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# Successful Construction Project Manager: Different Perceptions from Different Stakeholders

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## Abstract
The construction industry requires well trained managers and that explains the demand for appropriate educational programmes. However, it is questionable, whether the educational programmes offered are actually effective and respond to the industry's requirements. This paper investigates the perception of three different stakeholders in the education – industry system, namely the employers, the employees and the educators. Through a questionnaire survey prepared and conducted for this research, several interesting findings are inferred with the following being the most critical: a) industry's requirements for construction projects managers are hardly met, because of insufficient educational programmes, b) educators and professionals have a different evaluation of the required skills and competencies for qualified construction project managers, and c) soft skills are proven to be more critical than hard skills, which directly implies the need to develop behavioral and personality-based competencies compared to the strong technical and business training background. These findings are critical, because they contribute to the development of the philosophy and content for construction projects management educational programmes that can ensure a platform of knowledge to respond to a wide spectrum of required skills and competencies for construction projects managers.

## Keywords
Project Management, Construction Management, Education, Skills, Competencies

## 1. Introduction

Construction industry presents a significant project failure rate that is reported between 30-50% and with failure defined as cost overruns or schedule delays (Levy, 2006; Gardiner and Stewart, 2000; etc.). The effort towards project success includes the training and retraining of staff and especially the managers (Alam *et al.*, 2008). However, since little progress has been achieved in succesful project delivery, despite the great number of academic and professional programmes for project and construction management it should be investigated, whether there is a mismatch between the industry's requirements for the profile of a construction project manager and the academia's definion of content of this profile. This paper investigates the perception of employers, employees and educators with regard to the critical skills and competencies that a project manager should possess. A questionnaire survey has been conducted that included several skills and competencies, which the participants in the survey evaluated and ranked, in order to track down the priorities of each participant and identify potential differences in perceptions and attitudes. The following sections present the methodology and findings of this research.

## 2. The Conduct of the Survey

The survey presented in this paper was conducted with the use of a questionnaire that was originally designed for the purpose of this research. For the development of this questionnaire similar efforts were reviewed that were performed in the framework of the TUNING (Tuning Educational Structures in Europe) project, with the contribution of the European Civil Engineering Education and Training (EUCEET), and the European Council of Civil Engineers (ECCE) (TUNING, 2004). The questionnaire investigated 27 parameters that according to a vast literature (Seng Lei and Skitmore, 2004; El-Sabaa, 2001; etc.) had been identified as critical both from the industry and the academia. These parameters are presented in Table 1.

**Table 1: Skills and Competencies in Managing Construction Projects**

| No. | Skills and Competencies | p-values | |
|---|---|---|---|
| | | Importance in practicing PM | Level obtained through studies |
| 1 | Basic general knowledge in the field of constructions | ,905 | ,096 |
| 2 | Advanced engineering knowledge | ,693 | ,042 |
| 3 | Basic knowledge on construction contract law | ,978 | ,551 |
| 4 | Basic knowledge on quality management | ,463 | ,111 |
| 5 | Real estate management | ,913 | ,217 |
| 6 | Basic knowledge on safety management | ,638 | ,047 |
| 7 | Basic knowledge on HR management | ,750 | ,874 |
| 8 | Information management skills | ,070 | ,067 |
| 9 | Basic knowledge on construction economics | ,630 | ,350 |
| 10 | Basic knowledge on financial management | ,528 | ,245 |
| 11 | Decision making/ Basic knowledge on strategic management | ,655 | ,927 |
| 12 | Problem solving | ,958 | ,616 |
| 13 | Leadership | ,952 | ,686 |
| 14 | Ethical commitment | ,094 | ,050 |
| 15 | Concern for quality | ,570 | ,340 |
| 16 | Capacity to deal with complex situations | ,807 | ,427 |
| 17 | Elementary computing skills | ,602 | ,210 |
| 18 | Advanced software knowledge | ,668 | ,710 |
| 19 | Oral and written communication in native language | ,589 | ,372 |
| 20 | Knowledge of a second language | ,039 | ,613 |
| 21 | Ability to communicate with non-experts (in the field) | ,984 | ,413 |
| 22 | Understanding of other cultures and customs | ,655 | ,549 |
| 23 | Ability to work in an international context | ,834 | ,679 |
| 24 | Ability to work in an interdisciplinary team | ,683 | ,726 |
| 25 | Ability to work autonomously | ,692 | ,903 |
| 26 | Capacity to learn | ,793 | ,577 |
| 27 | Capacity to adapt to new situations | ,960 | ,096 |

