How to Cite:
Kokorina, Y., Vagabov, M., Gorshkova, T., & Lelina, E. (2021). Project activity at the university: History and problems of application. *Linguistics and Culture Review*, *5*(S4), 627-644. https://doi.org/10.21744/lingcure.v5nS4.1678

Project Activity at the University: History and Problems of Application

Yulia Kokorina
Moscow Polytechnical University, Moscow, Russia

Makhach Vagabov
Moscow Polytechnical University, Moscow, Russia

Tatyana Gorshkova
Moscow International University, Moscow, Russia

Elena Lelina
St. Petersburg State University, St. Petersburg, Russia

***Abstract*---**Project activity as a kind of pedagogical technology of higher education is widely used today in the world and in modern Russia. The optimal application of this method is impossible without the knowledge with its history, the experience of fellow teachers, and understanding the modern problems of educational design at the university. The beginning of the path of mastering this method in the world and in our country, a path that was sometimes difficult and ambiguous, is explored in this work. The propositions expressed by the first researchers in this field were developed by them within the framework of both higher and secondary schools. Therefore, this paper considers pedagogical technologies not only of higher, but also of secondary education. The purpose of this work is to identify the deep essence of project activity as a method, paying attention to the ideas that formed its basis, and modern problems.

***Keywords*---**educational design, higher education, project method.

Introduction

Before we consider the history of the project method development in Russia, it is necessary to turn to the history of the concept of “project” and the development of the method itself before its arrival in Russia and the USSR. The term “project” in literal translation from Latin means “thrown forward”, “protruding”, “conspicuous”. The area of its meaning in dictionaries is interpreted as “a set of

***Corresponding author**: Kokorina, Y.; Email: kokorina@inbox.ru*
Manuscript submitted: 09 June 2021, Manuscript revised: 18 Sept 2021, Accepted for publication: 27 Oct 2021

documents for creating a structure or product", "a preliminary text of the document", "a plan, and an idea" (Big Encyclopedic Dictionary, 2001, Modern Dictionary of Foreign Words, 1992). The use of the word in this meaning refers to the Renaissance, when at the Roman Higher School of Art, in addition to the main lectures, the most diligent students could get a task to make a sketch of a church, a palace, a monument, during the creation of which they independently learned to apply their knowledge, and the results of their works were called "progetti" - projects (Zimnyaya, 1997; Könings et al., 2007). The orientation to the practical nature of training, the direct participation of students in solving specific tasks has become a distinctive feature of the method for many centuries. Later, design grew from architecture to engineering, and in 1879, a Manual Training School was founded at Washington University (St. Louis), which used the project method (Bulan, 2018; Dudukalov et al., 2021; Puryaev & Puryaev, 2020).

Subsequently, the project method develops in the practice of school pedagogy, and often any innovative methods that differ from the classroom-based learning system introduced in the XVII century by the outstanding Polish thinker and teacher Jan Amos Komensky are referred to as project methods (Andreev et al., 2005). According to A.V. Samokhvalov, the rudiments of project activity are contained in the works of Plato, Thomas More, Jan Amos Komensky, Jean-Jacques Rousseau, Friedrich Wilhelm Adolf Dystverg. O. N. Grigorieva gives ten definitions of the concepts "project", "project activity" that exist in modern pedagogical literature, giving the opinion of M. M. Morozova about the reasons for such diversity, among which are:

- Interdisciplinarity of the studied phenomenon;
- The multiplicity of the original concepts of "method" and "project" in the phrase "project method";
- The multidimensional content, as well as the variety of processes and phenomena accompanying the project method (creativity, improvisation, forecasting, design, etc.) (Morozova, 2005).

One of the most successful is the definition of E. B. Mikhalkina: "project activity in higher education is a joint educational, cognitive, creative or playful activity of students who have a common goal, coordinated methods and methods of activity aimed at achieving a common result of activity" (Mikhalkina et al., 2016). I. G. Bulan gave a matrix of understanding the term project activity, comparing the concepts of six Russian authors on ten grounds. As a result, it was discovered that despite the ambiguity of the definition of this concept, practicality, the activity component, and the independence of students are common in its interpretation (Bulan, 2018).

The latest works of Russian scientists indicate the basic principles of the project method:

- Conceptuality (reliance on a strict system of philosophical and psychological-pedagogical concepts);
- Consistency (a complete sequence of didactic techniques and operations conditioned by a coherent logical scheme);

- Reproducibility (the possibility of using the method at various stages of training and with material of varying complexity);
- The principle of the student's personal interest in the development of the project;
- The principle of activity (active research assimilation of knowledge and skills through motivated and purposeful solving of tasks, problems) (Zhamkeeva, 2012).

