



PROVIDING POLYTECHNIC EDUCATION TO STUDENTS IN TECHNOLOGY EDUCATION MODELING CIRCLES AND ITS DEVELOPMENT FACTORS

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ABSTRACT

The article is devoted to the problem of the development of polytechnic education of students in aircraft modeling circles, the study of the factors that help or hinder this development, and the search for ways to solve problems and improve it. Also, additional education the content and essence of polytechnic education of teenagers in the lim system is highlighted.

KEY WORDS: *polytechnic education, polytechnic knowledge, polytechnic skills, polytechnic technologies, polytechnic significant personality traits, aircraft modeling training cluster.*

In the last decade, the problem of training modern engineering and technical personnel has become urgent. In solving this problem, the technical directions organized in the system of additional education, which provide initial polytechnic education to students and guide them to the profession, play an important role. Education has three components: general education, which studies nature, man and society; polytechnic education that studies the human-made environment (techniques, technologies, social production, relations with the environment) and professional education that studies the characteristics of a person's specific labor activities and forms skills and qualifications for using specific labor tools. Four components of polytechnic education are defined in scientific researches [2-6]: - polytechnic knowledge, - polytechnic skills, - polytechnic technologies, - personal characteristics of polytechnic importance. Polytechnic knowledge (natural science, scientific-technical, technological, organizational-economic) includes the system of scientific knowledge about modern production, techniques, technological bases, as well as management principles.

This knowledge is considered interprofessional and highly mobile.

Polytechnic skills are a method of practical implementation of polytechnic knowledge, which includes the ability to apply knowledge in practice (measurement, calculation, graphic, diagnostic, research, design skills, modeling, drawing diagrams), control and includes the ability to self-manage. control, workplace organization, management of various technical and technological devices. The polytechnic is created on the basis of the practical application of the laws of nature and society and includes production, agricultural, information and pedagogical technologies. Polytechnically important qualities of a person are creative thinking, ability to work independently and creatively, practical direction, critical thinking, self-awareness, ability to act in the social production system, communication skills, activity,



responsibility for one's actions.¹We define the structure and content of each component of polytechnic education for students in the aircraft modeling circle related to technology training. Polytechnic knowledge implies expansion and deepening of knowledge in the school curriculum in natural sciences such as mathematics, physics, informatics, ecology, basic knowledge - in aerodynamics; - about the properties of materials such as different types of wood, metals and their alloys, adhesives, combustible mixtures; - about various materials processing technologies; - various tools and equipment; - about different ways of presenting one's ideas; - it should consist of knowledge about working in a team and organizing the work of such teams. Polytechnic skills include: - measuring skills (using the simplest measuring tools); - calculation skills, including verbal calculations, calculations using an engineering calculator and PPP; - graphic skills (on paper and in electronic form); - the ability to model and design the simplest aircraft; - ability to read and create drawings; - ability to work with the simplest equipment and various equipment; - the ability to organize the workplace and time; - includes the ability to present and implement ideas, and present products. Polytechnic technologies include technologies for working with various materials, tools and structures.

Polytechnically, important personality traits imply the ability of creative activity, and it includes creative, creative thinking; also activity; dynamism; independence; critical thinking; responsibility for one's decisions and actions; the ability to introspect; practical direction; introduces courtesies. The need to improve polytechnic education in technical circles to provide additional education to children helps to identify the factors affecting the development of this education. We divided the identified factors into three groups: social-organizational, social-pedagogical and social-personal. The following are the socio-organizational factors. 1) Social demand for modern engineering and technical personnel. Social demand is a specific social need that belongs to the whole society or a part of it. When society realizes the importance of a certain social problem at the level of state structures or public structures, an organizational mechanism for the implementation of social inquiry is created. In the nineties, when the industry was in decline, neither the state nor business needed engineering and production. technical staff. The interest of the state and business in engineering and technical work and creativity has recently been shown when local production began to revive, and the development of technologies began to play a decisive role. 2) The existence of a group of enthusiasts interested in the development of engineering and technical directions in the additional education of children. 3) Sufficient financing of technical directions, updating and creation of modern material and technical base. The existence of a social demand for education for engineering and technical personnel does not mean the immediate restoration of technical fields in the additional education system for children. It should be noted that if it is possible to quickly restore the material and technical base of the clubs due to the increase in funding, it is not possible to quickly form professors and teachers of such clubs. Also, it is important to finance various events that allow the development of relations with teachers and teenagers from other regions, exchange of knowledge, experience and information with them. 4) Social cooperation with various state bodies and enterprises; coordination of activities, pooling of resources, coordination of programs and schedules of aircraft modeling clubs, specialization of aircraft modeling clubs; close cooperation with sports organizations and air athletes; the presence of a coordinating council of teachers and athlete-

¹ Hamidov J.A. Main Components of information Culture in Professional Teacher education in Informatization of Society // Eastern European Scientific Journal.-Germany, 2016. №1. –P.102- 105.