The questionnaire comprised 3 parts. Part 1 sought details of the background of the participants and their general response to the issue under investigation, i.e. their view on the sufficiency of the background obtained during studies for practicing project management. Part 2 sought views from the survey participants on: a) the Importance of each of the 27 construction project management skills and competencies in the professional practice, and b) the Level to which these skills and competencies are developed through education. Part 3 sought views from the survey participants on the hierarchy of the investigated skills and competencies in terms of importance. Parts 1 and 3 comprised open-ended, while Part 2 comprised closed-ended questions. For the latter a five-point Likert scale was used.

The survey was conducted among three distinct groups of participants: a) faculty members and instructors in universities teaching project management, b) students in project management programmes and practitioners involved in project management teams, and c) employers of project managers and employees involved in project management teams. A total of 280 questionnaires were distributed both by electronic mail and in printed form between September and October 2010 (40 days in total) and 79 useable responses were obtained, representing a response rate of 28.2%.

Reliability analysis of the questionnaire was conducted with the use of the Cronbach's alpha test, which resulted to a value of 0.907 for the first group of questions (i.e. those with regard to the importance of the investigated parameters) and a value of 0.900 for the second group of questions (i.e. those with regard to the level of development of the investigated skills and competencies through educational programmes). Both values were considered very satisfactory.

Statistical analysis of the responses was conducted with the use of the Kruskal – Wallis Test for each one of the 27 parameters. The Kruskal – Wallis Test is suitable for the survey, because it is a nonparametric (distribution free) test, which is used to compare three or more groups of sample data that are not necessarily normally distributed and are of ordinal type (responses in a five-point Likert scale). The statistical analysis was conducted with the use of the SPPS (v. 17.0) software program. Statistical significance was considered for $p < 0.05$. As shown in Table 1, only for two parameters, namely "Advanced engineering knowledge" and "Basic knowledge on safety management", the results were statistically important for the one of the two cases under investigation. The next section presents the most significant results of the survey.

## 3. The Survey's Significant Results

The survey revealed some interesting results, which are presented in Figures 1 and 2 and Tables 2, 3 and 4. Figure 1 presents the average score of both the importance and the level of development of each skill and competency identified for construction project managers (for illustration purposes, skills and competencies in the figures are designated with their respective numbers as presented in Table 1). These are collective results, i.e. the average refers to the whole sample and not to a specific group. It is very interesting to notice that in all cases the importance of the skill or competency outweighs the level of its development in an educational programme. This is emphasized in Figure 2 which presents the differences between the average scores of importance and level of development for each skill and competency. As shown in Figure 2, the differences range from 0.48 to 2.16 with an average of the differences reaching 1.35. This is a very significant result, for two reasons: a) because it verifies that the investigated skills and competencies are considered as important requirements for the industry. This can be inferred from the average value with regard to their importance, which equals to 4.02, a value that according to the Likert scale used for the survey corresponds to "high importance", and b) because it indicates an inability of construction project management educational programmes to provide a sufficient background for professionals, which is inferred from the average value with regard to the development of these skills and competencies that equals to 2.67, a value that corresponds to "average development through educational programmes".