E. S. Polat identifies the following stages in the development of the project method: 1590-1765 – the beginning of project activity in architectural schools in Europe, 1765-1880 – use project as a method of learning in a broad pedagogical practice and his "migration" to the American continent, 1880-1915 – using the project method in the production and learning in secondary schools, 915-1965 – rethinking of the project method and its "migration" from the American continent to Europe, 1965-present time – new "discovery" of the method of projects, the third wave of its international spread (Polat, 2006).

Method

When studying the method of projects in Russian education, this article uses the comparative historical method, biographical researches and historical and pedagogical technologies (Lee, 2009; van Kruiningen, 2013; Suryasa et al., 2019). The presentation is conducted in chronological order with the allocation of the main problems of pedagogy mainly of higher school. Since the article is devoted to the development of the project method in Russian pedagogical key, we have used mainly the works of Soviet and Russian authors. However, the international and interdisciplinary nature of modern science dictates the appeal to foreign interpretations of the project method and its transfer to the Russian ground. Special attention is paid to the project method in the interpretation of the Moscow Polytechnic University, which is one of the leading universities in Russia that use the project method. In addition to the comparative historical, we have used descriptive methods and techniques of pedagogical analysis, which allow us to reveal the main features in the concept of a particular author.

Results

The origin of the project method

The appearance of theoretical works specifically on the project method as a special pedagogical technology is associated with the names of the American philosopher of education, psychologist and educator J. Dewey (1859-1952) and his disciple and follower W. Kilpatrick (1871-1965). The latter is the author of the article "The Method of projects", published in 1918. According to the concept of W. Kilpatrick, the project method is a "wholeheartedly executed plan", during the implementation of which students work without the participation of a teacher. Freedom of action, the ability to judge independently their results made it possible to feel the spirit of democracy. J. Dewey criticized the definition of project activity and the essence of the concept of his follower, arguing that the project should be a joint activity of the teacher and students, all methods are based on the scientific knowledge and experience of the teacher, the project method is not

universal, but one of the possible effective teaching methods (Polat, 2006; Shmalko & Rudakova, 2021; Evans-Amalu & Claravall, 2021). The scientist designated the essence of the method as “learning by doing”, during which the student should be interested in mastering a certain amount of knowledge, skills and abilities and be aware of their need for future activity as a professional (Bulan, 2018). The world's first classification of educational projects was proposed by the American Professor E. Collings in the 1910s, highlighting “game projects”, “excursion projects”, “narrative projects”, “constructive projects”, etc. (Krupoderova, 2011).

The pedagogical system of the “Dalton Plan”, developed by the American teacher E. Parkhurst (1887-1973), who headed a private school in Dalton, is connected with project training. The Dalton plan is a combination of desk training with a project-based general education process based on three principles: freedom, independence, and cooperation. All these principles are united by the leading principle – the principle of humanism. This is the essence of the philosophy of Dalton technology. It provides great opportunities for the implementation of personality-oriented learning, the advantages of which are obvious in comparison with traditional, knowledge-oriented learning (Ishchenko & Magsumov, 2019; Kalimullina et al., 2021). The book by E. Parkhurst “Learning according to the Dalton Plan” was published in 1922 and was translated into 57 languages (Astarkhanova et al., 2019). It was also known in the USSR. According to this method, students are engaged in creating a project of their activities, during which they themselves discover a lack of certain knowledge and consciously assimilate it (Bulan, 2018).

For the first time, the word “project” in relation to the designation of pedagogical technology was used in 1908 by the head of the department of agricultural schools, D. Snezden. Before that, the project method was called the “problem method” or “target act method”. In 1911, the US Bureau of Education legalized the term “project”; it began to become more and more firmly established in American pedagogy (Cobeña et al., 2021; Lefebure, 2019). The universal use of the project method led to its new definition, which was given by the teacher, a philosopher and a colleague of J. Dewey, Professor W. Kilpatrick. His works “The Method of Projects” (1918), “The Basics of the method” (1925) were translated into Russian in 1925 and 1928, respectively. By a project, he means any activity of children that they have chosen freely and, therefore, is carried out willingly, “from the bottom of their hearts”. The dignity of any project is determined by the degree of interest, heartfelt passion of the student in the implementation of the goal. W. Kilpatrick builds his concept of project learning on the basis of the theory of “experience” by J. Dewey (the student firmly learns only what is learned through his independent work, i.e. acquires experience) and the psychology of learning by E. Thorndike (activity for which there is a “tendency” causes “satisfaction”, any activity that is performed under compulsion causes “irritation”). W. Kilpatrick believes that free education forms independence, capacity – qualities necessary for the support and development of democracy. In 1919, the Central School Department of the United States issued a special leaflet “Project method in education”, which was the state recognition of the project method (Malegiannaki & Daradoumis, 2017; Amandykova et al., 2021).

