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DEVELOPMENT OF R&D LIGHT INDUSTRY PROJECT IMPLEMENTATION SKILLS IN UNIVERSITY STUDENTS

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Abstract

The article describes the project-based training of students aimed at creating a system of intellectual and professional knowledge and skills, embodied in the final competitive consumer products or services, and developing a creative personality. Each student has to implement one project per year. During the project implementation, students participate in identifying needs of the university, assess available technical capabilities and economic feasibility. The project complexity is determined by knowledge, skills and abilities of the students. Project research develops qualities and skills required to adapt to professional life: the ability to use science-intensive technologies, make rational decisions, search for and process information, accumulate experience in solving problems related to the demand analysis, develop design and manufacturing technologies, calculate the production cost. Students participate in competitions, exhibitions, conferences, thematic discussions and disputes; employers are invited to project defenses. In addition, project activities boost the development of entrepreneurial skills. The implementation of a project-based teaching method makes it possible to increase the intellectual potential, educational and professional levels of future specialists who are able to master and use scientific and technological achievements, apply knowledge in the design, production and sale of their products and services.

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1. Introduction

Traditional higher education does not meet current needs. The 21st century has become the century of science and high technology. Modern production needs new educational requirements; students should be trained for working in constantly changing conditions and solving problems that have not yet been clearly formulated. In the technological era, each person should be able to assess results and choose methods, taking into account social, environmental, economic, psychological and other factors and consequences.

The main goal of higher education should be self-realization of individuals, development of their individual qualities. It is necessary to provide students with more opportunities to choose directions of professional education, offer a wide range of project activities. The project-based teaching method is a creative approach to the training system which takes into account individual cognitive abilities and helps to develop a person capable of achieving success in professional activities. The disadvantage of traditional classroom activities is that they follow a specific schedule, avoiding significant distractions. Therefore, educational courses on entrepreneurship (Iwu et al., 2019; Karim, 2016; Kirkwood et al., 2014) and project management (Barbosa & Ávila Rodrigues, 2020; Scholz et al., 2020; Wu et al., 2019) are being implemented into the curricula of universities. Project activity is a continuation of purposeful work on the development of creative abilities of students, interest in inventive and rationalization activities, scientific and technical creativity.

Project activity is an integrative educational area that synthesizes scientific knowledge from special disciplines, school and university courses in mathematics, chemistry, biology, economics, ecology, management, marketing. Cognitive and creative abilities of students are developed, the scientific and creative potential is realized, psychological and practical readiness for active independent activity is formed.

Implementing their own projects, students learn to adapt to the stringent requirements of the market economy.

2. Problem Statement

The need to develop new approaches to teaching university students determines objective requirements caused by changes in world social production in connection with the emergence of new technologies in all spheres of human activity. High technologies change human functions. The main thing in modern production is new information drawn from the single world information space, scientific and creative solutions to emerging production problems. It is obvious that leaders are countries capable of ensuring a high level of education.

Modern production is focused on a self-developing professional. Therefore, society puts forward the desire to use knowledge in professional practice.

University training should develop abilities, skills and competencies that allow students to make professional decisions based on the analysis and synthesis of knowledge gained. Through the practical work focused on the project-based teaching method, quality of education improves, logical thinking, planning skills, initiative, vision of the future, needs for self-education, information retrieval and

processing, communication skills are developed. It is necessary to teach students to evaluate results of labor: to assess the effectiveness of labor of each member of the project group, determine the competitiveness of products, analyze sales, and organize advertising. As a result of project work, the student should have a comprehensive understanding of the production process.

3. Research Questions

Today, when it is necessary to develop complex technical, technological and environmental ideas about production in university graduates, the vocational training is a complex and multifaceted process. It is necessary to provide a systematic approach to cognition, using analogy or empathy, associative and logical thinking skills.

In modern conditions, products that are in demand should be manufactured by students; they should be beautiful and competitive. The block of special disciplines forms professional knowledge and develops skills necessary to solve creative and technical problems. Project activities will allow students to develop creative skills.

Pedagogical management of project activities is reduced to the organization and preparation of the material base, development of didactic materials, selection of creative assignments, observation and stimulation and assessment of educational activities. Being organically related to educational activities, project work should take into account requests, individual inclinations, the level of knowledge, skills and abilities of students. To awaken interest in inventive and rationalization activities, scientific and technical creativity, develop technical thinking, a rational approach to solving emerging problems is required. It is the project work that is able to cultivate those qualities without which a creative person can fail, develop skills of rational thinking.

Students should participate in competitions, exhibitions, conferences, thematic discussions and disputes; employers may attend thesis defenses. In addition, project activities can give a huge impetus to the development of entrepreneurial abilities, and there is a need for teaching the basics of entrepreneurship in universities (Ahmed et al., 2020; Colombo & Piva, 2020; Ferreira et al., 2017; Lynch et al., 2019).