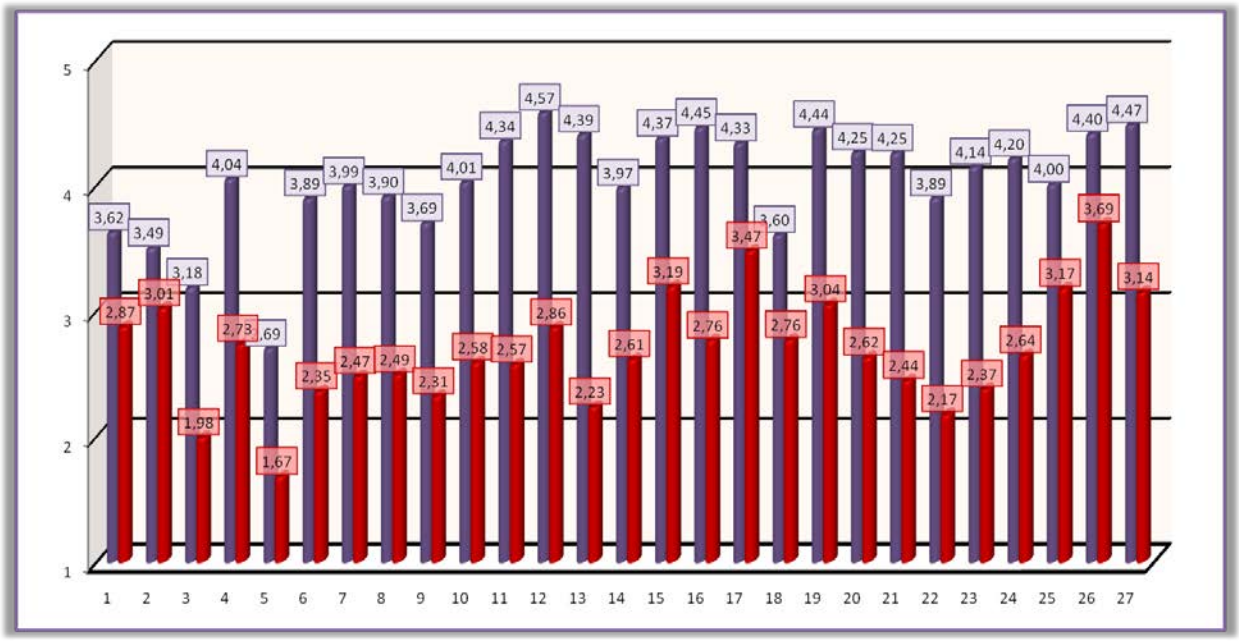


**Figure 1: Average Scores of Importance and Level of Development of Skills and Competencies for Construction Projects Managers**

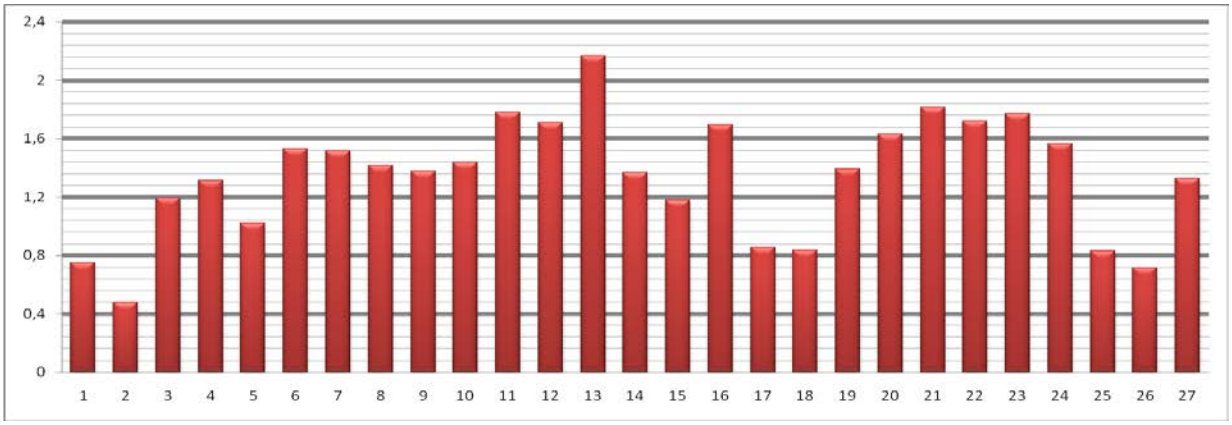


**Figure 2: Differences between the Average Score of Importance and of the Level of Development for all the Investigated Skills and Competencies for Construction Projects Managers**

