How to Evaluate Management Competencies: a Quantitative Approach

By Ihar Hancharonak[1], Boris Novysh[2]

Abstract

This article describes a quantitative model developed for evaluating competences of graduates of management universities. The model is based on a multi-criteria analysis using linear combination of local criteria method. The model and the programme are adaptable to employers' requirements, including government authorities.

Key words**:** *competency, competence, higher education in management, rating system, vector criterion, expert opinions.*

In the context of a highly dynamic labour market of young professionals which requires radical improvements in the educational processes the issue of optimal 'content' of professions matching employers' requirements is becoming a critical one. A good example is the sector of Information and Communication Technologies (ICTs) in public administration, which requires introducing new areas of studies, fundamental changes in the structure of model plans, contents of curricula and programmes of special courses, integration of new subjects and removal of irrelevant ones in accordance with new requirements, etc. Furthermore, proper staffing solutions are especially important in civil service in a world of constrained resources, including as driven by the global crisis processes.

Improvements in the educational process should be made based on the monitoring of a real situation at the labour market (its capacity and segmentation, trends in changing major requirements to the quality of training of young professionals, etc.), systematic analysis of innovations in industry and education, strategies of flagship domestic and foreign educational institutions. An important factor

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for efficient convergence of education and economic system of a country (particularly, with its industrial sector) is monitoring of knowledge and competencies of future professionals. The requirements to the levels and content of training of young professionals apparently vary from one employer to another, which particularly requires careful and timely analysis of information on potential consumers, levels of competition and several other factors.

Improved level of competence and competencies of young professionals is clearly one of the determinants for their high competitiveness at the labour market [1-2].

The evaluation of competencies is closely linked to the use of scoring and rating systems in education. We should note that though there are plenty of publications on the rating systems for evaluating students' knowledge, teachers' and universities' performance (e.g. [3-7]), this issue is still of practical interest and requires further studies.

Addressing of another important objective related to the evaluation of the level of competences among university graduates requires both the development of scientifically sound methodology for quantitative integral evaluation of graduates' competences and processing of wealth of information, including the data on graduates' employment, their career development, perspectives of social and personal development, etc. Such data seem to be difficult to collect (if not impossible) and along with the dynamics at the labour market, continuously increasing requirements to the qualifications of young professionals, high level of competition and other hardly predictable factors makes the above objective very challenging.

At the same time, given the need to make university graduates and relevant training programmes competitive as well as given the requirements of a quality management system, adequate competence-based models need to be developed for evaluating graduates that would enable making judgements on the prospects of employment in their professions, appropriateness of training programmes, possibilities for quick adjustments in the training processes, etc.

A simple approach based on the final rating of graduates by each type of competences – academic, social and personal and professional ones – can be used as such model. Under such approach each

competence can be considered as a separate criterion, which enables using one of multi-criteria analysis, for instance, linear combination of local criteria (linear convolution method) (e.g. [8]). As it known, this method offers using an alternative with an optimum value of a vector criterion

$$R = \sum_{i=1}^{n} \lambda_i \cdot K_i \quad , \qquad (1)$$

where R is a value of a vector criterion, K_i are the values of local criteria, and λ_i are coefficients of local criteria' significance.

With respect to competence evaluation one should consider that each competence is generated by a number of areas of study and the role of a specific area for one competence may differ substantially from the one for another competence.

Therefore, we will use the following formula for calculating the final score of graduate's professional competency

$$R = \sum_{i=1}^{n} K_i \cdot S_i \quad , \qquad (2)$$

where i is a measure of overall level of graduate's professional (academic, social and personal) competency, with a sum of all competences i, K_i is a standardized coefficient of significance of a competence i, S_i is the level of competence acquirement determined using the formula

$$S_i = \sum_{j} a_j \cdot f_j \ , \qquad (3)$$

where a_{ij} is a standardized coefficient of significance of a subject j for competence i, f_j is a level of subject acquisition (measured by an examination score) with a sum of the set of subjects required for competence i.

The calculations require using expert opinions. Such experts can be practitioners (e.g. representatives of employers), and leading professionals of universities – deans, heads of graduate and profile chairs, professors and associate professors delivering lectures for relevant subjects.

After proper mathematic processing, expert opinions on the significance of specific competences as well the importance of subjects for each competence can be used for evaluating the level of competency based on final rating.

Table 1 provides an example of expert data used for assessing specific competences. To illustrate the example we have taken some competences from professional standard for 'Information Resources Management' (IRM) in the Administration Academy under the President of the Republic of Belarus.

