Implementation of WorldSkills standards in the system of training specialists in mechanical engineering and engineering system

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Abstract. The article discusses the use of practice-oriented teaching methods based on the implementation of WorldSkills standards. Such an approach will allow us to systematize and standardize the approach to assessing the results of training specialists in the field of mechanical engineering. This will also make the training system more flexible, will allow you to quickly respond to changing requests from employers.

1. Introduction
Modern education is not only the acquisition of a certain amount of knowledge in accordance with educational standards. First of all, this is the acquisition of competencies that will be claimed by potential employers. The education system of Russia often neglects this area of interest, which results in a dissonance between the requirements of employers that they impose on staff and the requirements of educational standards. There is a need to bring these interests into line. Targeted training of students is introduced into the practice of education, when the enterprises of the machine-building complex determine the set of competencies of a group of students and organize work practices that are most consistent with future work practices.

The problem is scaling up the practice of oriented learning for all students, rather than a separate group. If it is possible for individual students studying in specialized programs to establish individual criteria for assessing competencies, then for the mass of students this is already difficult to do. That is why, the standard of the demonstration exam is introduced into the education system, which will allow an objective assessment of the level of competencies, in accordance with the requirements of the labor market [1].

How does a demonstration exam determine the role of a series of provisions on how to conduct it: “A demonstration exam according to WorldSkills Russia standards is conducted to determine the level of knowledge and skills of students and graduates that allow them to carry out professional activities in a particular field and (or) perform work in a particular profession or specialties in accordance with WorldSkills Russia standards”.

Currently, the standards of the demonstration exam are being introduced into the secondary vocational education system. The practice of holding a demonstration exam in a number of competencies was recognized as successful; implementation experience exists in almost all regions of Russia.
2. Regulatory support for the demonstration exam

Like any other event, the introduction of a demonstration exam requires information and documentation support. This procedure is expressed in the development of local regulations, the basis of which will be the norms and standards developed by relevant ministries and federal government.

To conduct a demonstration exam in an educational institution, it is required to develop a number of local acts that are necessary to consolidate a demonstration exam as a form of final certification. These documents include:

- The order of organization and implementation of educational activities for educational programs in an educational institution;
- Regulations for the implementation of educational programs in a state educational institution;
- Regulation on the organization of educational activities of students according to an individual curriculum at a state educational institution;
- Regulation on conducting state final certification on educational programs of graduates of an educational institution;
- Regulation on the organization and conduct of a demonstration exam according to Worldskills standards within the framework of the state final certification of educational programs.

The specified local documents are part of the general system for introducing the standards of the demonstration exam and determine the general procedure for conducting it in an educational institution of secondary vocational education, in accordance with the general standards approved by the WorldSkills Union, the Ministry of Education and the Agency for Strategic Initiatives under the Government of the Russian Federation [2].

The general procedure for the formation of plans and the generation of regulatory documentation with the participation of regulatory organizations at various levels is presented in figure 1.

![Organizational model of vocational education](image)

**Figure 1.** Organizational model of vocational education.

The scope and competence of the Ministry of Education include:

- determination of the process coordinator;
- development and approval of the regulatory framework;
promoting the development of infrastructure for the training system;
planning and control of the implementation of the dual education model in the region;
the formation of motivation mechanisms for employers and students.

The scope and competence of the coordinator - the Regional Center for the Development of Labor Resources include:

- operational control of the process and the initiation of necessary changes and decisions;
- coordination of activities for career guidance and updating educational programs;
- coordination of the training process and procedures for assessing the quality of education;
- assistance in signing agreements and contracts between enterprises of the region and professional educational organizations;
- organization and conduct of examination of educational programs.

The scope and competence of enterprises include:

- determination of the need for the right staff at the moment and in the long term;
- formation of requirements for competencies and qualifications of graduates;
- participation in the development of a model of the educational process based on the principles of vocational training and the specifics of the enterprise and educational organization;
- providing a mentoring system in the enterprise;
- development of measures of social support for students;
- the definition, together with the staff of the educational organization, of the personal educational trajectories of students and the development of criteria for assessing the quality of graduates;
- organization of training, including conducting field trips;
- participation in assessing the quality of education;
- conclusion of dual training agreements with an educational organization;
- conclusion of student agreements on dual training with students.