The first steps of the project method in Soviet Russia

In modern foreign secondary and higher schools, the project method is successfully used today. In Russian science, the ideas of teaching in practice were often expressed independently of foreign colleagues. Therefore, P. F. Kapterev wrote back in 1811 that "it is important that a person himself can learn what is needed, and not that he acquires as much knowledge as possible at school. The most important acquisition of students is the ability to think and speak correctly, the ability to learn"' (Vakulenko, 2015). One of the founders of Soviet pedagogical science, P. P. Blonsky (1884-1941), said: "Life means learning the reality and transforming it" (Vakulenko, 2015). "It is impossible to make a perfect society out of slaves brought up in slavish feelings. However, at the same time, a society based on despotism, that is, on slavery, educates slaves. The way out of this dead loop, from this vicious circle is the simultaneous liberation and emancipation of both society and the individual".

In Russia, the idea of the project method, independently of American colleagues, originated in 1905 with S. T. Shatsky (1878-1934) and his followers (Andreev et al., 2005). The concept of S. T. Shatsky, who introduced project methods in extracurricular work in the first years of Soviet power, was based on the idea of an "open" school, a center for raising children in a social environment. To a certain extent, A. S. Makarenko applied the principles of project activity in the secondary school, aiming to introduce students to a professional work, mastering complex techniques (Vakulenko, 2015; Kulikova, 2021; Goryushkina, 2021). In 1923, the classroom-based learning system was declared an obsolete form in the USSR and was replaced by a team-laboratory method of teaching. Students were divided into teams and received a set of knowledge and skills when performing "complex projects" such as "We will help a sponsored collective farm in the fight for a plan". The results of the team's work were evaluated at the final lesson (Astarkhanova et al., 2019).

In 1928, J. Dewey came to the USSR by the invitation of the People's Commissar of Education A.V. Lunacharsky at the head of a group of American teachers, got acquainted with the research of S. T. Shatsky and other Soviet teachers. A year later, the American scientist published "Impressions of Soviet Russia and the Revolutionary World", in which he praised the education in the USSR and declared his rejection of a negative assessment of what is happening in the Soviet Union: "I am forced to give up my positions, which, however, is naturally caused by the impressive development of progressive pedagogical ideas and the practice of their implementation under the patronizing guidance of the Bolshevik government, and I am talking only about what I saw myself, and not about what I was told".

However, in 1931 design methods were condemned and were canceled by the resolution of The Central Committee of the All-Russian Communist Party of the Bolsheviks "On primary and secondary schools". Modern authors point to objective difficulties in the application of project activities in that era (Krupoderova, 2011), as well as to the "inconvenience" of J. Dewey's pedagogy for the Stalinist regime which was focused on authoritarian methods in education.

The revival of the project method in the post-Soviet period

The project method was revived in Russia only in the 1980s, and the widespread use of this method can be attributed to the 1990s (Andreev et al., 2005). The end of the twentieth century forced us to turn to the problem of project in the socio-philosophical aspect, which is what the research of I. I. Lyakhov is devoted to in our science. In the beginning of the globalization era, the importance of project activities in any sphere of human society is stated, and this activity is designed to promote the unification of the efforts of all mankind to solve the tasks facing it. At this time, project activity is developing mainly in the practice of school education; since the 2000s, publications on the application of the project method in universities have been actively starting to appear.

In 2008, the "Concept of long-term socio-economic development of the Russian Federation until 2020" was adopted, which states that "The development of the education system should be based on such principles of project activity implemented in the priority national project "Education" as the openness of education to external requests, the use of project methods...". The possibility of project technologies to ensure the competitiveness of specialists of any profession in the modern labor market was emphasized (Project activity, 2012).

The problem of educational projects classification

Since the 2010s, attempts have been made to theoretically comprehend the use of the project method of teaching, including at the university. Thus, following the foreign researchers, E. P. Krupoderova contrasts "Teacher center education" (training, with the teacher located in the center) with "Student center education" (training, with the student located in the center); in the latter, she assigns a decisive role to the project method (Krupoderova, 2011). Researcher gives a classification of projects (according to E. S. Polat) for various reasons:

- According to the dominant activity in the project: research, search, creative, role-playing, applied, introductory and orientation;
- In the subject-content area: mono (within the same field of knowledge) and interdisciplinary projects;
- According to the nature of project coordination: direct (rigid, flexible), hidden (implicit);
- According to the nature of contacts (among participants of the same educational institution, city, region, country);
- According to the number of project participants;
- According to the duration of the project (Krupoderova, 2011).

Paying attention to the goals of projects in higher education, O. V. Vakulenko gives his own classification of projects, describing each class in detail:

- Research projects;
- Creative projects;
- Role-playing, game projects;
- Introductory and indicative (informational);

- Interdisciplinary projects (Vakulenko, 2015).

