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Trends in the development of technological education and advanced vocational training of students in the context of technological education

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Abstract

The purpose of this article is to study the trends in the development of technological education and advanced vocational training of students in the context of technological education. Based on the retrospective analysis, the authors identified the most significant problems arising in the process of reforming technological education. The problems are as follows: problems related to determining the result of technological education; problems related to the content; problems related to the facilities; problems related to the human resource, which correlates with the survey of students studying to be teachers in the technological field, to determine the most important aspects of the organization of advanced professional training of schoolchildren. The methodological basis of the research consists of general scientific cognition methods, including analysis and synthesis (as a general methodological approach), comparison, generalization, and methods of systemic, complex, logical, structural, comparative, statistical analysis.

Keywords: advanced training, technological education; vocational education; technology; school education;

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1. Introduction

According to the monitoring conducted in 2019 by the Center of Economics of Continuing Education of the IAER RANE&SC (CEOE), in recent years, the popularity of obtaining secondary vocational education has been growing (in 2006, there were 28.2% of the ninth-grade school graduates going to secondary special educational institutions, while in 2017 there were 38.9%, in 2019 - 41%) (Employment of youth. Choosing opensource software, 2019). «A significant part of the ninth-grade graduates does not want to continue studying in the tenth and eleventh grades and consider it more appropriate to continue their further training within the walls of a vocational school. Thus, the scientific and pedagogical community, having paid attention to this, notes the need for practice-oriented formats of education, focused on the choice of career and on the professional identity formation in students» (Ivanov et al., 2014).

«Technological education plays a special role in preparing students for professional activities. It is also worth noting that it is the technology lessons that give students the opportunity to master the competencies necessary for further professional training on the basis of IVE» (Gansle, 2012). Another important factor that determines the relevance of the issue of improving the sphere of professional and technological education is special attention to these issues on the part of the Government of the Russian Federation. Thus, on May 7, 2018, the decree of the President of the Russian Federation "On national goals and strategic objectives of the development of the Russian Federation for the period up to 2024" was issued, which established the need to improve the methods and the content of technological education.

1.1. Theoretical Framework

Theoretical foundations. The problem of advanced training of students was studied by many scientists. In our research, we will rely on the works by the following authors: Gershunsky (1987), who analyzed advanced training mainly in basic general education; A.M. Novikov (, analyzes this problem in the vocational education system.

The ideas of advanced learning can be traced in the works by the innovative teacher L.S. Vygotsky (1982). He noted that pedagogical activity should be focused on the area of the child's immediate development, and not on current knowledge. Thus, the activities of students and teachers should be aimed at advancing current knowledge (Vygotsky L.S, 1982).

Komensky (1982) and Ushinsky (1968) believed that the teacher should organize activities with a view to the future. Thus, the teacher's plan should be ahead of the actual knowledge of students (Komensky, 1982), (Ushinsky, 1968). Another approach to understanding the term *advance* is the approach proposed by Lysenkova, (1988). In her opinion, the pedagogical process should be built in such a way that it is possible to provide students with the material of future knowledge. A similar approach in labor training was implemented by I. P. Volkov who included sections on descriptive geometry in the school course of labor training (Volkov, 1982).

Bim-Bad (1988) believed that *advancing* means being capable of constant self-improvement. And he saw *advanced training* in educating learners ready for the future, and in developing their general abilities, value orientations and interests for their successful future activities (Bim-Bad, 1988). I. I. Pankova considers *advanced training* as an opportunity to organize educational material in such a way

that it is possible to provide material ahead of time. This arrangement of the material, according to I.I. Pankova, will allow one to assimilate the material and better develop meta-subject competencies in students (Berdyugina, et al., 2020).

The approach of Novikov (2000) is a kind of continuation of the approach of Bim-Bad (1988). One of the key theses of Novikov (2002) is that advanced training should teach the individual not only preparing him for full-fledged activity in the society, but also for his professional activity, which will be a source of innovation. And, accordingly, the professional environment will be transformed after the personnel, not graduates are to catch up with the realities of production (Novikov, 2002; Novikov, 2000).

