest that there is a strong correlation between project manager's leadership style, teamwork and project success. Müller and Turner (2010) agree and add that competency models and profiles of a successful project manager focus rather on soft skills than hard skills. They divide these competencies into three bundles: intellectual (critical analysis, vision etc.), managerial (empowering, communicating, achieving etc.), and emotional (intuitiveness, interpersonal sensitivity, conscientiousness etc.). Tureckiová (2007) under the term competency understands a statement of general ability to adequately assess the situation (far beyond only working situations) and manage to adapt their behaviour to such a situation, or to be prepared to (be able to) respond to the situation by interventions in the system, which can be changed in a desirable way as a consequence of this proactive behaviour. There is considerable evidence that organizational competitiveness depends on employee performance that is determined by employee abilities, motivation and working conditions (Šikýř, 2011), and competencies of an individual should reflect the organizational strategy (Medina & Medina, 2014). Competencies help to presently hold a large number of positions and functions, and they are suitable for coping with a wide range of mostly unpredictably changing requirements throughout life.

Koubek (2003) in his publications presents two views, and these are: 1. Competence is a term that refers to a job, to such a part of labour that a person is eligible to perform and is capable to perform. In other words, it is what one must be capable of doing in a particular role (in a particular job) and what standards of work are expected from him. It can be characterized as a work or employment derived capability, which relates to the expected performance in the workplace and standards / norms and results that are expected from a person occupying a particular role (job), and 2. Competency is a term used for the overall ability of a person, including professional competence, qualifications and ability to behave and, well, innate abilities. Thus, competence is a set of knowledge, skills and attitudes that are required in the company and at the position. It is also the set of knowledge, skills and attitudes that are

human being's own (the worker's own). One of the trends that can be observed in competency development is the transition from the development of knowledge and professional competencies to the development of personal and social skills.

Businesses focus on the identification of competencies and subsequently on their development, especially professional competences (incl. the requirements arising from legislation or law regulations), further on the development of managerial, interpersonal and social skills.

1 Objectives and methodology

The aim of the paper is focused on the level of professional competencies - technical, managerial, economic, project and team competencies, and their level demanded for positions that require predominantly university education. The theoretical basis of this paper is the issue of professional competencies in technical fields, focusing on competencies of graduates from technical universities in terms of competencies required by their employers and their self-assessment of their own competence. The main activities of companies are pursuing more and more effective work with human potential and its use to improve business performance and productivity.

We interpreted one part of a sociological longitudinal research at CTU concentrated to CTU graduates satisfaction on their competencies receiving in the time of study at university and opinion and demands of their employers. One purpose of the presented sociological longitudinal research (altogether nine studies conducted in the period from the year 1996 till 2013, CTU graduates from 1985 -2012) was to collect information about the competencies of CTU graduates in comparison with research data from other Czech universities. The aims of the research were: firstly, the possibilities of the graduates of the CTU to assert themselves on the labour market, their working position, career and successfulness, and secondly, to find out their opinions of the practical application of their knowledge gained at a university and to bring the gaps in knowledge into light. The graduates evaluate their adaptability, work in their line and out of it, and practical experience, considering the labour market and the possibility to assert themselves on it. As mentioned above, the researches focused on the possibility of the graduates of faculties to assert themselves on the labour market in the period 1985-2012 (Šafránková, 2003-2012).

2 Results - Professional competencies of CTU graduates

The analysis of engineers' competencies level is very useful. On the basis of a sociological longitudinal research at CTU in Prague, we selected one part of the research as it concerned professional competencies. The sample was a defined group of CTU graduates from years 1985 till 2012, one representative part of graduates from all existing CTU faculties from each year of graduation, and the results from all the samples were compared. There were only small statistically significant differences in the sample, mainly caused by the number of years after graduation. Young graduates are on non-managing positions, after 10 years of work experience from 30 to 75% (depending on the faculty studied) of graduates are already promoted to managerial positions. Three quarters of respondents in all CTU surveys say that they are employees and about one tenth of them are both employees and businessmen. Two thirds of the responding graduates of the CTU work in industry and building industry, almost 10% of them work in state or public administration and 5% in the field of education, trade and services (real estate agencies). The graduates of CTU work in various lines. Most of them work in the field of administration, management and design. One half of those from the period between 1985 and 2012 are managers. The knowledge of the official position of the graduates is enlarged with information about the possibilities to apply their line of study. One quarter of the graduates state that their recent work corresponds fully with their line of study and two fifths of them state that their work has to do with it. It means that more than three quarters of the graduates of a faculty work in the line that they studied. One of important factors that influence the life of man is comparison between ideas and opinions on one hand and reality on the other. Do ideas about work correspond with reality? The graduates lay stress on workload, the kind and intensity of work, salary, the improvement of qualification and social position, self-realisation and social benefits. The results of this comparison represent an important source of knowledge both of the personality of a graduate and the needs of practice. Most of the graduates expect above all that they will have a possibility of creative work and self-realisation. These two factors are combined with professional development, better salary, security of employment, independence, career and the efficiency of work. All these factors represent important values of life with respect to both ends and means. They reflect a certain degree of a graduate's awareness of his role at work and in the society. In most of factors expectations outweigh reality. The graduates expect above all creative work, the improvement of qualification, career and better salary. But the practice necessitates personal responsibility, team work ability, routine and the power of psychical resistance.