Another Russian researcher, I. S. Ogonovskaya, gives her own classification of projects:

- By the number of students – individual or group;
- By the scale of activity – from group to network;
- By subject area – historical, geographical, environmental, etc.;
- According to the content and binding to academic disciplines – single-subject and intersubject;
- By duration – short-term, medium-term and long-term;
- By coverage area – federal, regional, local;
- By the dominant type of project activity – informational, publishing, creative, existential (the dominant type of activity is self-analysis, self-assessment), reporting, practice-oriented, social, gaming, engineering;
- According to the degree of novelty – rationalizing, inventive, heuristic, innovative (Astarkhanova et al., 2019).

O. N. Grigorieva, classifying projects in tabular form according to the following criteria, summed up the results of the typology of projects:

- The sphere of orientation (social, material, environmental, service, complex projects);
- The dominant method of solving the project problem (research project, creative, informational, practice-oriented);
- The nature of contacts between the subjects of project activity (internal or regional, international, local projects);
- The nature of the implementation of subject relations (single-subject, intersubject, supra-subject);
- The nature of project coordination (projects with open and projects with hidden coordination);
- The inclusion of the project in the curricula (current and final projects);
- The scope of the project (mini-projects, medium and long-term projects);
- The number of participants (collective, individual group projects) (Grigorieva, 2014).

The summary table published by S. Yu.Savinova and N. G. Shubnyakova in the monograph devoted to the application of project activities in the professional training of management students can become the result of the typology of projects in universities. The problem of project typology can become the topic of a separate study, the basis of which was founded by these authors, giving the grounds for categorization and the classification of projects of eight foreign and six Russian researchers of the XX-XXI centuries (Savinova & Shubnyakova, 2017; Krylova et al., 2020). Without indicating the authorship of a particular one, I. S. Bulan provides a classification of projects on various grounds in tabular form (Bulan, 2018).

The problem of the stages of project activity

In the Russian literature, the identification of the stages of project activity is one of the problems in the application of this method in higher education. Depending on the requirements for the final product of the project, I. A. Kolesnikova identified the following levels of design:

- Conceptual – focused on creating a concept of an object or on its prognostic model representation. It can serve as a basis for the following levels.
- Informative – obtaining a product with the properties necessary for its use in further practical activities.
- Technological – is aimed at an algorithmic description of the method of activity in this context
- Procedural – helps to bring project activities into a real process, where a product is needed that is ready for practical use (Kolesnikova & Gorchakova-Sibirskaya, 2007).

N. A. Kargapoltseva identifies the stages of pedagogical design, based on their practical application: the preparatory stage, project implementation, reflection, or evaluation stage, and post-project activity. The classification of the stages of project activity proposed by N. V. has something in common with this. Emelyanova, who identifies the value-oriented stage (identification of the problem and search for ways to solve it), planning (strategic, tactical and detailed), constructive stage (implementation of the project plan), evaluation and reflexive stage (analysis of the results of activities) (Emelyanova, 2011). O. V. Vakulenko suggests not only dividing the process of working on the project into stages, but also indicates the results of the stage and forms of control of students' work. Thus, the motivational and evaluation stage includes familiarization of students with the subject, the formation of value motives, and the performance of the simplest tasks. The second stage – informative – includes the creation of a technical project, equipping students with knowledge that represents the basis for work. The third – professional activity stage – provides for the inclusion of all students in the work on the implementation of the project. Moreover, the final one - analytical and correction stage – includes the presentation of the results obtained, summing up the results. Thus, three stages are mandatory in project activity: research (finding a problem and choosing a way to solve it), technological (project implementation) and final (reflection) (Vakulenko, 2015). O. N. Grigorieva proposed a scheme of work on the project in the form of “Five P”: problem-design (planning), information search (P) – product – presentation (Grigorieva, 2014). According to I. P. Tarasova, the sixth “P” is a student's portfolio, which contains all the educational materials (Bulan, 2018).

A list of requirements for a modern student project has been formed:

- Design depends on the significance/demand/relevance: the presence of a problem that the project solves, accordance with existing challenges (for example, SNTR/NTI for technological projects), the availability of an order for the project result, a potential user, a shortage of something necessary, etc.

- Implementation of the full life cycle of the project: from the concept to operation and disposal (for an innovative project), from the hypothesis to the use of the acquired knowledge (for a research project). Project participants should implement the entire cycle, or at least see it in its entirety, if the emphasis is on some stage.
- Originality of the solution: search for the uniqueness of this project. The answer to the question: why is this work a new project and not a repetition of what was passed according to the algorithm or laboratory work? An explanation that the new is generated by the project (new knowledge, product, etc.)
- Involvement in the professional community: the level of the project result obtained must meet the real terms of the professional community. It is important to take the requirements of the professional community into consideration both at the stage of project implementation and at the stage of evaluating the result (Project Training, 2018).

