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Correlation between the time taken to master the competency and the rank of competence evaluated on the basic educational programme

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Abstract

The article deals with statistically important correlation between the time taken to master the competence and the rank of competence evaluated on the basic of educational programme "Soft engineering". The strength and the direction of correlation between these two characteristics was calculated using Pearson correlation coefficient. We estimated the empirical value of the correlation coefficient and the statistical significance of empirical value of the correlation coefficient using t-Student's criterion. It was shown that correlation between the time of competence mastering and the rank of competence is statistically important and the correlation is positive: the more significant competence, the more significant time for its mastering is needed.

Keywords: The Pearson correlation coefficient, t- Student's criterion, competence, the basic educational program, the program of the discipline.

1. Introduction

Decision making plays a significant role in choosing disciplines at the high educational institutions. Different disciplines often play an important role in student's mastering the competence [1,4]. While they select a discipline, one of the most important questions is to find the appropriate set of disciplines, which allows the student to master the competence fully [2,3]. This article presents the analysis of a set of competences in a basic educational program (BEP).

2. Discussion

The article represents the results of analysis of preparation of curriculum for the "Soft Engineering" direction for graduates of 2015 using BEP as a Base. The set of competences for every discipline, which the students of this educational direction have to master, has been formed in the curriculum. While studying at the university, the graduate must master the 37 competences. Out of which 9 are general cultural (GCC), 4 are general professional (GPC) and 24 are professional. We have calculated the rank of each competence using BEP as a Base (figure 1a).

The analysis shows that professional competence (PC) № 12 (the ability to formalize in their subject area, taking into account the limitations of research methods used) is the most valuable. It

must be mastered using in 11 disciplines for 1368 hours (or 38 credit units). The least important competence is PC № 9 (possession the methods of the project controlling and the ability to carry out the version control); it must be mastered only in one discipline, which requires 18 hours.

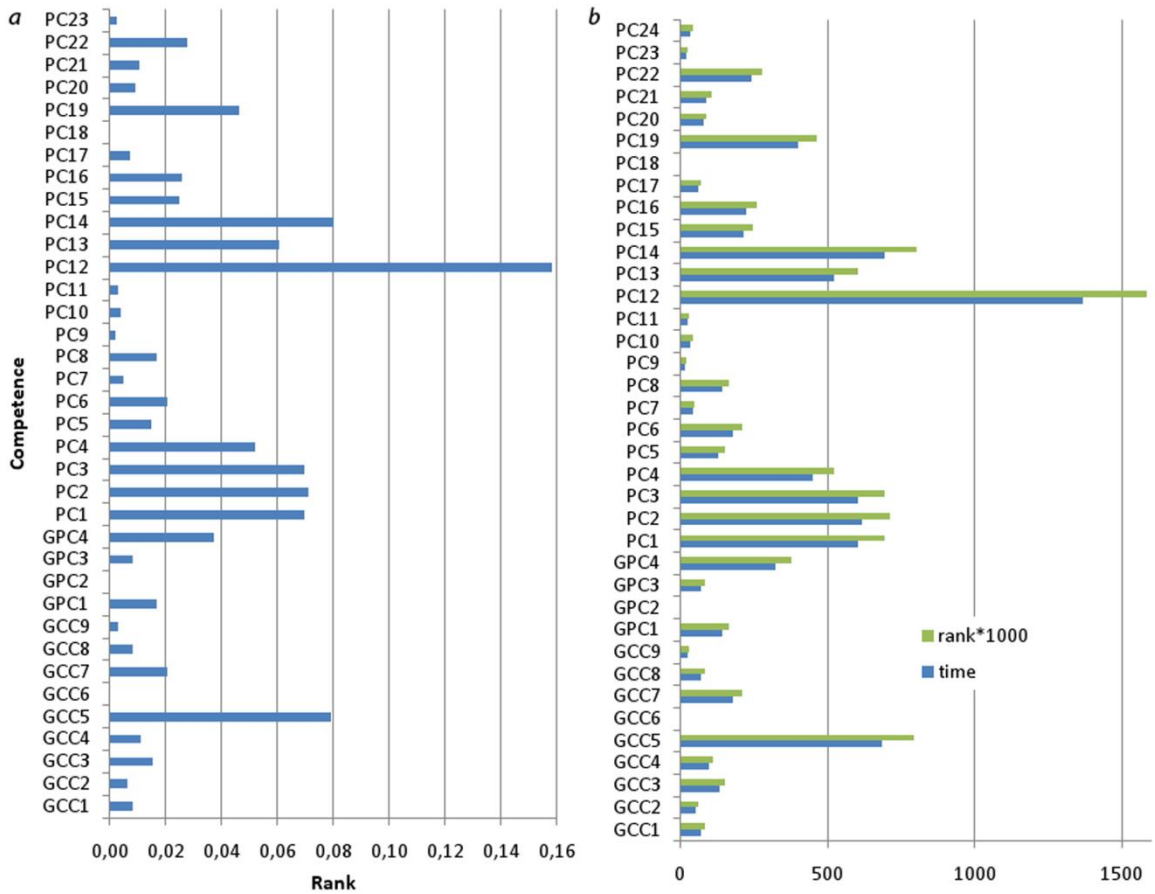


Fig. 1. a) the rank of competence in BEP;
 b) correlation between the time taken to master the competence and the rank of competence

The strength and the direction of correlation between the time taken to master the competence and the rank of competence can be calculated using Pearson correlation coefficient, as

$$r_{xy} = \frac{n \cdot \sum(x_i \cdot y_i) - (\sum x_i) \cdot (\sum y_i)}{\sqrt{(\sum(n \cdot \sum(x_i)^2 - (\sum x_i)^2) \cdot (\sum(n \cdot \sum(y_i)^2 - (\sum y_i)^2))}}, \quad (1)$$

where x_i is value of the time taken to master the competency; y_i is the value of the rank of competence; n is sample size. The result is a value $r_{xy}=0.7725$.

Then we determined the critical values of the Pearson product moment correlation coefficient for $n = 37$, they are equal to $r_{cr}=0.325$ at $\alpha \leq 0.05$ and $r_{cr}=0.418$ at $\alpha \leq 0.01$.

The empirical value of the correlation coefficient $r_{xy} = 0.7725$ exceeds the critical values for different α , the correlation between the time taken to master the competence and the rank of competence differs from zero.

With the help of t-Student's criterion we calculated the statistical significance of empirical value of the correlation coefficient, as:

$$t = r_{xy} * \sqrt{\frac{n-2}{1-(r_{xy})^2}} \quad (2)$$

The result is a value $t=7.196951$. Then we determined the critical values of t-Student's criterion for $df=37-2=35$, they are equal to $t_{cr}=2.030$ at $\alpha \leq 0.05$ and $t_{cr}=2.724$ at $\alpha \leq 0.01$.

Comparing the statistical significance of the empirical values of the correlation coefficient $t = 7.196951$ with critical values for different α , it is observed that it is much higher, therefore the correlation between the time of mastering competence and the rank of competence differs from zero.

Conclusion

Obtained results allow us to conclude, that correlation between the time of competence mastering and the rank of competence is statistically important and the correlation is positive: the more significant competence, the more significant time for its mastering is needed, and vice versa. In addition, the rank of competences must be balanced so that the time of the competence mastering in every definite discipline should be distributed uniformly.

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