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The transformation of secondary vocational educational system — modern requests and needs

Abstract. The modern digital society makes a new demand on all stages of education. It should provide the next level of training for pupils and students, making them ready to face the modern digital world. A modern person needs the ability to extract all the necessary information from various sources, to make quick decisions and deal with numerous digital platforms, software, and content. In this context, the modern educational system must fulfil all these tasks and change the means, approaches, and content of its educational process. Nowadays we can observe these changes on different stages of education in Russia. Technological changes also affected the secondary vocational education system, that is why, it is important to analyze the process of transformation and specify the ways for the most effective and rational organization.

Purpose. The main purpose of the article is to define the main aspects and vectors for the transformation of secondary vocational education and to share ideas of the most important directions for the renewal of the whole system of education.

Methodology and methods. The methodological basis of the article is the state documents defining the basic principles of modernization of secondary vocational education, like Federal State Educational Standard.

The main results of the study. Description and characteristic of the main vectors of transformation with emphasis on the means of digitalization for the needs of the secondary vocational education.

Scientific novelty. The essence of the structural problems existing in the current forms and approaches in secondary vocational education, that should be changed to achieve the most possible result including renovation of the existing curriculum and learning programs.

Practical relevance. The described vectors of transformation could be represented as steps for further development of the secondary education, taking into consideration the defined problematic fields of the stage of education could be the starting point for renewal.

Keywords: Secondary vocational education; digitalization; digital technologies; digital educational environment; transformation of education.

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Introduction

According to the data from BusinessStat deep analyze of secondary vocational market, the ratio of students is constantly increasing and in 2021 the number of students is up to 3.34 million and the research predicts the growth to 3,75 million in 2025 [13]. So, it is fair to say, that secondary stage of vocational education is now providing a substantial number of professionals for job vacancies and compete the graduates from the system of higher education. The main reasons for the choice of secondary vocational education are:

- Rising costs of study on the higher stage of education.
- Fast job finding for graduates.
- Short-length curriculum.

Accordingly, the importance for the quality of secondary vocational education is now also increasing. This stage must be modernized and be ready to prepare high-quality specialist, as the graduates are involved in all spheres of social life and the level of their professional qualities is directly influence the development of the country.

Vectors of transformation

Since transformation of the whole stage of education is complicated and touches all the level of the process, all the goals and changes should be clearly understood and realized accordingly to structured plan. It is also crucial to provide the functioning management mechanisms to allow reasonable response to the changes of labor market.

The main goal is to prepare high quality specialist that will be eagerly sought on the world market. Consequently, the image of such specialist must be precisely defined. Employers raise various demands for skills and values for job seekers, such as:

- ✓ High grade of hard skills.
- ✓ Technical skills (software and hardware knowledge).
- ✓ Adaptability.
- ✓ Flexibility.
- ✓ Problem-solving.
- ✓ Teamwork skills.
- ✓ Management skills.
- ✓ Multicultural sensitivity and awareness.
- ✓ Willingness to learn.
- ✓ Analytical skills.
- ✓ Technical literacy etc.

Thus, modern secondary education should provide the development of all these skills and values.

According to the goal of study, several vectors of transformation must be defined:

- 1) renovation of the contents of education;
- 2) digitalization of education;
- 3) new approaches for the vocational training.

Figure 1 demonstrates the main vectors and tasks of transformation of the secondary education.

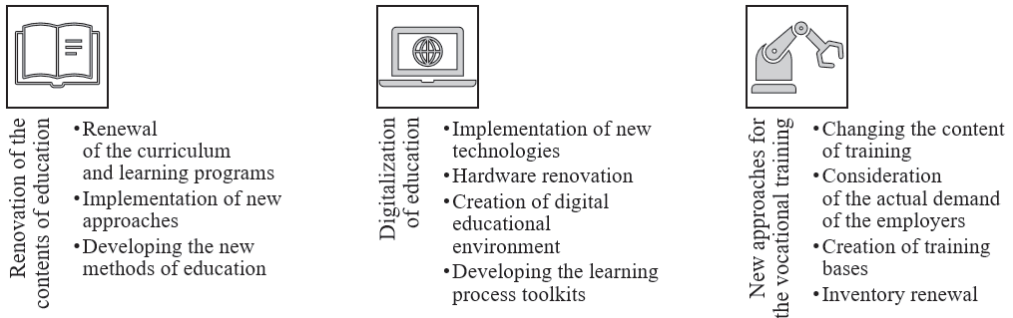


Fig. 1. Transformation vectors

Renovation of the contents of education

The key point of transformation is to bring up to date the content of educational process and building a new educational model. The main difference between the new model and the previous one is the focus on the need for lifelong education. Today, continuing education is still perceived as the idea of an add-on, additional training in cases where the basic is not enough.

Education in the new economy forms is the core of a lifelong career, whereas back in the mid-20th century, a career was based on the accumulation of knowledge and life experience within the framework of regular activities. As a result, individualization of educational trajectories occurs more than half of the set of educational services is no longer formed by a teacher/state in relation to an immature child, but by an adult, an independent person for himself.