The scope and competence of a professional educational organization include:

- organization and conduct of vocational guidance activities;
- conclusion of agreements on the joint implementation of educational programs with enterprises;
- design of training: development, updating and updating of educational programs, providing the educational process with educational, methodological and informational materials;
- providing the material and technical base, determining personnel requirements for the implementation of vocational training;
- informs students (legal representatives) about the possibility of training in vocational training programs;
- organizes the conclusion of student agreements on dual training between students and the company;
- assignment of curators to a vocational training group;
- ensures the implementation of a vocational training program;
- is responsible for receiving students in full education in accordance with federal state educational standards, professional standards;
• organization of procedures for intermediate quality control of the implementation of educational programs, development of mechanisms and tools for intermediate quality control of the implementation of educational programs;
• organization of the final state certification of students, development of criteria for assessing the quality of education of graduates and materials of the demonstration exam;
• monitoring the employment of graduates for three years.

Thus, the planning of the implementation of the standards of the demonstration exam as a final certification in the organization of secondary vocational education occurs with the interaction of the Ministry of Education, employers and the Regional Center for the Development of Labor Resources. The organization of secondary vocational education is developing a set of measures, based on regulatory documents and in accordance with a set of competencies presented by employers.

3. Implementation of demonstration exam standards
The implementation of the standards for the demonstration exam is impossible without consistent structural planning, in which the actions of all participants involved in the process would be spelled out. When implementing educational programs, the organization can apply the form of organization of educational activity based on the modular principle of presenting the contents of the educational program and constructing curricula, using appropriate educational technologies.

The sequence of actions for the organization and implementation of the educational process and the implementation of the standards of the demonstration exam consists of several stages, each of which contains a series of sequential actions that are performed by all participants in the project [3]. The following steps can be distinguished in the sequence of actions for the organization and implementation of training and the implementation of standards for the demonstration exam:

Stage 1. Forecast industry and regional staffing needs.
Stage 2. Vocational guidance of students.
Stage 3. Creating the conditions for the implementation of vocational training.
Stage 4. Updating and updating educational programs.
Stage 5. Organization of the educational process.
Stage 6. Implementation of the educational process.
Stage 7. Assessing the competencies of students mastered in the learning process.
Stage 8. State final certification of students.
Stage 9. Employment of graduates at enterprises of social partners.
Stage 10. Analysis and generalization of the results of the implementation of vocational training.

The WorldSkills Russia demonstration exam within the framework of the state final certification is organized and conducted in accordance with the requirements established in the WorldSkills Russia Methodology and other regulatory documents of the WorldSkills Russia Union, as well as in accordance with administrative acts of the Ministry of Education and Science.

The results of the demonstration exam in the framework of the state final certification are recognized by the international and Russian WorldSkills community under the following conditions:

• the use of assessment tools for the demonstration exam, standardized by WorldSkills Russia;
• conformity of material and technical support of the demonstration exam venues with the requirements of the WorldSkills Russia Union;
• the participation of experts entitled from the WorldSkills Russia Union to evaluate in assessing the performance of the tasks of the demonstration exam;
• registration of data on the organization and conduct of the demonstration exam in the information systems defined by the WorldSkills Russia Union.

The demonstration exam is held at sites whose material and technical base meets the requirements of the WorldSkills Russia Union.
A decision on the material and technical base of the demonstration exam venues is made by the Worldskills Russia Alliance following an analysis of the documentation submitted by organizations in accordance with the selection procedure for the Demonstration Exam Centers approved by the Worldskills Russia Alliance.

The following are allowed to organize and conduct a demonstration exam for WorldSkills Russia standards:

- certified Worldskills experts;
- experts who have been trained by the WorldSkills Russia Alliance and have evidence of the right to assess the performance of the demonstration exam assignments;
- experts who have been trained by the WorldSkills Russia Alliance and have certificates of the right to hold a corporate or regional championship.

In order to comply with the principles of objectivity and independence during the state final certification, it is not allowed to evaluate the results of the work of graduates participating in the exam by experts who participated in their preparation or representing the same educational organization as the examinees.

To assess the results of the certification tests, the state examination commission is formed as part of the state final certification for the educational program.

