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Newsletter 2

A modern tool  
for assessing  
students'  
competences

# A modern tool for assessing students' competences

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Technological changes, ongoing socio-economic processes, globalisation or the need to take care of the natural environment are only a few items on the list of important factors that force constant change in the system of higher education. Adapting to the current expectations of the labour market is difficult and requires comprehensive monitoring of educational outcomes and, above all, constant cooperation between the education sector and employers. For years, there has been talk about the poor preparation of school graduates for the labour market, their inadequate skills or level of knowledge in areas important for employers. Measures taken in various EU countries to improve the situation bring different effects, and therefore initiatives where flexible solutions can be worked out in international teams should be highly appreciated. Opportunities for such international initiatives are provided by the Erasmus+ Programme.

As part of the For Future project of the Erasmus+ strategic partnership, partners from Poland, Finland, Hungary and Greece have developed a comprehensive competency assessment system that allows assessing the preparation of students of selected fields of study to the requirements of the labor market. This is possible by assessing the level of students' competence in various areas and comparing it with the desired one for typical professions in a given industry. In the project, in cooperation with experts, we created competence matrices for selected professions (patterns) and used the tools of multidimensional comparative analysis to compare the results obtained with the developed patterns. We used linear ordering methods, and to assess a possible competency gap, we used the Euclidean distance from the standard understood as the requirements indicated by experts in the competency matrices for specific occupations.

We carried out our work in three steps:

- Competency profiles for selected professions and positions – **Pattern – Step 1**
- Competency tests for the selected professions – **Checking the level of students' competences – Step 2**
- IT tool for automatic assessment of the level of competences and compliance with the profiles – **Comparison with pattern – Step 3**

Finally, we distinguished 11 types of competencies:

1. Professional – theoretical knowledge
2. Professional – practical skills
3. ICT – the knowledge of software
4. Linguistic – knowledge of foreign languages
5. Analytical – the ability to solve problems
6. Interpersonal – communication, teamwork
7. Interpersonal – work in diverse teams (e.g. multicultural, multigenerational)
8. In terms of organization and self-organization – time management, independence
9. In terms of creativity – generating new ideas, a creative style of work
10. In terms of learning – openness to continuous development
11. Personal – loyalty, commitment, responsibility

In the project, we focused on four fields of study, namely: economic analytics, management, tourism and automotive. For all the above-mentioned fields of study, we have prepared questions dedicated to the main areas of knowledge and skills, according to the field-specific criteria, as part of professional competences. In each of the analyzed fields of study, we have separated four areas constituting the key content of the field. For all analyzed fields of study, we have prepared questions for the distinguished so-called flexible competences, i.e.

those that are somehow not related to a specific field of study or occupation and are useful regardless of the place of work. For each type of competence four levels were distinguished, for which the expected standard of competencies understood as knowledge or skills was described (in accordance with the European Qualifications Framework). The description of individual standards for the subsequent levels of competencies is progressive, which means that the next level includes the knowledge and skills indicated in the previous one.

We have prepared test questions to test the knowledge and skills of students in their final years of study. These questions were of various nature:

- Single-choice questions
- Single-choice questions requiring simple calculations
- Declarative responses (certificate)
- Choosing a solution for a problem issue
- Questions requiring a score

According to the adopted assumptions, the person undergoing the assessment answers questions which are randomly selected by an IT program within each competency tested. The number of questions in total and in the area of specific competencies, as well as their scoring, are controlled by the program administrator. It is also possible to define subsets of questions assigned to

a given type of competency, from which their number is randomly selected. It should be emphasised that in closed-ended questions, where only one answer is correct, as well as those in which different ways of acting are described and assigned to an appropriate level of competency in an IT program, answers are always randomised.

For a comprehensive assessment of competencies, we used the composite indicator method, where partial variables define the level of a single competency. They are the result of answers to questions/tasks/problem areas assigned to a given competency. The method of aggregation is different for specific types of questions, but on the output the values of partial variables for individual competencies have the same form and the same set of values defined by integer numbers from 0 to 4. The value of 0 means that there is no such competency at all, whereas 4 – its high level. Other values are intermediate states.

While determining the composite indicator, the distance between the results obtained by the person and the competency profiles for specific professions was calculated. For each partial variable (types of competencies), we measured the difference between its value obtained during the study and the value defined in the competency profile for a given profession. Next, on the

basis of these differences, we calculated the Euclidean distance between the tested (the person taking part in the assessment) and the pattern object (specific competency profiles). For each of the people whose competencies are assessed, a ranking is built based on the values of distance measures. The basis for creating it is the distance between the tested model and the individual model objects described by profession competency profiles. The smaller the distance, the closer the level of the person's competencies to the levels of specific competencies indicated in a given profession profile. The first position in the ranking is taken by the profession with the lowest value of the distance measure, while the next ones are ordered according to the value of this measure in a growing manner (that is, from the smallest to the largest). The ranking created in this way allows us to check to what extent the competencies one already has ensure the possibility of effective employment in specific professions/positions, and to what extent it is necessary to undertake development activities, and in which area (that is, which competencies need improvement). In the project, we primarily test professional competences for selected fields of study. If you study economic analytics, management, tourism or automotive and want to check your preparation for work in the chosen profession, please test our tool.

To participate in the testing, please visit the website:

## Competency assessment

and then create an account by selecting Create an account option.

In the next step, you will receive by e-mail, to the address indicated when setting up the account, information about the assignment of the test. After logging in to the application, you will be able to complete the test (32 questions, the estimated time needed to answer is about 15 minutes).