In the course of monitoring the possibility of the graduates to assert themselves on the labour market and their further education it is important to find their opinions of the system of education at a faculty. Its evaluation is one of the most important feedback factors for drawing the curricula. If the graduates point out problems concerning the application of their knowledge, they at the same time point out the necessity of changes both in the content and form of teaching or individual educational programmes. On the contrary, their satisfaction witnesses the good content of an educational programme or individual subjects. Within the researches the graduates evaluate according to their experience how they are prepared for work after graduation from a faculty. It is clear that study at a university cannot prepare graduates fully for all kinds of work. Nevertheless, it is important as a feedback. The same approach is for example in characteristics of a project manager that indicate the type of leader and leadership style that the project manager applies during the management of projects (Zulch, 2014).

The researches monitor whether the graduates are satisfied and how they apply their knowledge acquired at a faculty in their everyday activities. They monitor their opinions of teaching, i.e. both theoretical and practical or supplementary subjects such as languages or humanities; in addition, the studies find out which knowledge is appreciated, which gaps in it should be filled and which knowledge and skills are important for the graduates to assert themselves on the labour market.

With respect to the comparison of the results of the research, we lay stress on those which show the practical contribution of individual parts of a teaching programme. It can be said that in spite of the fact that the monitored groups of the graduates (from the period between 1985 and 2012) differ with regard to practice and experience, their evaluation of teaching is remarkably similar. They are satisfied above all with their theoretical knowledge.

Overall assessment of graduates in terms of how knowledgeable the graduate is indicates the rate of satisfaction with the level of higher education and is another important feedback indicator for every college or university. In the long run, half to two-thirds of graduates report that they are satisfied with the knowledge acquired during their studies. More than a third is partially satisfied and only less than a tenth expressed dissatisfaction.

1. Most of the graduates appreciate acquired ability of “technical thought” (78%) (Notes: for interpretation we used description in percentage, scale 1- the best, 5 – less) and more than three quarters of them appreciate their theoretical preparedness. In addition, they appreciate ability to orientate themselves in their line (69%), ability to analyse and work systematically (49%), special knowledge in the line (46%) and ability to work on PC and

apply software programmes (25-36%; nevertheless, there are evident differences among the graduates with respect to the year of graduation).

2. On the contrary, the graduates find insufficiencies in their ability of self-presentation (20%), practical knowledge (11%), ability to communicate with people (15%), ability to manage and organise (13%) and the knowledge of foreign languages (7%). With respect to the evaluation of knowledge acquired at school, the opinions of the graduates from the period between 1985 and 2003 and those from the period between 1993 and 2001 do not differ.

Table 1 represents the results of Reflex research.

Tab. 1: CTU graduates competencies (graduation 2008-2012, summary)

Competencies (scale 10 –max., 1 min.)	Graduates	Employers
General knowledge and insight	6,29	6,36
Professional theoretical and methodological knowledge	7,17	6,95
The ability to use expert knowledge in practice	6,36	7,05
Knowledge of the conditions for the use of expert methods and theories in practice	6,08	6,29
Language skills in a foreign language	4,24	5,97
Mathematical skills	7,23	5,18
Computer skills	6,54	6,87
Ability to work with information	7,04	7,50
Skills to identify and solve problems	6,47	7,73
Skills of creative and flexible thinking and acting	6,26	7,35
Presentation skills and writing skills	5,87	6,54
Independent decision-making skills	5,97	6,57
Teamwork	5,91	7,25
Ability to take responsibility	5,56	7,13
Organizational and management skills to lead a team	4,56	6,09
The ability to think and act economically / economic eligibility	5,03	6,56
The ability to communicate with people, to negotiate	5,05	7,16
Ability to adapt to changing circumstances, conditions	5,95	7,14
Ability to work in a multicultural / international environment	4,72	5,98
Ability to train and organize own learning	6,96	6,47
Technical competencies	6,35	6,59
Legal eligibility	4,55	5,44