The State Examination Commission is composed of teachers and people invited from third-party organizations, including teachers, representatives of employers or their associations, the direction of which corresponds to the field of professional activity for which graduates are preparing.

During the demonstration exam, the State Examination Commission also includes experts from the Union "Agency for the Development of Professional Communities and Workers" Young Professionals (WorldSkills Russia). In accordance with the WorldSkills Russia Methodology, an expert group (evaluators of the results of the tasks of the demonstration exam) is formed from among experts to conduct a demonstration exam.

The procedure for preparing a demonstration exam consists of the following organizational steps.

Not later than 6 months before the state final certification, the educational institution develops and approves the state final certification program, which provides for a demonstration exam.

Not later than 2 months before the demonstration exam, regulatory documentation is generated on the organization and conduct of the demonstration exam and brought to the attention of the members of the expert group.

Not later than 2 weeks before the demonstration exam, registration of all registered participants in the "eSim system" is carried out, and also ensures that all participants fill out personal profiles.

Not later than 1 month before the demonstration exam, registered participants of the demonstration exam are informed about the timing and procedure for the demonstration exam.

Not later than 3 weeks before the state final certification, an order is issued on the composition of the state examination commission for a specific educational program.

Not later than 2 weeks before the state final certification, an order is issued to admit students to the state final certification.

Not later than 2 weeks before the state final certification, a schedule for the state final certification is formed.

In order to ensure transparency and publicity during the demonstration exam, video broadcasting is organized on-line on the platforms of the demonstration exam.

On the established day, the distribution of the participants' jobs on the site in accordance with the draw is carried out. The draw is carried out in the presence of all participants in a manner that excludes the planned distribution of jobs or equipment. The results of the draw are recorded in the Draw Protocol.

Participants should be familiar with the mode and conditions of the demonstration exam:
• time for the start and completion of examination tasks / modules;
• time breaks;
• conditions for admission to jobs;
• conditions allowing participants to leave workplaces and the site;
• time and method of checking equipment;
• place and meal schedule;
• conditions for the provision of medical care;
• responsibility for the safe use of all tools, equipment, auxiliary materials;
• the nature and range of sanctions that may be followed in case of violation of the regulations for the demonstration exam.

On the established day of the demonstration exam, the participant passes registration with an identity document (passport) and a compulsory medical insurance policy.

The procedure for evaluating the results of the tasks of the demonstration exam is carried out in accordance with the rules established in the sets of assessment documentation.

The tasks of the demonstration exam are evaluated in accordance with the scoring scheme developed on the basis of the characteristics of competencies determined by the technical description. All necessary forms and forms are formed through the CIS system.

The result of the work of the expert group is the final protocol of the meeting of the expert group, which indicates the general list of participants, the sum of points for each participant for the completed exam task.

The assessment should not be put in the presence of the participant of a demonstration exam.

Based on the completed final protocol of the meeting of the expert group, a protocol of the meeting of the state examination commission is drawn up.

For students, training and consultation on working with the eSim system are mandatory. As the established practice shows, organizational meetings and briefing during registration, contribute to the fact that at the stage of the examination there are no problems for participants and experts.

Evaluation and analysis of the stages of implementation of the standards of the demonstration exam is the main condition for planning its implementation in the educational system.

The analysis of activities is determined by three interrelated elements, namely the analysis of the existing legislative prerequisites, the level of interest of the end users of educational services and the development strategy of the implementation process.

4. Conclusion
The World Skills Union, the introduction of standards of which was originally intended only for working professions, is now increasingly used for areas of training in higher education. Evaluation methods used in assessing competencies are fully applicable in the training of specialists in the field of engineering.

The main difference from traditional assessment methods based on solving typical engineering problems within the framework of final qualification work should be that the complex of qualification tasks performed as part of the demonstration exam will be performed in accordance with the requirements of employers for specialists. Also, the advantage of this approach will be its variability and practice-oriented approach. This will exclude the stereotypedness of the proposed assessments of key competencies and will make the system of training specialists more in line with the demands of the labor market.

The main condition for introducing the practice of the demonstration exam will be the coordination of its composition with the training programs prescribed in the standards. It is also necessary to attract experts from employers, which will increase the objectivity of the assessment of competence.

References
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