There are several fundamental consequences associated with this:

✓ Sharp increase in the share of choice, the formation of an open market of educational programs and modules instead of a pre-established standard.

✓ Needs for a transparent and understandable system for recognizing the results of education in each module.

✓ New regulation of the educational market: the state can no longer control the quality of educational programs. The focus of regulation is shifting to ensuring the completeness and reliability of information provided by market participants.

The idea of flexible and incomplete educational trajectories will be the core around which innovations are built, covering all levels and components of the educational system.

There are several positive trends in the development of the content of education:

- gradual transition to a personality-oriented education,
- transition to a variety of educational programs that create prerequisites for a real choice of individual educational trajectories,
- increasing level of autonomy of the educational institutions,
- the development of academic freedoms for teachers and students,
- expanding the scale and increasing the importance of the innovation movement,
- reorientation of the educational process to students' mastery
- transition from the study of computer technology to the development of information technology,
- development of orientation towards a more complete use of the educational opportunities of the socio-cultural environment,
- attracting new teaching staff to colleges,
- avoiding monopolism in educational book publishing, creating a market for educational literature and the real possibility of its choice.

The general goal of these trends is to ensure a more complete compliance of the education system with the requirements of the individual, society and the state, and the education management system with socio-economic and political conditions. At the same time, we need to proceed from the fact that the key drawback of the education management system lies in the fact that in a democratic society and a market economy, the system tries to solve problems using the previous command and administrative methods. Consequently, the administrative system also must be changed and renewed. And the involvement of all participants in the educational process in the management of the education system is crucial.

Digitalization of education

Digitalization is a complex process that involves different sides of education. It includes equipping educational institutions with digital technologies; connecting them to high-speed Internet; providing the educational process with digital tools and materials (digital sources, tools, and online services).

For the effective usage of digital technologies in solving educational and organizational tasks, colleges must receive a variety of software tools. Among them are computer training programs on individual subjects or topics, computer testing tools, digital reference books, encyclopedias, and dictionaries. Electronic libraries, electronic journals, and diaries are also needed. Management workers also need electronic legal reference systems and specialized software tools for solving organizational, managerial, and economic tasks, as well as for organizing electronic document management.

One of the components of the digital transformation of education is the transformation of its content. Digital literacy has become a new element of such content. Today, instead of mastering programming thinking, we usually say mastering algorithmic, procedural or computer thinking. The formation of digital literacy is among the main priorities of education. The digital transformation of education is based primarily on promising digital technologies that will create new opportunities for solving educational problems. There is a consensus in the scientific literature regarding the use of technologies such as cloud technologies, big data technologies, and network technologies. First, they transform education through unlimited access to resources anywhere and at any time, through the possibility of collaboration and intensive communication in the global space. Such transformation leads to the creation of digital educational environment.

The digital educational environment refers to a variety of phenomena. It is assumed that students will switch to distance learning using modern means of communication such as *Zoom* or *Teams*. Sometimes we are talking about the use of IT technologies as a supplement to existing educational practices. This includes the training of future specialists who will be able to acquire the necessary skills to meet the realities of the digital economy and help to reduce the shortage of personnel in the field of information technology.

The digital educational environment is not only about providing every educational institution with computers and equipment. This is the creation of a fundamentally new educational space where high quality education is available for everyone, regardless of health and place of residence.

Digitalization implies the creation of a unified environment:

- classrooms equipped with automated workstations for students and teachers, interactive equipment, implying remote lessons using videoconference technologies;
- specialized classrooms and laboratories for experiments and additional education;
- a data processing center that provides any scientific information in the form of lesson notes, video recordings of lectures and other video content, regardless of the student's location;
- recreation space, with free Wi-Fi access, places for leisure and relaxation with upholstered furniture, chess tables, information boards etc.

During the lessons, students should use individual tablets or PC, communicating via Wi-Fi with a smart board in the classroom, work in electronic textbooks, perform control tasks on tablets, "visit" virtual excursions and electronic libraries, even use educational computer games.

Each student in the distance form of learning should be provided with a personal tablet or laptop with a Web camera. Teachers are provided with a workplace with installed classroom management software, a content storage and management system, and a document camera.

All information flows are transferred to the digital environment. Everything should be completely online — an electronic journal, presentations, lesson recordings, knowledge control results. The process of knowledge control also becomes easier — tests, laboratory work — all this is subject to automation. Such an educational approach becomes more individualized and flexible.

Additional means necessary for secondary vocational education are virtual reality technologies. The main practice of using VR has not changed greatly:

1. An image is generated by the PC.
2. The user of the VR observe the image through the transmission system.
3. Special sensors detect all the user's motions and actions and direct them to the computer.

