Competency Schemas as a Tool for Comparative Analysis of Competencies of Polish and Russian Students

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Abstract

Purpose of the article The modern world, social and economic processes are developing in accordance with the principles of the knowledge society. The system of higher education plays a special role in national development. The 4th industrial revolution demands graduates with updated competencies. In this regard, the aim of the research is to make a comparative analysis of competencies of Polish and Russian students. Also the analysis of relationships between students' competencies and identification of homogeneous groups of competencies were performed. Whereas from the methodological point of view, proposing a comprehensive procedure for building and comparison of competency schemas describing competencies expressed on the Likert scale can be treated as the fundamental purpose of the article.

Methodology/methods This study is based on mixture quantitative and qualitative research methods. In particular graph theory and cluster analysis of complex data form the theoretical background for all methods and analytical tools used in the research. Empirical study was based on 311 surveys filled in by Polish and Russian students between April and October of 2018 using the author's questionnaire with Likert scale used to measure competencies from three students' perspectives: self-assessment of competencies, assessment of the role of University in building competencies and expectations of competencies demanded by the labour market. The research methodology involved the following steps:

- construction of competency schemas representing competencies of Polish and Russian students. The concept of competency schemas was proposed by the authors in their previous publications. Competency schema described a set of competencies and relationships between them. It is represented by a weighed graph with weights assigned to nodes (representing competencies) and edges (representing relationships between competencies). In the model proposed here, the competency importance was defined as a composition of two factors: its evaluation performed by students with the use of the Likert scale and the evaluation of respondent reliability measured by Gini co-efficient. The importance of relationship between two competencies was calculated as a minimum value of weights assigned to two nodes adjacent to the considered edge. The analysis of competency schemas for Polish and Russian students allowed to identify main homogenous clusters of competencies (represented by communities detected within a weighted graph);
- comparative analysis of competency schemas representing Polish and Russian students. To per-form this step of analysis, competency schemas' normalization was required. During this process all weights representing importance of competences and relationships between them were trans-formed to [0; 1] range. After this operation, the difference between two competency schemas was calculated. To facilitate the interpretation, all obtained results were presented in the graphical form.

The procedure presented above was implemented by the authors using R language.

Scientific aim The concept of competency schemas and the research methodology proposed in the paper allow to present the generalized information about competencies and relationships between them. These tools can be useful for description of the supply and the demand of competencies on the labour market. The comparison of competency schemas can present competency gap and its structure. The analysis of study program realized at universities and

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the analysis of learning outcomes also belong to potential areas which can be studied with the use of competency schemas.

Findings In Russia and in Poland the young people, as the representatives of the generation Z, are thinking about their professional development and their future role on the labour market. They try to predict the future situation on the labour market and adjust their competencies to predicted expectations. However, some distinct differences between Polish and Russian students were identified. Professional competencies were evaluated higher by Russian students in comparison to Polish respondents. Very similar patterns were identified during the analysis of answers concerning analytical and linguistic competencies. On the other hand, Polish students evaluated higher soft competencies.

Conclusions The proposed method of analysis allowed to generate useful results. It seems that the concept of competency schema can present more aspects of labour market than the concept of competency profile which is very popular in the literature. In future the authors are going to perform similar analysis on the broader sample. They are also going to develop theoretical and empirical aspects of analysis with the use of competency schemas on the level of universities, companies and government.

Keywords: 4th industrial revolution, competencies, competency schemas, generation Z, education, labour market, graph theory, community detection algorithms

JEL Classification: C02, C65, C81, I25, J24