aeromodellers. Although today in many regions of our government, the problem of financing technical fields is very acute, the organization of social cooperation with government and business structures, active work with parents, combining available resources in the fields of aircraft modeling and more effective distribution can reduce the severity. Business representatives not only form a social order to ensure the quality of polytechnic education, but also provide financial and organizational support, provide available information about the latest technologies and materials that have appeared in modern production and are used in aircraft modeling, provides examples. knowledge about such materials, new technologies and materials, and most importantly, their implementation and application characteristics are considered today's requirements for future engineers. The work of pilots with the latest materials allows them to be interested, expands their imagination and inventive thinking in the development of aircraft models, allows the creation of models with new qualities, and awakens imagination about the possibilities of using such materials and technologies. It allows students to develop their thinking in different spheres of life. The above problems will be appropriate if they are solved within the framework of the training cluster of aircraft modeling. The creation of an aircraft modeling cluster allows for the pooling of resources, specialization of aircraft modeling circles, coordination of their activities, and coordination of programs and schedules of activities for technical fields spread among various state structures. The pooling of material resources within the framework of the aircraft modeling cluster makes it possible to partially update the material and technical base, distribute the purchase of various modern equipment among all circles, and provide students with aircraft modeling and other technical circles. the technology of working on this equipment allows to use any tools and equipment that are not in their fields, but are included in the aircraft modeling cluster, to study its structural features and capabilities. Currently, the most important factor in the development of polytechnic education for students is information resources (electronic documents, training programs, methodological developments of aircraft model teachers, PPP for creating drawings, flight simulator programs for model aircraft, etc.). The integration of information resources in the context of the aircraft modeling cluster allows the creation of documentation, standard programs, a library of training manuals, simulator programs, etc., which allows to provide teachers and students with new tools. Software-methodical support of the educational process: communication between IT-technologies, teachers, students, air sportsmen during the educational process makes it possible to increase the awareness of teachers, their competence. An important component of the education and training process in the technical circle is sports training. Close cooperation with sports organizations and aeromodelling athletes allows to hold various sports events at a high level, which are not available within the framework of an airplane modeling club or an additional educational institution for children. The existence of a coordinating council of teachers and model airplane athletes ensures the solution of organizational and methodological problems of this interaction. We include the following socio-pedagogical factors.²

Previously, most of the leaders of technical circles had not a pedagogical education, but an engineering-technical education. In the 90s, the elimination of the technical direction in the system of children's and teenagers' creativity led to the loss of a significant part of the teachers of technical circles. The problem is that the head of the club with an engineering or technical background is not always

² Hamidov J.A. Using Multimedia Technology Problems in Professional Education // Eastern European Scientific Journal /Auris – Verlag.de 2019, №1. 187- 190 ctp.



familiar with new educational approaches and technologies, and graduates of pedagogical universities do not have enough engineering and technical training to create working models of airplanes. .development of design thinking, formation of design skills, modeling of technological processes, encourages conscious choice of engineering and technical professions. This is the question of the effectiveness of polytechnic education of teenagers In such conditions, it is extremely important to competently organize training and provide methodical support to the leaders of technical circles. The main task of additional education is to develop the personality of students. To develop organizational and creative abilities of students in the educational process of the aircraft modeling circle. , involves increasing the interest of adolescents in technology and technical creativity and achieving success in productive activities. Development of individual development programs for teenagers allows us to solve this problem. An individual program includes a fixed and a variable part. An invariable part of the individual program includes studying the theoretical foundations of technical modeling, designing the simplest models, getting acquainted with tools and equipment, the technology of working with them, the properties of various materials and their processing technologies. The basis of the program should be the formation of elementary skills for presenting one's developments, participating in team work, and sports training. The adaptive component of the program should take into account the interests, abilities and aspirations of older learners. In the aircraft modeling circle, a special educational environment is formed, in particular, as a result of the grouping of students into different age groups, which allows them to more fully reveal the potential inherent in teenagers, to develop communication skills, organizational skills allows. creates ample conditions for working in a creative team, clearly expressing one's thoughts, ideas, etc., reveals the pedagogical potential of a teenager, educates important personal qualities such as sensitivity, perseverance, listening to others, being able to see his opinion . forms positive qualities, empathy for the successes and failures of others, the ability to rationally defend one's opinion

Involving students' parents in the educational process. The involvement of parents in the educational process allows to partially solve the existing problems related to the purchase of consumables, travel documents of members of the regional team, as well as some organizational problems. Parents are usually involved in the development of individual programs, training and sports activities. The participation of parents in the educational process strengthens the family, helps to establish mutual understanding between the teenager and his parents, encourages teenagers to choose engineering and technical directions in their future career.

In our opinion, the process of polytechnic education includes the following social and personal factors:

1) increased interest of teenagers and their parents in getting polytechnic education as a general cultural component of teenage education.

2) Improvement of natural and mathematical preparation of schoolchildren. In the modern public school, the decrease in the level of preparation of students in mathematics and natural sciences makes it difficult for teenagers to study in the technical circle. Leaders of technical circles say that the majority of teenagers are not able to perform simple measurements and calculations (find the volume of the airplane, the wing area, calculate the stability coefficients of the model according to the given formulas), elementary measurement is bad understands As mentioned above, the problems that have arisen in the technical direction of additional education for children can be solved, at least in part, within the framework of the educational cluster of aircraft modeling. The main factors of the aircraft modeling cluster are the creation of conditions for students to master the basics of engineering culture during the



educational process, the development of students' engineering skills, the independent acquisition of professions, the acquisition of primary polytechnic training, the interest in the field of engineering in teenagers, development of design thinking, formation of design skills, modeling of technological processes, encourages conscious choice of engineering and technical professions. This makes it possible to achieve significant results in solving the issue of the effectiveness of polytechnic education of teenagers.

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