In the course of the formation and use of the concept of advanced education in relation to vocational training, researchers began to fill the concept of *advance* by a variety of meanings. In this connection, A.M. Novikov wrote: "In numerous publications, we are talking about the fact that education, including vocational education, should be ahead of something. But what exactly and how, the answers in the same publications are rather vague" (Novikov, 2002).

Thus, its first sense is to advance the existing mechanic and engineering conditions of production, to provide students with professional knowledge in the areas of store and material means of production that are still in their infancy. Another sense, in contrast to the first one, lies in the prognostic orientation not on the nascent material means of production themselves, but on the content of labor that will be in demand in the conditions of "nascent" new technology and innovative engineering (Movchan et al., 2021). Finally, the third sense implies the advanced development of human capital in the broadest sense of the word. The key direction of the changes should be giving up the "adaptive" model of the school with the education content being pedagogically adapted experience of the world culture, for the purposeful construction of a new content and a new model of educational activity matching the expected condition of production and social sphere.

1.2. Background information.

It is impossible to reform educational processes without taking into account the historical development of this area. Any significant changes in the field of technological training are associated with innovations in the production sector and ruled by the socio-economic characteristics of the country in the period under study. Changes in production and science modify the social structure of the society, which in turn affects the social demand, and the requirements for students' knowledge, skills and competencies. Therefore, it is necessary to trace the development of industry in the country and its impact on the education system, which will allow us to predict trends in the further development of education and identify the most important problems to be solved when modernizing technological education. According to the theory of long waves by N. Kondratiev, the scientific and technical revolution develops in waves with cycles of approximately 50 years (Makasheva, 2021). Let us analyze the relation of the scientific and technological revolution to the development of the economy, labor training and technological education.

The first industrial revolution of the late 18^{th} – early 19^{th} centuries marked the transition from agricultural economy to industrial economy. There was a process of development of transport, which occurred due to the appearance of gas and steam engines, the appearance of machines in production, looms, and the development of metallurgy (Haradhan, 2019). Those changes led to the need of training

personnel capable of productive activities in accordance with the trends of economic development. However, those changes in public activity, later on, had a huge impact on the development of labor and technological education.

The second industrial revolution of the late 19th – early 20th centuries was associated with the electrification of production, the division of labor, the introduction of in-line production, and the emergence of railway transport. Research in the field of electronics influenced the speed of information transmission: telephone and telegraph were invented, and the development of oil and chemical industry and the study of thermal processes led to the invention of internal combustion engines (Evsyukov, 2019). In the 60s of the 19th century, the domestic industry was born; therefore, the introduction of labor training in the school system was caused by the need to train highly qualified workers and craftsmen.

The industrial Revolution of the 19th – 20th centuries played a huge role in the development of education. It was thanks to the first and second technical revolutions that it became necessary to prepare students for work. And in 1884, in Russia, labor began to be studied as an academic subject (Evsyukov, 2019). Thus, there is an increase of interest in labor training in schools and it is that moment that can be called the primary impulse for the development of labor training.

Due to the socio-economic transformations in the country, the content of labor training in the 20-30s of the twentieth century was being modernized – an emphasis was being placed on an in-depth study of the theoretical aspects of industrial activity. The course on the basics of production was introduced into the curriculum. Schools were attached to the nearest enterprises and farms. Also, the content of labor training was being modernized due to the ideological features of that time, which was characteristic of the entire Soviet space.

Industrialization had a major impact on the development and acceptance of labor training. The importance of labor training for industry and social sphere of the country was reflected in the labor training programs, first developed in 1927, during the period of industrialization, under the leadership of N. K. Krupskaya, with the obvious emphasis on labor training and its impact on the pedagogical component of education, on a responsible attitude to work (Zotova, 2016). However, the socio-economic features and political instability of that time had a negative impact on the modernization of labor education, on the introduction of new and innovative ideas and concepts of that time. There is still an unresolved issue of the provision of educational institutions with the necessary material and technical facilities and often the complete lack of necessary equipment. These problems led to the fact that since 1937 labor training in schools was abolished and scientific research in this direction lost its relevance and was stopped.