Table 1. *Expert opinions on the significance of some competences for IRM (example)*

Competence index	Competence	Significance of competence		
		Expert 1	Expert 2	Expert 3
PC-9	To use modern telecommunication facilities	80	90	100
PC-11	To know methodologies of information collection and processing	90	100	100
PC-16	To manage research and development activities for developing performance management information systems	100	90	80
PC-19	To prepare terms of reference for designing databases and information systems	90	95	95
PC-21	To administer and operate information technologies, systems and resources	75	85	90

The importance of each subject for building each competence is similarly assessed (Table 2.).

Table 2. *Assessment of importance of subjects for building a professional competence (example)*

Competence	Subject	Importance of a subject for a competence (ten-point scale)		
		Expert 1	Expert 2	Expert 3
To manage research and development activities for developing performance management information systems	Algorithmization and programming	9	9	8
	Operational systems and computer networks	8	9	10
	Database systems	9	10	10
	Information systems and technologies	10	9	8
	Designing of information systems	10	10	9
	Administering of information systems	10	9	10
	WEB technologies	7	7	8
	Information security management	9	9	10
	Information resources	9	9	8
	Information management	9	9	10

The programme for calculating final rating is implemented in MS Excel in Visual Basic for Applications. At the first stage the subjects which are essential for different competences are selected. Table 2 demonstrates the data from a worksheet where the lists of subjects required for each competence are automatically generated, as well as the values of significance coefficients of subjects (ten-point scale) and graduate's grades from the grade book. In the calculation process all factors (parameters) of interest are normalized.

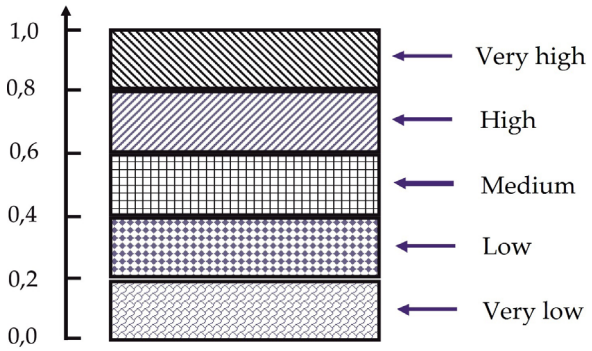
Table 3 presents data used in the calculations. The data include (as per the legend of table columns):
A – Significance of a subject for a competence (ten-point scale);
B – Graduate's grades;

C – Level of acquirement (in linear dependence from summative assessment grades);
D – Normalized coefficient of a subject significance for professional competence.

Table 3. *Input data for calculating final rating*

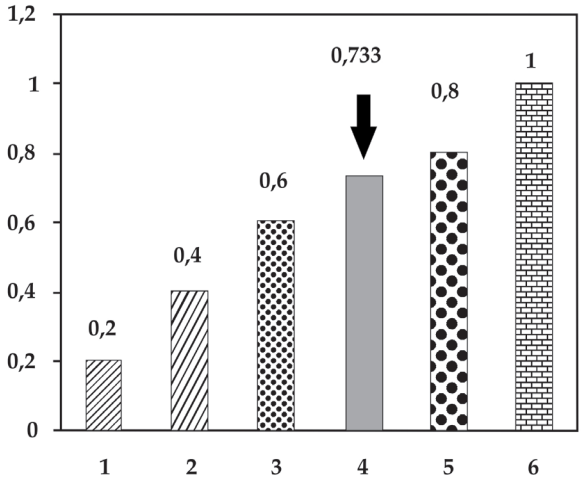
Competence index	Subjects	A	B	C	D
PC-1	Basics of management	7	10	1,0	0,045
	Organizational economy	10	10	1,0	0,065
	Organizational management	4	10	1,0	0,026
	Legal support for information activities	6	7	0,50	0,039
	Operational systems and computer networks	6	7	0,50	0,039
	Database systems	6	9	0,83	0,039
	Administration of information systems	4	10	1,0	0,026
	WEB technologies	9	7	0,50	0,058
	Information security management	4	10	1,0	0,026

Depending on a final rating value a graduate is included into one of categories, e.g. as per the ranking in Picture 1 (of course, any ranking can be used, with any number of groups which are easy to use).



Picture 1. One of possible options for ranking by levels of competency as determined thorough final rating of graduates

Picture 2 gives an example how a graduate's competency was evaluated (R = 0,733).