As a rule, limited funding and insufficient technological capabilities complicate the creation of real systems. Therefore, if, for example, the University of Texas annually distributes up to $ 500 million for the promotion and implementation of projects, and though not every project becomes successful, these investments are considered profitable, and for Russian universities in the current condition, the main source of budget for the realization of expensive projects is sponsorship. The examination of project solutions by representatives of the socio-professional environment as a stage of post-project work gives the student an invaluable experience of interaction with representatives of the professional environment and an understanding of the real problems of their activities. This stage is considered in the work of E. P. Tatyanina, on the example of the training of future teachers (Tatyanina, 2016). The increased attention to the stages of project activity at the university on the part of Russian specialists indicates, on the one hand, the desire to provide practical assistance to teachers mastering the method, on the other – the diverse nature of this experience and the lack of an established methodology, due to the relative novelty of the method for modern Russia.

The problem of project activity methods

Researchers of the use of project activities at the university call methods that allow you to rationalize the various stages of work on the project. So, in relation to the creation of graphic projects, such methods will be “brainstorming”, the method of focal objects (selecting several random objects and determining their characteristic features), the method of control questions, synectics (searching for various kinds of analogies), a business game (Khapilina, 2005). Recently, project specialists have also been using SWOT analysis – a method of strategic analysis that consists in identifying factors of the internal and external environment of the object under study and dividing them into four categories: Strengths, Weaknesses, Opportunities and Threats. The purpose of this analysis is to formulate the main directions and trends of the object's development through the systematization of available information about its strengths and weaknesses, potential opportunities and threats. In project activities, such methods of modern management are used as a tree of goals, a tree of work, a matrix of responsibility distribution, the selection of control points to check the degree of readiness of

work at each stage. In the course of working on projects, students use the methods of sociology (questionnaires), mathematical statistics (scaling, sample determination) (Mikhalkina et al., 2016).

Russian scientists have raised the problem of personal socialization during the creation of creative projects (Sapugoltseva, 2012), in general, project activity is considered as a means of forming a student's social experience. In this perspective, project activity is analyzed as an optimal pedagogical technology for developing students' independent work skills, which allows us to conclude that knowledge "is not transmitted, but is obtained in the process of personally significant activity" (Grigorieva, 2014).

O. N. Grigorieva identified the following criteria for the formation of social experience in project activity:

- The criterion of meaningful readiness (the presence of a volume of knowledge, strength, awareness, independence of judgments);
- The criterion of practical readiness (the presence of meaningfulness, independence, sequence of actions, etc.);
- The criterion of motivational readiness (the presence of a depth of understanding and inner conviction in the need to engage in project activities).

This allowed the researcher to identify the following components of social experience in project activities: cognitive (a system of ideas, views, knowledge); performance (the ability to formulate a problem, outline and implement its solution); value (a system of interests, motives and needs that ensure the application of knowledge, implementing them students carry out project activities). Russian scientists identify roles in the course of the project. The teacher thinks, advises, motivates, facilitates (helps students), observes, and the student chooses, builds a system of relationships with people, evaluates (Grigorieva, 2014).

The result of such activity is of a practical nature, significant for its participants. At the same time, it is significant not only for students, but also for teachers. "They are given new opportunities to comprehend their own experience, improve their professional skills, further deepen pedagogical cooperation aimed at strengthening interdisciplinary ties, developing a unity of requirements, which ultimately contributes to the optimization of the educational process" (Vakulenko, 2015). The legal basis of project activity at the university is being formed. Thus, a number of higher education institutions, such as the Southern Federal University, have developed their own Standard for the design and implementation of educational programs, according to which project activity is a mandatory part of the curriculum (Mikhalkina et al., 2016).

The modern stage of information technology development sets the task of attracting information resources to the implementation of projects taking into account personal experience. This includes the following steps: 1) independent selection and justification by the student the need to attract certain information resources; 2) coordination and approval of the list of resources in the project

group; 3) use of resources in collective project activities and their rotation, if necessary. All taken together contributes to the formation of a responsible attitude among future specialists to work in a group, creating a situation of success and confidence in achieving the goal (Tatyanina, 2016).

The problem of determining approaches to the development of project activities at the university

In modern pedagogy of higher education, there are three approaches to the development of project activities at the university, depending on the degree of coverage of the elements of the educational process and the functions of teachers and students in the learning process. The first approach connects project training with educational and production practices. The second involves the use of professionally directed study of specialized and non-core disciplines. The third, the broadest approach, provides for the acquisition of knowledge, ability, skills, practical experience in order to achieve professionally and socially significant competencies. Motivation on the part of a student studying theoretical material comes from the need to solve a practical problem. Various modifications of the project method are proposed. Thus, S.A. Deynega formulated a project-modular method, the advantages of consist "in a combination of active learning methods, in the use of a personal-activity component (learning through interest, motivation of students), in a practice-oriented orientation (obtaining practical experience in solving problems related to the real context of professional activity), in a developmental component (the formation of professional and personal qualities of a specialist that form the basis of his modern competencies)" (Deynega, 2011).