Source: CTU graduates, research REFLEX, CTU data 2013

(Notes: The Reflex research used for evaluation of competencies indicator as a scale, when 10 is maximum and 1 is minimum. The authors are aware that the data in this article compares 2 methods of ranking, a scale and percentage. For this level of interpretation, this approach is methodologically possible because the scale from 1 to 10 is logically equal to percentage).

Results of the last representative research “Reflex” in 2013 (Koucký & Ryška, 2015), which encompassed all Czech university graduates from 2008 to 2012, including a sample of 500 CTU graduates and their employers. We interpreted only small part of results concerning competencies of CTU graduates between years 2008-2012. The main part of results corresponds to the longitudinal CTU research (see points 1 and 2).

From Reflex results, in the point of view of CTU graduates and their employers, the main difference is in “Mathematical skills”. Graduates appreciate it and when asked to evaluate it on scale, they level themselves by 7.23 from 10 points possible, while the demand of employers is only 5.18, which is far lower than the real level of this competency.

Problems in real level of competencies from graduate evaluation and demand of employers (further Graduates : Employers) are mainly in following five competencies:

- Teamwork 5.91: 7.25
- Ability to take responsibility 5.56: 7.13
- Organizational and management skills to lead a team 4.56: 6.09
- The ability to think and act economically / economic eligibility 5.03: 6.56
- The ability to communicate with people 5.05: 7.16

It has been more than 20 years’ discussion between universities and employers, what competencies have to have graduates of technical universities, as mainly technical or greater soft skills and ability to manage and work in teams (Šafránková & Franěk, 2008).

In part of competencies of “Professional theoretical and methodological knowledge” is the level of competencies appropriate to employers demand 7.17:6.95 and in “Ability to work with information” 7.04: 7.50, too.

The graduates appreciate above all the ability of technical thinking, the general knowledge of facts and knowledge in their field. One fifth of the graduates think that they have to improve their knowledge of foreign languages, work on PC (especially those who graduated in 1990s and before), economic skills, communication with people and the capability for solution of interpersonal problems, law and legislation. That is why they find insufficiencies in knowledge that they acquired in a faculty in the field of management and communication with people as well as the knowledge of the contemporary society that is so important for their ability to assert themselves. One half (maybe even two thirds) of the graduates state that they are satisfied with knowledge acquired during their studies. More than one third of them are satisfied partly and only a small part of them are not satisfied at all. As for the potential changes at the CTU, the graduates suggest the improvement of practical

knowledge, the knowledge of foreign languages and the attitude of some pedagogues to students. The orientation of teaching relates to a certain degree to the students' abilities and skills. Some of them can be developed within the framework of the pedagogical process itself. The development of students' abilities can help their preparedness for work. The graduates of individual faculties express their opinions of contemporary demands on the labour market, required abilities and social competencies.

Conclusion

These results prove that the graduates adapt themselves to the existing conditions of market economy, economic development and international co-operation. The graduates who graduated in 1990 - 2012 agree on their opinions of important social competencies. In their opinion ability to solve problems, to communicate with people and to learn is important for practice. One half of the graduates stress the necessity of the ability of teamwork. The graduates who have been working for longer time stress ability to risk. It is possible to deduce from the above information that in practice it is more important for them to be able to solve problems and communicate with people than to adapt themselves to the situation of an enterprise. It is good that these opinions are not advocated only by the graduates who hold high posts. The information witness that the graduates agree on principle regardless a faculty they graduated from and a year in which they did so. The differences result from the variety of positions which they hold after finishing studies.

The guideline for curricula can be related to a certain extent to the skills that are important in practice. Some skills and abilities of students, depending on the advancement of an individual's personality, can be developed as a part of the educational process. The development of the necessary skills of students may also subsequently improve their working ability. From our point of view, it is helpful to pay attention to the opinions of the CTU graduates, who, after gaining experience, state their views on certain demands of the current labour market, especially addressing the opinions of graduates on the required skills, or social competencies, respectively.

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