Each student should implement at least one project per year. A project is a scientific and / or creative work in a certain discipline.

In the implementation of projects, students participate in identifying needs of the university and society in this or that product, assessing available technical capabilities and economic feasibility. The complexity of the project is determined by knowledge, skills and abilities of students. The implementation of projects will provide students with the ability to consciously and creatively choose the best methods, think systematically, independently identify needs for information support, master new skills and apply them to solve professional problems. The self-educational competence is developed during the training (Efremtseva et al., 2019).

For one of the project groups of students, a project was proposed to develop the design and manufacturing process of the bachelor's vestment – a mantle and a confederate cap. After Russia's entry into the Bologna Process, many leading Russian universities are adopting European graduation traditions: the graduation ceremony requires a traditional academic dress, which has become an integral part of the

holiday. The mantle emphasizes the solemnity of the moment, and personifies involvement in a huge scientific community, and the academic confederate cap is a symbol of higher education.

In the process of manufacturing a bachelor's kit, students discussed design and sewing features, asked questions, and shared information they found. Such a system of friendly teamwork plays a psychological role, performs information, communication and organizational functions. The most capable students passed on their experience to the laggards, performing a teaching function.

Students performed the following activities: they analyzed the demand according to the methodology suggested in (Shershneva & Shunaeva, 2001), selected and justified the model, development the design, selected materials and optimal technologies, manufactured the product, calculated its cost, and developed the advertisement.

4. Purpose of the Study

The goal of project training is to develop a system of intellectual and professional knowledge and skills, embodied in the final competitive consumer products or services and contribute to the development of a creative personality of the student.

5. Research Methods

The program "Designing of light industry products" is included in the "Engineering, technology and technical sciences" field. The word "engineer" comes from Latin ingenium which means to invent, to create (Kasavin, 2009). Creativity awakens the need for knowledge, incessant search, creation of spiritual and material values. An important element of creativity is a project carried out annually by a group of students.

Students of the "Design of light industry products" program implement projects in the following general sequence.

A group of students offers the teacher a product that they would like to design or receives an assignment from the teacher. After agreeing on a specific assignment, students draw up a project plan. At the next stage, they study and analyze the existing analogues of the designed product, find out consumer properties that force people to purchase it. Then they choose materials and designs, develop design drawings for product parts, a technological sequence for the manufacture of a product, select technological processing modes, manufacture and test samples, obtain a rational technological solution. They perform economic calculations assessing the cost of materials and tailoring. If necessary, students develop an advertising package. The work is completed by its defense. Achievements are demonstrated during the project competition.

Project managers aim to develop the maximum independence in students working on the project. The role of the manager is to guide, teach and control knowledge, skills and abilities of students. Through the development of skills, dexterity and experience, students develop interest in professional tasks. When there are various forms of training, there is a desire for the creative use of science-intensive technologies, achievement of success in the profession with its various attractive factors: satisfaction, tangible material results, responsibility for fulfilling the tasks and the desire to make own changes in the labor process.

The design and creative system of professional training is related to and organically fits into the formation of technical creative thinking necessary to solve a wide variety of production problems, develop skills in searching, obtaining and processing information, accumulate experience in solving demand analysis problems, develop design and manufacturing technology, and calculate the cost of products.

6. Findings

The technological revolution is affecting the way of life. The current stage of scientific and technological progress is characterized by rapidly developing technologies – resource-saving, science-intensive, environmentally friendly, miniature, etc. High technologies are changing human activities and lifestyle of society: the integration of household and production (e.g., using a 3D scanner to print clothes at home), expansion of the range of home activities ("home office") and other types of human activities.

The projects develop qualities and skills required to adapt to changes in professional activities: the ability to make rational decisions on production tasks, search and process information, accumulate experience in solving demand analysis problems, develop design and manufacturing technologies, calculate the cost of products.

Another area of project activity is to prepare students for work in the market economy – creation of enterprises manufacturing products of providing services, design offices, on outsourcing companies. It is necessary to develop the entrepreneurial ability and the ability to evaluate the effectiveness of their activities. The introduction of a project-based teaching method makes it possible to increase the intellectual potential, educational and professional level of future specialists who are able to master and creatively use technological achievements, apply knowledge in the design, production and sale of their own products and services.

7. Conclusion

The specificity of modern production is due to the impossibility of creating a complete list of technical tasks, as they are being updated. The learning objectives change accordingly: you need to teach how to apply them in various cases. With a new approach to training, it is necessary to use real life situations as a model, to search for solutions – to reproduce scientific and practical discoveries, thus activating the thinking of students, involving them in creative activities. The tasks should contribute to the consolidation of knowledge and develop an inventive style of mental activity.

The educational system is the basis for solving the above tasks. Many of the problems that arise with the use of new teaching methods may be reflected in the rapidly outdated educational and methodological literature. It is necessary to revise educational and methodological materials that are unacceptable for the next stage in the development of scientific and technological progress.

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