The insufficiency of educational programmes to meet the industry's requirements is further emphasized from the analytic results of the survey as presented in Tables 2 and 3 per group of participants to the survey. Focusing on the evaluations for "Successful" and "Very Successful" development of the required skills and competencies, it is shown that the educators steadily appreciate more the sufficiency of the programmes being outweighed by the two other groups in only one case (survey item no. 18). However, a shared opinion with the employees and the employers in the construction industry is achieved only in 7 cases (survey items no. 5, 17, 19, 21, 22, 26 and 27). In 10 cases (survey items no. 7, 8, 10-12, 14, 16, 20, 24 and 25) the evaluations between the three groups can be considered as being in closer proximity, however with the employers expressing steadily the lowest appreciation for the sufficiency of the programmes. In the rest 10 cases (survey items no. 1-4, 6, 9, 13, 15, 18 and 23) there is a great difference between the evaluations from the educators and the other two groups with regard to the sufficiency of the educational programmes to support adequately to the development of the required skills and competencies for managing construction projects.

**Table 2: Evaluation of the Importance in Construction Project Management of the Identified Skills and Competencies**

| No. | Skills and Competencies | Importance | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Very low | | | Low | | | Average | | | High | | | Very High | | |
| | | E1 | E2 | E3 | E1 | E2 | E3 | E1 | E2 | E3 | E1 | E2 | E3 | E1 | E2 | E3 |
| 1 | Basic general knowledge in the field of constructions | 14.3 | 10.5 | 13.6 | 28.6 | 15.8 | 9.1 | 14.3 | 15.8 | 4.5 | 0.0 | 15.8 | 40.9 | 42.9 | 42.1 | 31.8 |
| 2 | Advanced engineering knowledge | 14.3 | 12.8 | 9.5 | 14.3 | 5.1 | 0.0 | 42.9 | 25.6 | 33.3 | 0.0 | 30.8 | 38.1 | 28.6 | 25.6 | 19.0 |
| 3 | Basic knowledge on construction contract law | 14.3 | 23.7 | 13.6 | 14.3 | 5.3 | 13.6 | 28.6 | 26.3 | 22.7 | 14.3 | 21.1 | 40.9 | 28.6 | 23.7 | 9.1 |
| 4 | Basic knowledge on quality management | 0.0 | 0.0 | 0.0 | 0.0 | 2.6 | 0.0 | 42.9 | 20.5 | 28.6 | 42.9 | 43.6 | 38.1 | 14.3 | 33.3 | 33.3 |
| 5 | Real estate management | 28.6 | 23.7 | 22.7 | 14.3 | 21.1 | 22.7 | 42.9 | 28.9 | 27.3 | 14.3 | 13.2 | 9.1 | 0.0 | 13.2 | 18.2 |
| 6 | Basic knowledge on safety management | 0.0 | 5.1 | 9.1 | 0.0 | 10.3 | 0.0 | 42.9 | 12.8 | 13.6 | 42.9 | 33.3 | 40.9 | 14.3 | 38.5 | 36.4 |
| 7 | Basic knowledge on HR management | 0.0 | 0.0 | 4.5 | 0.0 | 0.0 | 0.0 | 14.3 | 35.9 | 22.7 | 57.1 | 35.9 | 27.3 | 28.6 | 28.2 | 45.5 |
| 8 | Information management skills | 0.0 | 2.6 | 0.0 | 0.0 | 5.3 | 0.0 | 14.3 | 23.7 | 31.8 | 14.3 | 42.1 | 54.5 | 71.4 | 26.3 | 13.6 |
