Professional and Educational Standards: Inter-Institutional Matching Issues

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Abstract. The purpose of the study is to solve the problem of matching the parameters of inter-institutional identification of social objects in Russian systems of professional and educational standards, which allows optimizing the procedure of employing young professionals based on their competence potential assessment. The methods of comparison, mathematical and computer modeling were used in the paper. A model of a “competence-based converter” is presented. It makes it possible to evaluate the system of professional competencies generated by a graduate on the basis of a combination of levels of educational achievements in academic subjects presented in the diploma. The use of such a model allows employers to optimize the procedure of the selection of young professionals when filling vacancies in accordance with the requirements of professional standards. The results of applying the “competence converter” are given on the example of the specialty 15.03.02 “Technological Machines and Equipment” and the subsystems of the corresponding Russian professional standards (No. 191, 219, 392, 402, 496).

1. Introduction

The development of information and communication technologies in the fourth industrial revolution has a significant impact on the change in the core competencies of specialists working in different sectors of the economy, and, as a result reflected in their job descriptions, affects the sphere of vocational education, training and academic accreditation of professional education institutions. [8, 24, 25].

With the rising cost of human resources, the effective use of human capital is becoming an important component of productive investment in the future. Moreover, the economic feasibility of investing in personnel education, reproduction and support is reflected in the active interaction of enterprises and institutions of the professional education system, i.e. social institutions of economics and education [4, 15, 17]. In this regard, the problem of the interaction of labor, education and production institutions is the subject of both fundamental and applied research in different countries of the world [2, 12, 22].

2. Theory

In recent years, the process of revising professional standards has become a component of the overall modernization of educational standards. Its purpose is to strengthen the practical component of education [10, 15], as well as the formation to unite practical results, educational and professional components [6, 11]. So, for school management, a key factor in the success of the school system functioning is: an effective mechanism for selecting teachers, effective teaching processes and development of
teachers, as well as the availability of effective systems and support structures used to activate the first two factors [3, 23]. For knowledge-intensive professional managerial work in the field of health care is the effectiveness of inter-professional cooperation, which is achieved with the help of relational resources (common goals, interests, knowledge, skills, etc.) [7]. It is also important to eliminate the duality of the goal of using professional standards both as a regulator of the professional activity of a specialist, and as an institutional format for the development vector of his personality [6]; This leads to a modification of the approaches used in the system of an employee professional assessment [5].

In addition, the issue of professional digital identity [16, 18], which is inter-institutional by nature and directly affects the quality of the implementation of the selection process of young specialists for the replacement of vacant posts in science-intensive production and services [17, 19].

3. Model

The problem of matching educational and professional standards through the development of a scientifically based system of interconnection of their components and content is widely represented in the works of Russian scientists, including in relation to different subsystems of professional education [13, 20, 21]. The development of methodological approaches to the formation of main professional educational programs on the basis of educational and professional standards is carried out through the use of a mechanism of their interaction, giving a synergistic effect in the context of inter-institutional space formation [1, 9, 14, 17].

The study conducted by the author showed that the basis for the identification of graduates of the professional education system is the system of competences, and for identification with young specialists with a certain position, the system of labor functions. Moreover, the main document to identify the graduate of a higher professional education institution in his professional sphere is a diploma, which lists all the studied academic disciplines with an indication of their level of mastering by a five-point system. Thus, when employing young specialists it is almost impossible to identify the level of formation of each of the professional competencies (there is no list of them in the diploma), and the degree of readiness to perform a certain set of labor functions in accordance with the subsystem of professional standards corresponding to the specialty specified in the diploma.

In our opinion, the solution to this problem should be sought in the development of the “competence converter” model (from Latin ‘convertere’ - to change, transform), which allows to evaluate the system of professional competencies of a graduate (most appropriately - clusters of such competencies) on the basis of his achievements in academic disciplines presented in the diploma). The results of such an assessment will reveal: 1) the possibility (as an indicator) for young specialists to perform the labor functions listed in the professional standard 2) if there are several vacant positions, the opportunity to employ a young specialist for a position that allows him to make optimal use of his individual system of competences.

4. Result

The practical results of the development and implementation of the proposed model are presented in [17, 18, 19]. For example, one can assess the quality of the professional training of each of the two university / college graduates using the normalized scale for the six main clusters of competencies (C1 - “Knowledge and Comprehension”, C2 - “Engineering Analysis”, C3 - “Engineering Designing”, C4 - “Engineering Practice”, C5 - “Researches”, C6 - “Personal Skills”), which are used in the European system of engineering education (see Fig. 1.).

If both young specialists claim to fill the same vacant position, then it is advisable to compare the results obtained (see Fig. 2.). This will allow to employ the right specialist, whose the level of the competence system development better corresponds to the competency requirements of the professional standard for a vacant position.

If, however, we analyze a situation in which a young specialist can be employed for one of several vacant positions that correspond to the level and content of his professional education, it is advisable to compare the existing system of his competencies with a set of labor functions that are individual for
each professional standard. Such a procedure will make it possible to identify which of the positions is best suited for the employment of this young specialist (see Fig. 3).

**Figure 1.** The comparison of young specialists’ cluster competence-diagrams and priority definition in the levels of their competence cluster.

**Figure 2.** The comparative shown cluster competence-diagram of two young specialists graduated from different universities.
Figure 3. Comparative analysis of the compliance of the individual system of competences of a young specialist with the requirements of professional standards that correspond to the level of his professional education (for example, the subsystem of Russian professional standards No. 191, 219, 392, 402, 496 of the specialty 15.03.02).

5. Conclusions
The conducted studies allow us to draw the following conclusions.

1. The problem of matching educational and professional standards is inter-institutional by nature and can be solved by establishing correspondence between the three assessment systems: levels of mastering academic disciplines (in accordance with the basic professional educational program), levels of development of professional competencies (or their clusters), the competence potential of a specialist performing labor functions in accordance with the requirements of the analyzed professional standard.

2. The proposed model of a “competence-based converter” allows to evaluate the system of professional competences of a graduate (clusters of competences), based on the totality of the levels of educational achievements of a graduate in academic disciplines.

3. The results of the implementation of the procedure for evaluating the competencies of a young specialist allow to assess his ability to perform a combination of labor functions that meet a certain professional standard and corporate requirements of the employer, as well as simplify the procedure for selecting a position for employment; This allows the young specialist to maximize his competence potential.

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