Labor training returned to schools in the post-war years, due to the need to restore the national economy, when highly qualified personnel were required to be trained. In 1954, the course of labor training was introduced in schools, echoing the restoration of polytechnic education (Grebenev and Somova, 2015). All this can be called a revival of interests in labor training and a new loop in the development of labor and technological training.

The revival of labor training was effected taking into account the experience of the 30s of the 20th century. Considerable attention was paid to providing the material and technical facilities of schools

(machine tools, the production of special equipment, the organization of training workshops), industrial enterprises were involved into the organization of that activity. Moreover, there appeared a domestic system of interaction between schools and production – patronage.

Beginning with the school year in 1955-1956, the high school shifted to a new curriculum based on the principles of the school's polytechnization. The task of the new curriculum was to preserve the school as a general education, capable of providing knowledge for subsequent professional training, training of highly and medium-qualified personnel and training for mass professions. The main innovations in the curriculum were as follows: in grades 1-4 – manual labor; in grades 5-7 – practical classes in workshops and training areas; in grades 8-10, workshops on agriculture, mechanical engineering and electrical engineering. The new programs defined the minimum required polytechnic knowledge, skills and abilities that a secondary school should provide in the field of industrial and agricultural production. Thus, we see that the second stage of the development of labor training was more intensive than the first one, and many more innovative ideas were introduced, not only in schools, but also in pedagogical educational institutions.

However, there were still negative aspects of the development of technological education, which later negatively affected the image of labor training in the eyes of the society (Gattarova and Semin, 2019; Isaikina et al., 2021). The negative aspects of labor training at that time are as follows: the low level of psychological, pedagogical and methodological training of teachers, due to the large number of teachers having no pedagogical education; the goals and objectives of labor training were excessively ideologized and strictly declared and they hindered the rapid implementation of innovative ideas; also there was formal approach to production practices; lagging behind the pace of building up and improving the material and technical facilities of educational institutions compared to the pace of updating training programs for labor training. These shortcomings were also observed in the training of teachers on the basis of pedagogical schools and institutes.

As a result, there were problems in the professional adaptation of school graduates to the production sector, which required the involvement of additional resources for retraining. By the end of the 60s of the 20th century, those aspects had greatly discredited labor training in the eyes of the public. The solution was found in the adoption of a state decision to strengthen the connection of labor training with the basics of science, polytechnic education with socially useful and productive work. In schools, along with labor training, industrial training, some new practices were introduced: graduates of the 8th form, along with secondary education, were required to acquire vocational training, which helped to reduce the costs of retraining and additional training of young workers coming to production.

The transition to eleven-year training was caused precisely by the introduction of industrial training, which in the senior (9-11) classes was allocated one third of the entire school time. The restored national economy of the country required highly skilled workers with minimal costs for their adaptation to production. The active development of the society in the field of science and production actualized the need to train specialists with higher education in the production field. The resources needed to support vocational training in schools proved to be unnecessarily large, so in 1966 industrial training was abolished. In schools, the number of hours spent on labor training was also decreased, and so was the prestige of labor training. As a result, the education of teachers of labor training was stopped in pedagogical institutions, with only the training of job coaches remaining (Grebenev and Somova, 2015).

The industrial revolution of the second half of the 20th – the beginning of the 21st centuries was held under the auspices of industrial automation. That revolution was related to the electrification and digitalization of the production sector. In production, there was the introduction of automation tools and the complication of technical aspects of the production sphere. Those changes in the economic sphere aroused interest in the educational sphere. And that was a new stage in the development of industrial training in the country.