4. This information changes the virtual reality accordingly to the user's actions.

Virtual reality technologies make learning visual, more active, and involve students more fully in the learning process. Teachers and students could use virtual laboratories to study the world around them, to form and develop skills, as well as to demonstrate their progress and automated assessment. The time is not far off when virtual reality simulators will help students master their initial professional skills [15, p. 390].

In spite the fact of the advantages of digitalization of education, disadvantages also must be taken into consideration:

1. Untested technologies.

Before the widespread introduction of gadgets into the learning process, it is necessary to organize long-term studies and observations for at least 10 years, and create rules for their application, with the participation of psychologists, psychophysicologists, clinicians, and healthcare organizations.

2. Loss of writing skills leads to the loss of creative abilities.
3. Screen addiction.

Today it is already known that tablets, smartphones, and computers are one of the forms of digital addiction.

4. Decline in social skills.

Most of the students suffer from loneliness and cannot live without social networks. These are the results of a survey conducted by the All-Russian Popular Front. The study affected almost 80 regions of Russia. The student's personality is formed in the process of communicating with the outside world. It is the emotional participation of the society where a person is being formed that is of great importance here.

5. Electromagnetic radiation.

Lots of electronic devices create electromagnetic pulses and the influence of such pulses is not study well for a mass usage at schools and colleges.

A special place in the formulation of tasks for the development and testing of digital technologies should be occupied by educational technologies and entire educational systems supported and developed by professional communities of pedagogical employees. It is important to simultaneously ensure the strengthening

of the advantages of educational technology through digital solutions, and the development of digital solutions in the technological educational cycle, and the study of frankly weak “places” of educational technologies and systems. The absolute value of developing any solutions should remain the development and well-being of a person, the creation of potentials for his dignity and self-realization in a wide range of life tasks.

Digital transformation can lead to a qualitative change in educational work. Without such a change, it is impossible to form the ability of every member of society to live and work productively in a changing economy, to continuously continue their education throughout their lives. The essence of this change is the use of the latest, rapidly developing CT for a consistent transition to a personalized, result-oriented organization of the educational process [4].

New approaches for the vocational training

One of the most important components of the process of training middle-level specialists for professional activity is the practice-oriented nature of mastering the profession in the context of learning.

In institutions of secondary vocational education, training should be conducted daily at the same full-time workplaces.

For practical training, students should be sent to enterprises and organizations where they will work after graduation from an educational institution. Thus, this practice completes the professional training of students.

Prior to the start of industrial practice, the Master of Industrial Training selects, in agreement with the enterprise, full-time jobs that meet the requirements for improving professional training at the final period of training of students in a vocational education institution.

Well-organized vocational training develops initiative, creative thinking of students and leads to professional adaptation to working conditions at the enterprise.

The purpose of the training is the comprehensive development of all the types of professional activities in the profession of secondary vocational education, the formation of general and professional competencies, as well as the acquisition of practical work experience for students in the profession.

The task of vocational training is to consolidate and improve the professional skills acquired while training of students in the profession under study, the development of general and professional competencies, the development of modern production processes, the adaptation of students to the specific conditions of the activities of organizations of various organizational and legal forms.

The content of the training is determined by the requirements for the results of training for each of the modules in accordance with the Federal State Educational

Standard, the work programs of the practice, developed and approved by the educational institution independently.

One of the actual strategic directions for updating approaches to the organization of the process of professional training for midlevel specialists is the individualization of education. Individualization of the development of general and professional competencies by students at the level of secondary vocational education occurs both during the development of an educational trajectory for achieving the results of studying academic disciplines and interdisciplinary courses, and during the development of electives, a person-oriented assessment of the level of their own achievements in mastering the profession, as well as during organized vocational training, which is the part of the professional training of a mid-level specialist, taking into account modern demands for the development of science.

The concept of “individualization of the educational process” is a meaningful generalization of the interpretation of various authors and reflects the variability of content approaches and applied educational innovative technologies of professional training based on self-realization and self-improvement (personal and professional) of the future teacher, as well as on a reflexive analysis of the results of educational and professional activities in the educational process.

On the part of the teacher, in the process of individualizing the training of, each student receives the necessary help and support, while the degree of support varies depending on the requests of the future specialist.

The individualization of the development of competencies in training according to the profile of the specialty is built at the stage of students performing standard tasks [7, p. 44].

Conclusion

The process of transformation must be organized wisely and in full-scale. It is impossible to expect qualitative changes transforming only one part of the whole stage of education. If we want to see changes, transformation must be put into result simultaneously in the content of education, in renewal of equipment and digitalization and the approaches for the vocational training.

Summing all up, the curriculum and educational programs must be updated accordingly to the modern demands of the society, including requests from the employers and students. The process of learning also must be renewed, educational institutes should use the up-to-date equipment and all the achievements of technological progress. Digital transformation relies on implementing more and mere digital means, that are convenient, and the educational process could be more rational and faster, which leads to qualitative results in learning. Combining online and offline education makes it possible to organize continuous process of learning. As a result, the way of vocational training would change in line with the reformation of educational content and equipment.

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