| 9 | Basic knowledge on construction economics | 14.3 | 10.5 | 13.6 | 0.0 | 7.9 | 0.0 | 0.0 | 23.7 | 22.7 | 42.9 | 26.3 | 27.3 | 42.9 | 31.6 | 36.4 |
| 10 | Basic knowledge on financial management | 14.3 | 0.0 | 0.0 | 0.0 | 0.0 | 9.1 | 0.0 | 23.1 | 22.7 | 42.9 | 41.0 | 36.4 | 42.9 | 35.9 | 31.8 |
| 11 | Decision making/ Basic knowledge on strategic management | 0.0 | 0.0 | 0.0 | 14.3 | 2.6 | 4.5 | 0.0 | 7.7 | 9.1 | 14.3 | 41.0 | 40.9 | 71.4 | 48.7 | 45.5 |
| 12 | Problem solving | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 14.3 | 7.7 | 9.1 | 14.3 | 28.2 | 27.3 | 71.4 | 64.1 | 63.6 |
| 13 | Leadership | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.5 | 14.3 | 7.9 | 9.1 | 28.6 | 44.7 | 36.4 | 57.1 | 47.4 | 50.0 |
| 14 | Ethical commitment | 0.0 | 0.0 | 0.0 | 14.3 | 5.1 | 0.0 | 0.0 | 38.5 | 31.8 | 0.0 | 25.6 | 31.8 | 85.7 | 30.8 | 36.4 |
| 15 | Concern for quality | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.5 | 14.3 | 13.2 | 0.0 | 14.3 | 36.8 | 50.0 | 71.4 | 50.0 | 45.5 |
| 16 | Capacity to deal with complex situations | 0.0 | 0.0 | 0.0 | 14.3 | 0.0 | 4.5 | 0.0 | 7.9 | 0.0 | 14.3 | 39.5 | 40.9 | 71.4 | 52.6 | 54.5 |
| 17 | Elementary computing skills | 14.3 | 0.0 | 0.0 | 0.0 | 5.1 | 0.0 | 0.0 | 5.1 | 13.6 | 42.9 | 30.8 | 45.5 | 42.9 | 59.0 | 40.9 |
| 18 | Advanced software knowledge | 14.3 | 2.6 | 0.0 | 28.6 | 17.9 | 13.6 | 14.3 | 23.1 | 22.7 | 14.3 | 28.2 | 40.9 | 28.6 | 28.2 | 22.7 |
| 19 | Oral and written communication in native language | 0.0 | 0.0 | 0.0 | 0.0 | 2.6 | 4.8 | 0.0 | 7.7 | 9.5 | 28.6 | 30.8 | 38.1 | 71.4 | 59.0 | 47.6 |
| 20 | Knowledge of a second language | 0.0 | 0.0 | 0.0 | 0.0 | 2.6 | 9.1 | 14.3 | 10.5 | 18.2 | 28.6 | 23.7 | 45.5 | 57.1 | 63.2 | 27.3 |
| 21 | Ability to communicate with non-experts (in the field) | 14.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 10.3 | 18.2 | 42.9 | 48.7 | 36.4 | 42.9 | 41.0 | 45.5 |
| 22 | Understanding of other cultures and customs | 0.0 | 2.6 | 4.5 | 14.3 | 2.6 | 4.5 | 0.0 | 28.2 | 22.7 | 42.9 | 41.0 | 31.8 | 42.9 | 25.6 | 36.4 |
| 23 | Ability to work in an international context | 14.3 | 2.6 | 0.0 | 0.0 | 0.0 | 4.5 | 0.0 | 15.4 | 18.2 | 42.9 | 38.5 | 36.4 | 42.9 | 43.6 | 40.9 |
| 24 | Ability to work in an interdisciplinary team | 0.0 | 2.6 | 0.0 | 0.0 | 0.0 | 0.0 | 14.3 | 13.2 | 14.3 | 28.6 | 42.1 | 47.6 | 57.1 | 42.1 | 38.1 |
| 25 | Ability to work autonomously | 0.0 | 0.0 | 0.0 | 14.3 | 2.6 | 0.0 | 28.6 | 20.5 | 31.8 | 14.3 | 41.0 | 40.9 | 42.9 | 35.9 | 27.3 |
| 26 | Capacity to learn | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.5 | 28.6 | 10.3 | 4.5 | 14.3 | 41.0 | 31.8 | 57.1 | 48.7 | 59.1 |
| 27 | Capacity to adapt to new situations | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.5 | 14.3 | 5.1 | 4.5 | 28.6 | 38.5 | 36.4 | 57.1 | 56.4 | 54.5 |

E1: PM educators, E2: Employees in PM teams, E3: Employers of managers and employees involved in PM teams (PM: Project Management)