The inertia of the education system led to the inability to adapt to socio-economic changes in the society and resulted in another decline in the prestige of labor training in the 90s of the XX century and to its complete devaluation. Labor training was replaced by a new subject area "Technology" and the training of technology teachers at the faculties of pedagogical universities was set since 1993 (Nasyrova and Gavrilova, 2020; Panova et al., 2020). The emergence and introduction of innovative science-intensive technologies, as a feature of that technological revolution, contributed to the intensive growth of the world production and stimulated active changes in the public sphere. In the current socio-economic situation, the training of technology teachers is becoming relevant and important, since technological education is important in the formation of the technological culture of students.

1.3. Related Research

Research related to advanced vocational training was carried out by A.M. Novikov, who considered advanced vocational training in the context of vocational education. In his works, he focuses on defining the essence of advanced vocational training. This issue was also considered by other authors in the context of the pandemic (Tarman, 2020; Kalimullina et al, 2021), new educational technologies (Volkova et al., 2020), distance learning (Semenov, 2021; Demichev, 2021; Donohue, 2020).

Research gaps. However, it should be noted that while studying this problem, little attention was paid to considering the history of the development of advanced training in the context of vocational one. Also, in our opinion, there remains the need to clearly identify the problem areas of the organization of advanced professional training of students. Results and scientific novelty. In the course of this work, the concept of *advanced vocational training of students* was clarified. The main tasks to be solved in improving technological education were identified. The necessity of implementing *advanced vocational training* as a factor of professional education development was actualized. Possible ways of solving problems related to the development of technological education were considered.

1.4. Purpose of the Study

The purpose of our research was to consider the trends in the development of technological education.

2. Methods and Materials

2.1. Research Model

The methodological basis of the research consists of general scientific cognition methods, including analysis and synthesis (as a general methodological approach), comparison, generalization, and methods of systemic, complex, logical, structural, comparative, statistical analysis. The above methods have been used in different combinations and at different stages of the study, depending on the goals

set and the tasks to be solved. This, of course, has helped to ensure the reliability of the analysis and the validity of the author's conclusions.

2.2. Participants

The survey involved 141 3–4-year students of the Elabuga Institute of the Kazan Federal University (KFU) aged 20 to 22 years. To determine the role of the educational environment, 4 directions of training bachelors were used, which are presented in Table 3.

Table 3. List of bachelor training areas in the Elabuga Institute of KFU considered in the survey, and the number of students surveyed

KFU Department/Institute	Bachelor training area	Number of students
Engineering and Technology Department (KFU, Elabuga Institute) Year 3	44.03.05 Teacher Education (with two training profiles) Profile Technology, Informatics	25
Engineering and Technology Department (KFU, Elabuga Institute) Year 4	44.03.05 Teacher Education (with two training profiles) Profile Technology, Informatics	17
Engineering and Technology Department (KFU, Elabuga Institute) Year 5	44.03.05 Teacher Education (with two training profiles) Profile Technology, Informatics	25
Engineering and Technology Department (KFU, Elabuga Institute) Year 4	44.03.01 Teacher Education, Profile Technology	25
Engineering and Technology Department (KFU, Elabuga Institute) Year 4	44.03.01 Teacher Education, Profile Technology	26
Engineering and Technology Department (KFU, Elabuga Institute) Year 5	44.03.01 Teacher Education, Profile Technology	23

2.3. Data Collection Tools.

The tool of theoretical research is the scientific method of empirical research. The work was based on the methodology of system analysis and synthesis of theoretical sources, foreign and domestic pedagogical experience. To determine the concept of the development of technological education, a retrospective analysis of it was carried out.

To achieve the goal, it was necessary to solve the following tasks:

-analyzing domestic and foreign sources devoted to advanced vocational training;

- conducting a retrospective analysis of technological education;

- identifying the most acute problems of the development of technological education;

- considering current and future methods of improving technological education.