In recent years, the problem of cooperation between students of humanities and technical faculties of universities within the framework of project activities has risen to full growth. An example of such cooperation can be called the initiative on the application of elements of the CDIO system and the project method in the process of teaching Russian as a foreign language (RFL) at Astrakhan State University (Agleeva & Saidova, 2016). CDIO is called the "new philosophy of project learning", emphasizing that it includes the following elements: (Conceive - Design - Implement - Operate). "One of the authors and main ideologists of CDIO is E. Crowley, who heads the Skolkovo Institute of Science and Technology (Skoltech). He believes that CDIO is not a dogma, but a set of ideas that are primarily designed to help strengthen existing educational programs at universities and saturate them with proven practices. Currently, more than 100 universities from 25 countries, including 10 Russian ones, have joined the CDIO Global Initiative" (Gansuar et al., 2015).

The aim of this approach was to develop in students the most important competencies necessary for a modern engineer and specialist from the first year onwards:

- conceive, design, implement and operate systems in enterprises, business and social environment;
- apply the acquired knowledge while working in organizations;
- development of creative thinking, the ability to solve real problems, the desire to conduct experiments, discover and invent new things;

- ability to think systematically, understanding the interaction between disciplines and knowledge;
- critical thinking, the ability to identify weaknesses and constantly improve production;
- adherence to professional ethics (responsibility, honesty of an engineer who realizes that his project or product will be related to the life and safety of people);
- ability to work alone and in a team, the ability to be a leader and interact effectively within the team.

The “CDIO World Initiative” was adopted initially by universities of engineering directions. However, it turned out to be effective for modern universities in general (today there are more than 100 universities from different countries in the association of the “CDIO World Initiative”). It involves the use of a learning model in which a significant place is given to the participation of students in the production process, as well as the creation of new ideas, products and systems by them – from the original idea to the management of their project, as the name itself says” (Baeva, 2014). In relation to humanities, CDIO standards are being implemented in many ways for the first time. Single steps were previously taken, for example, at the University of Information Technology Chengdu (CUIT) in China, where the principles of CDIO are used to prepare students in the direction of “Social Work” and “Design”, at Turku University in Finland there is experience in teaching students in the areas of “Business and Administration”, “Ebisness” under this system. The experience of Russian universities, for example, Astrakhan State University, allows us to conclude that “for the humanitarian and social sphere, to complete a project is not only to collect material, necessary information on the topic, but also to apply the acquired knowledge in practice, for example: to conduct an excursion (including multilingual), develop a new tourist route, prepare an issue of a student scientific journal, a collection of art works by young authors, independently hold a round table, a TV program or even a scientific conference, and much more” (Baeva, 2014).

The concept of “educational engineering” was developed at the Ural Federal University, which means “a sequence of design, technological and production actions corresponding to the full life cycle of the product creation, carried out at one facility in educational and production conditions close to professional activity. The design results of each stage are checked by their practical implementation, on the basis of which the necessary refinement and correction is carried out” (Isaev & Plotnikov, 2016). The essence of the concept of educational engineering is expressed in a two-circuit model of students passing the main stages of the life cycle of a technical system. The first circuit (1st semester) is a practical activity of students to create layouts of selected products. The second circuit of educational engineering lasting seven semesters is a project and production activity that is as close as possible in terms of content, organization of work and requirements for the results of professional activity. The ultimate goal of the students' work is to create prototypes from structural, not mock-up materials. The concept of educational engineering also provides for conducting classes by a team of consultants consisting of a university teacher and a qualified engineer from an industrial enterprise or an engineering organization who are potential employers of graduates (Isaev & Plotnikov, 2016).

Discussion

Above, we have considered the problems that Russian scientists reveal in their works devoted to the problems of using projects in education, primarily university education. We see that the project activity in education is investigated comprehensively and is actively used in teaching students. Its legal base is being formed and expanded (Lozano et al., 2013; Woolf, 2020). The project method has proven its productivity as a way to form a comprehensively developed, actively thinking, and competitive personality in the modern labor market. Attention to the project method and a comprehensive analysis of the problems associated with it are a clear proof of its widespread use and productivity. However, at the same time, researchers of the project method identify a number of difficulties associated with the process of its application in practice:

- In reality, the project method complicates the learning process, since:
  The student himself checks subject connections.
  It is difficult to develop certain standards in different areas.
  Learning becomes fragmented.
  Much more qualifications are required from the teacher than in ordinary subject training.
- Project-based learning assumes a basis in the form of personal values of each student and requires respect for these values on the part of the supervisor. The student's personal interest in the results of activities is necessary, which is complicated by the use of universities' standards systems.
- The project method requires an individual approach to each student, whereas the modern ideology of higher education speaks about the unification of curricula on a national scale.
- Careful planning of project activities is necessary.
- In the relationship between a teacher and a student, a transition is assumed from an authoritarian teaching style to a partnership based on democracy. This may be due to a number of problems.
- Difficulties arise in the organization of project activity control.
  The degree of influence and intervention of the supervisor in the student's work may be different: in one case, it is necessary to give an impulse to start working on a project, in the other – to temper your ardor and ambitions.
  The adequacy of control should be regulated by some objective criterion, for example, the schedule of work.
  The supervisor's control may be based on a personal attitude towards the student, which often leads to a decrease in the motivation of the student.
- There is a problem of ambiguity of the role of the teacher:
  The teacher is a counsellor, a master who coordinates the actions of the student.
  The teacher is a supervisor who evaluates the student's work.
  Apparently, these functions of the teacher need to be separated in time.
- There is a problem of correlation between the criteria for evaluating the project and the general system of university assessments of students learning (Magsumov, 2017).

Describing the current situation in industry, the director of the Skolkovo Open University, E.V. Morozova, notes: “The number of competitive technology projects in Russia is small. The number of projects with the prospect of commercialization and with the potential to enter global markets is critically small (Tolboom & Kuiper, 2014; Sergis et al., 2019). One of the reasons for this situation is the lack of a culture of project activity in the education system and low entrepreneurial activity among young people. In this case, entrepreneurship is understood not only as the desire and ability to earn money, but, first of all, the willingness to take responsibility and risks, motivation to create a new one, lack of fear of mistakes and disappointment”. Universities are called upon to form a new type of graduate, which, however, face a shortage of specialists capable of ensuring the development of project technologies. To respond to these requests, a series of educational intensive courses called “Mentor School” was launched. In the fall of 2017, the school was dedicated to the introduction of project-based learning formats at universities. The results of this event laid the foundation for a methodological manual, which presents the practices of implementing project-based learning at universities to solve a wide range of tasks (Project-based learning, 2018) (Garrison & Kanuka, 2004; Van Dinther et al., 2011).

Conclusion

Nowadays, monographs are published on the application of project activities in universities, textbooks for teachers implementing this pedagogical technology, and methodological guidelines for students studying using this method. PhD dissertations are defended, which consider various aspects of project activity in a modern university. Training manuals for teachers and the work of the method founders are translated from English (Kondratska et al., 2021; Khasanah et al., 2021). At the beginning of the XXI century, our country is mastering the Internet, and websites appear on the information network, in which generalizing works about the biographies of the method founders, their theoretical positions and the practical implementation of their developments are published. Russian and foreign teachers of higher education submit their methodological developments for general discussion and create websites of projects carried out under their guidance. Theoretical and practical articles on this subject are published by teachers of the Moscow Polytechnic University, such as, for example, an extensive article published by a team of authors in 2016 (Molodykh et al., 2016). Along with the analysis of the experience of project activities of University students, it outlines “the necessary conditions for the implementation of high-quality engineering projects: 1. Motivation on the part of the customer. 2. Active involvement of the head of the educational program: adaptation of the curriculum, motivation of students, expertise and scientific guidance. 3. The readiness of the university staff to solve administrative, financial and bureaucratic problems that arise during the preparation and implementation of the project. 4. Motivation of students to work through a relevant and interesting topic, career perspective” (Molodykh et al., 2016). The same conditions are necessary for the implementation of projects in the humanitarian sphere. It is the humanitarian sphere of activity, in our opinion, that contributes to the formation of the project culture to the maximum extent, which Russian researchers are talking about now. So, I.A. Winter considers project culture as the basis of harmonious interaction of a person with nature, society and the technological

environment, which is a common form of realization of the art of planning, forecasting, creation, execution and design (Kovalenko & Nikitina, 2012). At the same time, project activity is considered “not only as a purposeful rational human activity to create a product to meet social needs, but also as a means of self-development and self-realization of the individual” (Kovalenko & Nikitina, 2012). In general, the problem of returning project activities to Russian higher education and the development of this pedagogical technology at a new theoretical level may become the topic of further special research. In our opinion, it is impossible to carry out such work without referring to the history of the project method, a history that has often been contradictory and difficult in our country.

References

Agleeva Z.R., & Saidova L.V. (2016). Ispolzovanie elementov initsiativy CDIO i metoda proektov v obuchenii RKI [Using elements of the CDIO initiative and the project method in RCT training] Symbol of science.No 6. pp.100-102 [In Russian]

Amandykova, D., Gulmira, A., Myrzakhmetova, S., Mukanovna, A. I., Nigmetova, A., & Popov, Y. (2021). The method of formation of interdisciplinary principles in the educational program of the specialty "architecture". *Linguistics and Culture Review*, *5*(S3), 486-498. https://doi.org/10.21744/lingcure.v5nS3.1521

Andreev G.P., Bugaev N.I., Mikhalyova O.I., & Romanov N.N. (2005). K stoletiyu metoda proektov [To the centenary of the project method]. School technologies. 2005. №4. pp. 28-30 [In Russian]

Astarkhanova, N.R., Rabadanova, P.M., & Abdulgalimova, G.N. (2019). The use of the patriotic aspect of folk ecology in the education of students. *Bulletin of the Dagestan State Pedagogical University. Psychological and pedagogical sciences* , *13* (2), 91-94.