Picture 2. Example of evaluation of overall professional competency of a graduate

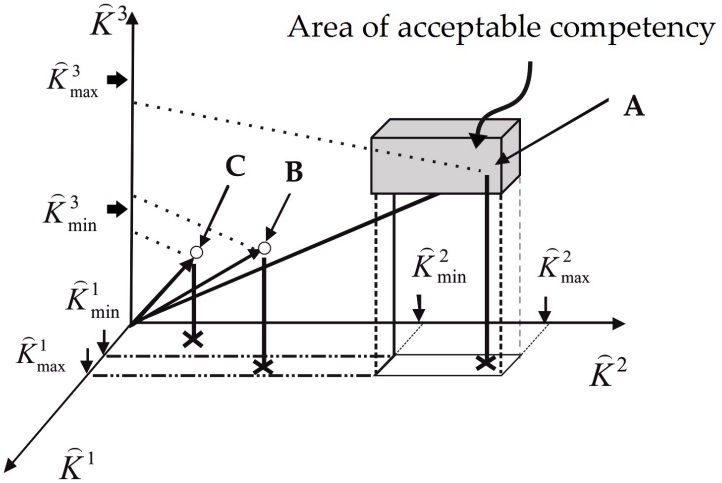
We believe that despite of the challenges due to the need to engage many experts and considerable analysis required the proposed model for evaluating competency based on final rating will help to have a more adequate evaluation of professionals' quality than, for instance, an average score. This model, particularly, allows taking into account the opinions of both practitioners and university staff and if there are considerable differences in the evaluations to determine the 'extent of misalignment' in the opinions of university staff and representatives of employers. There is then a possibility to compare the results of analysis made by two categories of experts and if any considerable differences are found this may indicate the need to adjust curricula in order to meet the requirements of the modern labour market.

The described here model and the implementing programme can be easily adapted taking into account employer's requirements. Variations can be made (in accordance with the opinions of 'third party' experts) in the lists of competences and subjects required for building such competences, significance of specific subjects, etc. Thus, graduate's rating is formed *from the perspective of a specific employer*. This will help to inform recruitment decisions, reduce the likelihood that wrong HR management decisions are made and

will help to take into account the specifics of particular entities, enterprises, government authorities, private companies, etc.

Experts may indicate acceptable ('desirable') ranges of competence levels (local criteria).

Picture 3 presents a situation when taking into account employer's opinion three groups (aggregates) of competences were identified, labelled as 1, 2, and 3. When an entity needs to recruit several specialists the selection procedure will enable identifying candidates with the required 'educational capacity' (number of points within the block).



Picture 3. A more complicated competency evaluation scheme. The acceptable ranges of competency are represented by sides of the box. Graduate A has sufficient level of all three groups of competences, Graduate A has sufficient level of two groups of competences and Graduate C has none.

The approach demonstrated on Picture 3 seems to be more flexible when there is a possibility to differentiate the levels of graduate's professional competency by components which are of different interest for an employer. For instance, the groups of competences on the picture can stand for competences in information and analytical activities ($\widehat{K}^1$), research and development activities ($\widehat{K}^2$) and project activities ($\widehat{K}^3$).

The use of such differentiated approach will help to model the demand for university graduates in different market segments

(government organizations, IT companies, industrial enterprises of various forms of ownership, etc.).

Thus, the model for evaluating competences of university graduates based on final rating can be used for analysing competitiveness of young specialists as well as for determining whether educational programmes meet the clients' requirements. The results of such studies are of interest both for educational institutions and potential employers.

One should note that the algorithm of competence evaluation described in this paper can be used for prospective (predictive) analysis ***taking into account changing requirements of*** the labour market and clients (to identify trends in changing significance coefficients). This task is definitely of a considerable practical interest and is planned to be addressed in future studies.

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Theoretical and Practical Issues of Systemic Enhancement of Efficiency of Administrative Procedures: Practice of the Presidential Administration of the Republic of Kazakhstan

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Abstract

The article reviews theoretical and practical issues of systemic efficiency enhancements of administrative procedures applied in the Presidential Administration of the Republic of Kazakhstan.

Key words: *management, efficiency, public administration, personnel, principles, indicators, processes.*

Today systemic enhancements in the efficiency of public administration and public services become increasingly important worldwide. President Nazarbayev clearly defined what professional public sector is in Kazakhstan's strategic documents.

In this context, we should note that any activity should be considered as a process; otherwise the perception of such activity will be fragmented. A cook who has overdone a shish kebab will not blame a grill in it! He knows that he failed to meet one of the process requirements:

- Do not overdo food on the fire;
- It is important to realize one's role in the process of collective labour! Otherwise how would you understand what you are for and what they want from you;
- One should be able to analyse his/her systemic and frequent mistakes in order to be efficient;
- One should be able to see the results of his/her work, assess such result and realize the extent to which it is efficient. This is the precondition for a 'take-off' without which there is no 'flight'.

Unfortunately, most people have a problem with analysing their activity or inactivity – few people want to do it. It is much easier for

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