Based on the tasks set, the two-stage study was conceived, organized and carried out. At the first stage, the authors made a list of 6 questions focused on identifying the most significant aspects of organizing advanced vocational training, as well as the degree of satisfaction with solving the problems found while analyzing the history of development of vocational and technological education.

Table 1. Questionnaire for students (1).

1) Select from the list the four most significant aspects of the advanced vocational training of schoolchildren:	1. A competent teacher 2. Furnishing schools with new modern equipment 3. Modern topics for teaching 4. Psychological support 5. Excursions to the company 6. Vocational orientation tests 7. Understanding of the practical importance of academic subjects in future professional activities 8. School and city administration 9. Financial assistance to the school 10. Extracurricular activities 11. Cooperation with other organizations of the city (schools, industrial enterprises, sports and creative schools) 12. Participation in competitions and olympiads 13. Involving parents in school life

Table 2. Questionnaire for students (2)

1) In your opinion, how often do teachers of technology associate the material taught with professional activity?.	1) Always 2) Often 3) Sometimes 4) Seldom 5) Never
2) To your mind, does the equipment of schools allow one to study modern professions?	1) Always 2) Often 3) Sometimes 4) Seldom 5) Never

3) In your opinion, how often do technology teachers set the goal of acquainting students with aspects of a profession?	1) Always 2) Often 3) Sometimes 4) Seldom 5) Never
4) I track changes in the labor market and monitor new professions	1) Always 2) Often 3) Sometimes 4) Seldom 5) Never
5) I often use interactive teaching methods in my lessons.	1) Always 2) Often 3) Sometimes 4) Seldom 5) Never

The purpose of this study is to determine the most significant issues of the organization of advanced vocational training. At the second stage of the study, in view of the purpose, a questionnaire was conceived, organized and conducted. The purpose of the questionnaire was to determine the most significant issues of organizing advanced professional training from future teachers' prospective (Table 1 and Table 2).

2.4. Data Collection Process and Data Analysis

The survey was carried out using a questionnaire offered to students of the 3rd - 5th courses. The choice of this group of respondents is due to the fact that senior students are potential labor personnel ready to enter the employment market and having high theoretical and practical experience during the period of study. The questionnaire consisted of 5 questions (Table 1 and 2). The survey was feasible thanks to the deans of faculties, professors and group academic advisors. The survey used the Likert scale for the answer (Kitsantas et al., 2009) and, accordingly, values from 1 to 5 were taken, 5 meaning always, 4 - often, 3 - sometimes, 2 - seldom, 1 - never. The test was assessed by choosing one correct answer out of five.

3. Results.

All the trends in the development of the modern technological world and the history of the development of technological education suggest that it is necessary to radically revise the approach to technological education, as there have been several declines in labor and technological education for similar reasons: the inertia of the education system, insufficient material and technical base in schools, insufficient speed of training and retraining of school personnel (Balganova, 2021). All these issues require special attention on the part of the scientific and pedagogical community.

Let's define the related tasks that have to be solved:

1) Tasks related to the result

2) Content-related tasks

3) Tasks related to facilities

4) Tasks related to human resources

As it follows from the literature analysis, the trends in the development of the modern technological world and the history of the development of technological education indicate the need for a radical revision of the approach to technological education, since there have been several recessions in labor and technological education for similar reasons: the inertia of the education system, insufficient material and technical base in schools, and insufficient rate of training and retraining of school personnel. All these issues require special attention of the scientific and pedagogical community.

From the analysis of the results of the survey (Table 1), the authors identified the most significant components of the organization of advanced vocational training. As future teachers think: A competent teacher (76%), Furnishing schools with new modern equipment (84%), Modern topics for teaching (82%). And more than half of the respondents (59%) consider it necessary to understand the practical significance of academic subjects in their future professional activities.