**Table 3: Evaluation of the Level of Development of the Identified Skills and Competencies through Educational Programmes**

| No. | Skills and Competencies | Level of Development through Education | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Very Unsuccessful | | | Unsuccessful | | | Average | | | Successful | | | Very Successful | | |
| | | E1 | E2 | E3 | E1 | E2 | E3 | E1 | E2 | E3 | E1 | E2 | E3 | E1 | E2 | E3 |
| 1 | Basic general knowledge in the field of constructions | 0.0 | 21.1 | 23.8 | 16.7 | 18.4 | 19.0 | 33.3 | 23.7 | 38.1 | 0.0 | 23.7 | 14.3 | 50.0 | 13.2 | 4.8 |
| 2 | Advanced engineering knowledge | 16.7 | 12.8 | 13.6 | 16.7 | 25.6 | 18.2 | 0.0 | 28.2 | 27.3 | 16.7 | 28.2 | 22.7 | 50.0 | 5.1 | 18.2 |
| 3 | Basic knowledge on construction contract law | 0.0 | 54.1 | 38.1 | 50.0 | 18.9 | 23.8 | 0.0 | 24.3 | 33.3 | 33.3 | 0.0 | 0.0 | 16.7 | 2.7 | 4.8 |
| 4 | Basic knowledge on quality management | 0.0 | 20.5 | 13.6 | 16.7 | 23.1 | 22.7 | 33.3 | 30.8 | 45.5 | 50.0 | 20.5 | 18.2 | 0.0 | 5.1 | 0.0 |
| 5 | Real estate management | 16.7 | 57.9 | 52.4 | 50.0 | 26.3 | 38.1 | 16.7 | 13.2 | 4.8 | 16.7 | 2.6 | 4.8 | 0.0 | 0.0 | 0.0 |
| 6 | Basic knowledge on safety management | 0.0 | 28.2 | 33.3 | 33.3 | 25.6 | 28.6 | 16.7 | 38.5 | 23.8 | 33.3 | 2.6 | 14.3 | 16.7 | 5.1 | 0.0 |
| 7 | Basic knowledge on HR management | 0.0 | 20.5 | 40.9 | 16.7 | 30.8 | 18.2 | 50.0 | 20.5 | 36.4 | 16.7 | 23.1 | 4.5 | 16.7 | 5.1 | 0.0 |
| 8 | Information management skills | 33.3 | 15.8 | 22.7 | 16.7 | 31.6 | 36.4 | 16.7 | 28.9 | 27.3 | 16.7 | 21.1 | 13.6 | 16.7 | 2.6 | 0.0 |
| 9 | Basic knowledge on construction economics | 0.0 | 34.2 | 38.1 | 16.7 | 21.1 | 28.6 | 16.7 | 28.9 | 28.6 | 66.7 | 10.5 | 0.0 | 0.0 | 5.3 | 4.8 |
| 10 | Basic knowledge on financial management | 0.0 | 30.8 | 40.9 | 0.0 | 15.4 | 22.7 | 66.7 | 20.5 | 13.6 | 33.3 | 25.6 | 13.6 | 0.0 | 7.7 | 9.1 |
| 11 | Decision making/ Basic knowledge on strategic management | 16.7 | 17.9 | 40.9 | 0.0 | 25.6 | 22.7 | 50.0 | 30.8 | 22.7 | 16.7 | 17.9 | 13.6 | 16.7 | 7.7 | 0.0 |
| 12 | Problem solving | 16.7 | 12.8 | 13.6 | 16.7 | 20.5 | 27.3 | 16.7 | 28.2 | 40.9 | 50.0 | 28.2 | 13.6 | 0.0 | 10.3 | 4.5 |
| 13 | Leadership | 16.7 | 42.1 | 36.4 | 16.7 | 10.5 | 31.8 | 16.7 | 31.6 | 27.3 | 50.0 | 10.5 | 4.5 | 0.0 | 5.3 | 0.0 |
| 14 | Ethical commitment | 16.7 | 23.1 | 13.6 | 33.3 | 23.1 | 31.8 | 16.7 | 30.8 | 40.9 | 33.3 | 15.4 | 9.1 | 0.0 | 7.7 | 4.5 |
| 15 | Concern for quality | 0.0 | 7.9 | 4.5 | 16.7 | 13.2 | 50.0 | 0.0 | 31.6 | 22.7 | 66.7 | 28.9 | 22.7 | 16.7 | 18.4 | 0.0 |
| 16 | Capacity to deal with complex situations | 33.3 | 7.9 | 22.7 | 33.3 | 31.6 | 27.3 | 0.0 | 26.3 | 27.3 | 16.7 | 21.1 | 18.2 | 16.7 | 13.2 | 4.5 |
| 17 | Elementary computing skills | 33.3 | 2.6 | 4.5 | 0.0 | 10.3 | 22.7 | 16.7 | 30.8 | 31.8 | 16.7 | 35.9 | 22.7 | 33.3 | 20.5 | 18.2 |
| 18 | Advanced software knowledge | 16.7 | 12.8 | 18.2 | 33.3 | 25.6 | 31.8 | 50.0 | 28.2 | 27.3 | 0.0 | 28.2 | 13.6 | 0.0 | 5.1 | 9.1 |
| 19 | Oral and written communication in native language | 16.7 | 7.9 | 9.5 | 33.3 | 10.5 | 19.0 | 33.3 | 44.7 | 52.4 | 0.0 | 18.4 | 9.5 | 16.7 | 18.4 | 9.5 |
| 20 | Knowledge of a second language | 16.7 | 34.2 | 14.3 | 16.7 | 15.8 | 52.4 | 16.7 | 26.3 | 9.5 | 16.7 | 10.5 | 19.0 | 33.3 | 13.2 | 4.8 |
| 21 | Ability to communicate with non-experts (in the field) | 16.7 | 28.2 | 22.7 | 16.7 | 28.2 | 27.3 | 50.0 | 25.6 | 36.4 | 16.7 | 7.7 | 9.1 | 0.0 | 10.3 | 4.5 |
| 22 | Understanding of other cultures and customs | 16.7 | 30.8 | 31.8 | 33.3 | 35.9 | 31.8 | 33.3 | 25.6 | 27.3 | 16.7 | 7.7 | 9.1 | 0.0 | 0.0 | 0.0 |
| 23 | Ability to work in an international context | 0.0 | 28.2 | 40.9 | 40.0 | 30.8 | 18.2 | 0.0 | 23.1 | 31.8 | 40.0 | 10.3 | 9.1 | 20.0 | 7.7 | 0.0 |
| 24 | Ability to work in an interdisciplinary team | 33.3 | 21.1 | 18.2 | 16.7 | 21.1 | 27.3 | 16.7 | 26.3 | 45.5 | 16.7 | 28.9 | 9.1 | 16.7 | 2.6 | 0.0 |
| 25 | Ability to work autonomously | 16.7 | 10.3 | 9.1 | 0.0 | 17.9 | 18.2 | 16.7 | 30.8 | 31.8 | 33.3 | 30.8 | 27.3 | 33.3 | 10.3 | 13.6 |
| 26 | Capacity to learn | 0.0 | 0.0 | 4.8 | 16.7 | 10.3 | 14.3 | 16.7 | 30.8 | 28.6 | 16.7 | 35.9 | 19.0 | 50.0 | 23.1 | 33.3 |
| 27 | Capacity to adapt to new situations | 16.7 | 5.3 | 13.6 | 33.3 | 18.4 | 27.3 | 0.0 | 28.9 | 18.2 | 33.3 | 36.8 | 22.7 | 16.7 | 10.5 | 18.2 |