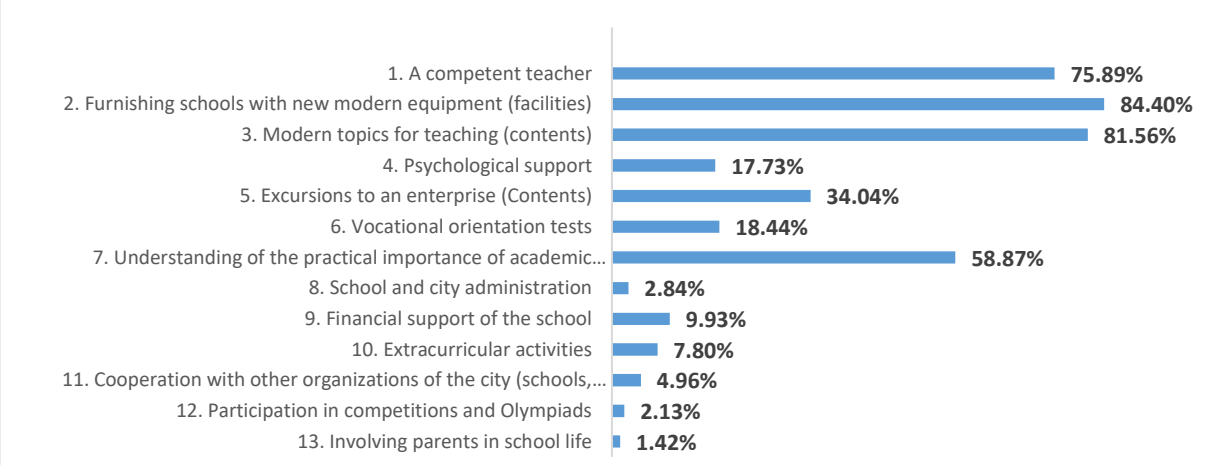

Figure 1. Rating of the components of advanced vocational training. (Based on student responses).

As the students' answers show, future teachers can feel, even at this stage, the importance of factors that have played a significant role in the history of the development of technological and vocational education. However, it should be noted that only 56 percent of the respondents consider it necessary to highlight the theoretical relevance of the educational material. Perhaps this is due to the considerable theorization of school disciplines and the desire to provide not only practice-oriented material, but also the development of the general outlook of students. As the respondents' answers show (Fig. 2), more than half of the students believe that school material is rarely associated with professional activity, which reveals the need to focus on the practical component of the educational material.

Table 3. Results of the students' survey

Questions	Always	Often	Sometimes	Seldom	Never
In your opinion, how often do teachers of technology associate the material taught with professional activity?	2.13%	22.70%	15.60%	59.57%	0.00%
To your mind, does the equipment of schools allow one to study modern professions?	0.71%	22.70%	29.79%	43.97%	2.84%
I track changes in the labor market and monitor new professions.	7.09%	44.68%	29.08%	19.15%	0.00%
I often use interactive teaching methods in my lessons.	0.00%	51.06%	29.08%	19.86%	0.00%

In the opinion of less than half of the respondents, the equipment of schools is rarely sufficient to familiarize students with modern professions, which is not such a large indicator. Perhaps this is due to the fact that students associate the professions of the future with IT technologies and in recent years schools have been strengthened with computers, but still quite a lot of students consider the equipment of schools to be insufficient.