E1: PM educators, E2: Employees in PM teams, E3: Employers of managers and employees involved in PM teams (PM: Project Management)

Another significant result is that soft skills are considered as being more significant than hard skills. The top ten skills and competencies in terms of importance – in the whole sample – ranked in descending order are: 1) Problem solving, 2) Capacity to adapt to new situations, 3) Capacity to deal with complex situations, 4) Oral and written communication in native language, 5) Capacity to learn, 6) Leadership, 7) Concern for quality, 8) Decision making/ Basic knowledge on strategic management, 9) Elementary computing skills, and 10) Ability to communicate with non-experts (in the field). This ranking indicates a clear precedence of the capacities to manage, communicate, adjust to situations and cooperate with others, which, in turn, demonstrates the importance of soft skills in construction project management. However, as shown in Figure 2, only two of these skills and competencies, namely "Elementary computing skills" – which can be considered as the only hard skill among the ten – and "Capacity to learn" are considered as almost adequately developed through education. Figure 2 indicates that three of them, namely "Leadership", "Ability to communicate with non-experts (in the field)", and "Decision making/ Basic knowledge on strategic management" are the least developed skills and competencies compared to their importance.

Finally, significant results are drawn from the comparison of the ranking of the skills and competencies for both parameters (i.e., "importance" and "level of development") for each group of the sample. Table 4 presents the top five skills and competencies for each group of the sample. The results drawn are that:

**Table 4: Top Five Skills and Competencies for Educators, Employees and Employers in the Construction Industry**

| **Importance** | | | **Level of Development through Education** | | |
|---|---|---|---|---|---|
| E1 | E2 | E3 | E1 | E2 | E3 |
| Ethical commitment | Problem solving | Problem solving | Basic general knowledge in the field of constructions | Capacity to learn | Capacity to learn |
| Information management skills | Knowledge of a second language | Capacity to learn | Advanced engineering knowledge | Elementary computing skills | Advanced engineering knowledge |
| Decision making/ Basic knowledge on strategic management | Elementary computing skills | Capacity to deal with complex situations | Capacity to learn | Concern for quality | Elementary computing skills |
| Problem solving | Oral and written communication in native language | Capacity to adapt to new situations | Elementary computing skills | Oral and written communication in native language | Capacity to adapt to new situations |
| Concern for quality | Capacity to adapt to new situations | Leadership | Knowledge of a second language | Basic general knowledge in the field of constructions | Ability to work autonomously |

- The three groups have only one common competency among their top five ("Problem solving"), while there is only another one skill where two of the groups coincide ("Capacity to adapt to new situations" for groups E2 and E3). This proves an important difference in perception about the most significant skills and competencies for construction project managers, not only between educators and professionals, but, also, between professionals themselves.
- The three groups share the opinion that "Capacity to learn" and "Elementary computing skills" are among the most developed skills and competencies through education for construction project managers.

Educators coincide, also, with the employees in the case of the skill of "Basic general knowledge in the field of constructions", while educators coincide, also, with the employers in the case of the skill of "Advanced engineering knowledge", in terms of their evaluation with regard to the level of development of these skills through education. These observations lead to the conclusion that the three groups coincide more with each other to perceptions about the level of development through education of skills and competencies for construction project managers.

- There is, generally, very little concordance between the top five skills and competencies in terms of importance with the respective ones in terms of the level of development through education for all groups. Only the skills of "Oral and written communication in native language" and "Elementary computing skills" for the employees and the competence of "Capacity to adapt to new situations" for the employers are evaluated as being both among the most important and the better developed through education skills and competencies. This is a strong indication that educators and professionals recognize that educational programmes offer a strong background to construction projects managers on skills and competencies that are not of top priority to the industry.

## 4. Conclusions

The questionnaire survey that was presented in this paper revealed that there are significant differences among educators and professionals in the construction industry with regard to their perceptions for the importance and level of development through education of specific skills and competencies for construction projects managers. These differences justify the hypothesis that the several educational programmes are not in agreement with the construction industry's requirements for the profile of the construction project manager, which may be one of the main reasons for the relatively high projects failure rate in construction projects. The sufficiency of the educational programmes is further lowered by the findings that they fail to provide to professionals the appropriate background in skills and competencies which are important to the industry. One of the reasons for these phenomena may be that soft skills, which, based on the survey's results, are more important compared to hard skills are difficult to be developed through education. Another reason, similar to the previous one, is that competencies may be inherent to human beings or developed through experience instead through an educational programme. Whatever the reasons, it is imperative to achieve better compliance of the industry's expectations and needs for construction projects managers with the educational programmes that provide to professionals the level of skills and competencies, which is required for efficient management of construction projects.

## 5. References


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