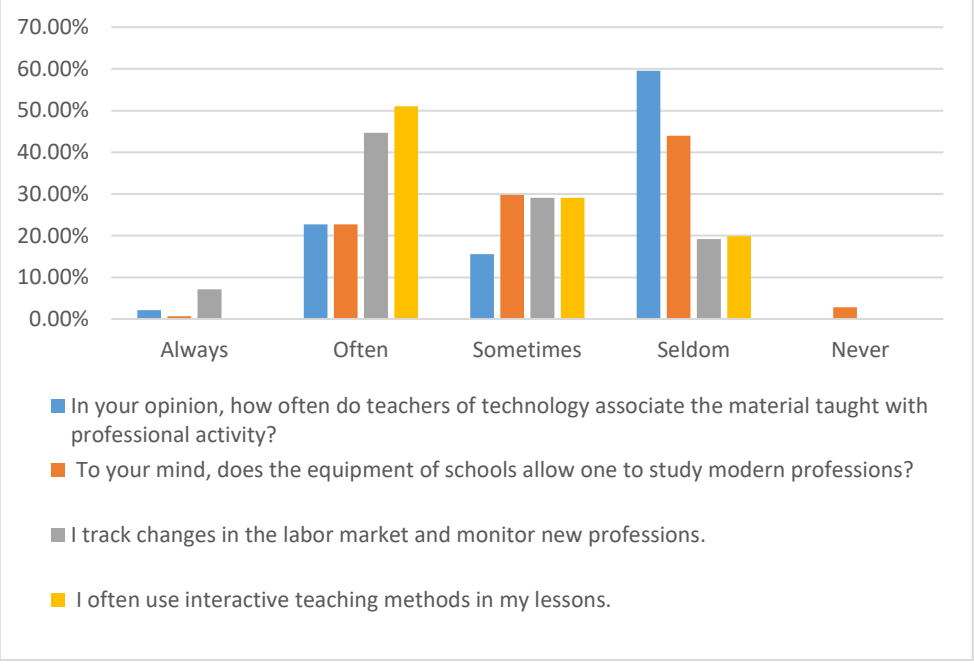

Figure 2. Students' answers diagram

Prospective teachers mark the item "I track changes in the labor market and monitor new professions". That, on the one hand, demonstrates a high orientation in changes in the professional sphere and the ability to orient students in the world of professions, on the other hand, it raises concerns about the possible professional reorientation of future potential teachers and leaving the chosen profession. Students mark that in the classroom they often use modern technologies for organizing educational activities, which demonstrates the desire to give up traditional passive teaching

methods for modern ones, as well as positive trends in the development and implementation of modern educational technologies.

4. Discussion

Today, the world of professions has become more differentiated, extremely dynamic and changeable, the number of universities and areas of work has increased significantly. About 500 new professions appear annually, many professions “living” today for only 5 to 15 years, then either "dying" or changing beyond recognition (Galchenko, 2019). German scientists Wilk, Rommel, Liauw (2020) write in their research that changes leading to the world of “new work” and digital transformation create huge problems in education. Higher educational institutions and teachers have to adapt the content of educational programs, deal with new technologies and opportunities, but also focus on the expectations of the future generation of students (Wilk et al., 2020).

Apart from the content of education, today there arises a question of understanding vocational guidance and advanced vocational training. The Dutch scientists M. Magee, M. Kuijpers & P. Runhaar, in their study of 2021, found that the teaching and administrative staff in the educational sphere have several approaches to the definition of career guidance activities, which is a reason for revising the definition of career guidance activities in the context of advanced vocational training and the goals of the educational sphere in these aspects and, possibly, the specification of the goals of education will allow the introduction of significant innovative technologies in the field of advanced vocational training (Magee et al., 2021). The problem of vocational guidance of students was also considered by scientists from Kazakhstan: B. Zhaina, S. Ospan, M. Elmira and others. Thus, as a result of the survey, it was found that students are poorly aware of employment opportunities and do not correlate the knowledge gained and acquired with further employment, which is one of the most important problems of vocational guidance of students and actualizes the need not only for vocational guidance activities of schools, but advanced vocational training with integration of professional knowledge in teaching material (Zhaina et al., 2020).

Domestic studies of the vocational orientation of school graduates show that when choosing a profession, schoolchildren are guided mainly by prestigious professions on the tongue of men, with no consideration of the real situation on the labor market, or regional characteristics, which also shows the need to work with students in the field of vocational guidance (Andrienko, 2020).

Monoprofessionalism is replaced by polyprofessionalism. This means that a person should strive to master not one single profession, but several related ones. Sociologists believe that for many young people, the reality will be not only a change of jobs, but also a change of profession 5 or 6 times in a lifetime. Consequently, it has become increasingly difficult to make professional choices. The result has become uncertain. We do not know what profession we are preparing students for today, unlike the Soviet school. With the modernization of the educational environment and the introduction of the federal state educational standard, changes in the goals of education have already begun. In the classical school the goals were to develop knowledge and skills, while today this approach is no longer enough and since 2010, the federal state educational standard has been introduced in schools, where the competence approach is considered.

Today, the Federal State Educational Standard provides for subject, meta-subject, personal competencies. However, if we consider a school as an organization that prepares students not just for educational activities, but also lays the foundation for further professional development, it is advisable to consider supra-professional competencies, which are the foundation for mastering the profession (Pesha and Evplova, 2020). Through the introduction of changes in educational standards, an attempt is made to reorient the results and content of education in accordance with the dynamically changing realities of life. If you give a more detailed consideration to the current innovations in the regulatory framework of education, you can see that in most cases, "directions of activity" are set and enough time is given to educational organizations and teachers to personally determine the best ways to achieve these goals.

The new demands of an uncertain outcome and a new content of education require the development of infrastructure. Today, huge changes in the implementation of educational activities in the field of technological education are already noticeable. Global innovation projects are being implemented - one of the main problems in the development of technological education was the insufficient material and technical support of educational institutions. One of the ways to solve this problem is to open quantoriums.

In accordance with the indicators of the development of the network of quantoriums laid down in the *Modern School* Federal Project (hereinafter referred to as FP) by December 31, 2020, at least 20 territorial entities of Russian Federation should have the opportunity to study the subject area "Technology" on the basis of organizations with highly equipped student places, including quantoriums; and by 2024, this opportunity should be available in all regions of the Russian Federation (*Modern School* Federal project, 2018). According to the *Success of Every Child* Federal Project, the goal is to create a network of children's technoparks by 2024, including at the expense of federal support for at least 245 children's *Quantorium* technoparks and 340 mobile *Quantorium* technoparks (for children living in rural areas and small towns) with coverage of at least 2 million children (*Success of Every Child* Federal Project, 2018). The whole story is reminiscent of the EPC, which at one time appeared as a help for a comprehensive school.

However, in the course of analyzing the historical development of technological education, it can be noted that with each subsequent loop of development of this field, there is a significant increase in innovations introduced in the field of education, and today the introduction of innovations in line with the new technical revolution has just begun, so these areas require special attention on the part of science, society and the state. Today, one of the main tasks of the *Education* National Project of the Russian Federation is the introduction of new methods of teaching and upbringing, educational technologies at the levels of basic general and secondary general education, ensuring the development of basic skills and abilities by students, increasing their motivation to learn and involvement in the educational process, as well as updating the content and improving the teaching methods of the subject area "Technology".

5. Conclusion

Based on the historical analysis and current trends in the development of education, it follows that at present there is another rise in technological education and with a high probability it will bring significant innovations to the educational sphere. However, in addition to the possibility of introducing

significant changes in education, history also shows considerable difficulties of these processes related to the content, logistical and personnel aspects. Which is also noted by students of pedagogical universities, since, according to the survey, it is the material and technical facilities and the teaching staff that are key in the implementation of advanced professional training in the opinion of students.

And currently, a lot of work is being done to create a regulatory framework and stimulate innovative activities of teachers aimed at determining the optimal content components of education, as well as formulating requirements for the results of education corresponding to modern dynamically changing conditions. In addition, there are attempts to organize infrastructure to allow solving the issue of technical equipment with the possibility of dynamic changes in equipment, taking into account changes in the industrial, scientific and social spheres. However, in our opinion, the main aspect of the development of technological education is the training of teachers who are able to navigate in modern realities and to teach the future generation to navigate in dynamically changing conditions themselves. For it exactly depends on the teaching staff how well the material and technical arsenal will be used and how well the goals and objectives of educational activities will be set and achieved.

6. Recommendations

The materials of this article can be used as a basis for further theoretical and practical developments in the studied field.

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