Baeva, LV (2014). Proektnoe obuchenie v sovremennom vuze: opyt primeneniya standartov CDIO dlya podgotovki studentov sotsiogumanitarnykh napravlenii [Project-based learning in the modern University: the experience of the application of the CDIO standards for the training of students of social and humanistic directions]. *Znanie. Ponimanie. Umenie* , 82-89.

Bulan, I.G. (2018). Criteria and diagnostic tools for assessing the formation of design and research skills of students of secondary vocational education. *Professional education in Russia and abroad* , (2 (30)).

Cobeña, G. T. B., García, L. A. P., Pin, S. C. S., & Montes, L. C. Z. (2021). The formative assessment as systematic practice in higher basic education students. *International Research Journal of Management, IT and Social Sciences*, *8*(2), 132-140. https://doi.org/10.21744/irjmis.v8n2.1100

Deynega, S. A. (2011). Project-modular training in technical university. *Yaroslavl Pedagogical Gazette*, *2*(3), 146-151.

Dudukalov, E. V., Terenina, I. V., Perova, M. V., & Ushakov, D. (2021). Industry 4.0 readiness: the impact of digital transformation on supply chain performance. In *E3S Web of Conferences* (Vol. 244, p. 08020). EDP Sciences.

Emelyanova, N. V. (2011). Project activity of students in the educational process. *Higher education today*, (3), 82-84.

Evans-Amalu, K., & Claravall, E. B. (2021). Inclusive Online Teaching and Digital Learning: Lessons Learned in the Time of Pandemic and Beyond. *Journal of Curriculum Studies Research*, *3*(1), i-iii.

Gansuar, K., Neretina, E. A., & Korokoshko Yu, V. (2015). Experience in project-oriented training and organization of team work of university students. *Education Integration*, *19*, 22-30.

Garrison, D. R., & Kanuka, H. (2004). Blended learning: Uncovering its transformative potential in higher education. *The internet and higher education*, *7*(2), 95-105. https://doi.org/10.1016/j.iheduc.2004.02.001

Goryushkina, N. Y. (2021). “Start all business from the beginning”: N.S. mordvinov – theorist of the excise system for tax collection from alcohol.

Grigoreva O.N. (2014). Proektnaya deyatelnost kak sredstvo formirovaniya sotsialnogo opyta studenta [Project activity as a means of forming a student's social experience]. Orenburg: OOO IPK “Universitet”, 110 pp. [In Russian]

Isaev, A. P., & Plotnikov, L. V. (2016). «Educational Engineering» in the Context of the Implementation of the CLIO Ideology. *Vysshee obrazovanie v Rossii= Higher Education in Russia*, (12), 207.

Ishchenko, O. V., & Magsumov, T. A. (2019). Siberian Students' Material Situation in the early 20 th century (based on Student Questionnaires). *Былые годы. Российский исторический журнал*, (51), 366-379.

Kalimullina, O., Tarman, B., & Stepanova, I. (2021). Education in the Context of Digitalization and Culture: Evolution of the Teacher's Role, Pre-pandemic Overview. *Journal of Ethnic and Cultural Studies*, *8*(1), 226-238.

Khapilina N.V. (2020). Proektnaya deyatelnost studentov vuzov v protsesse graficheskoy podgotovki [Project activity of university students in the process of graphic training]. Bryansk, RIO Bryanskogo gos. universiteta, 150 pp.

Khasanah, Rahanra, N., & Susanty, L. (2021). Challenges of e-learning development and implementation in remote Indonesia: educational development analysis. *International Research Journal of Management, IT and Social Sciences*, *8*(5), 497-505. https://doi.org/10.21744/irjmis.v8n5.1934

Kolesnikova, I. A., & Gorchakova-Sibirskaya, M. P. (2007). Pedagogical Design (Akademiya, Moscow.

Kondratska, G. D., Voloshyn, O. R., Prots, R. O., Kopko, I. I., & Stets, V. I. (2021). The influence of sports disciplines on the development of key competencies of future physical education teachers. *Linguistics and Culture Review*, *5*(S2), 537-547. https://doi.org/10.21744/lingcure.v5nS2.1389

Könings, K. D., Brand-Gruwel, S., & Van Merrienboer, J. J. (2007). Teachers’ perspectives on innovations: Implications for educational design. *Teaching and teacher education*, *23*(6), 985-997. https://doi.org/10.1016/j.tate.2006.06.004

Kovalenko Y. A., & Nikitina L. L. (2012). Proektnaya deyatelnost studentov v obrazovatelnom protsesse vuza [Project activity of students in the educational process of the university] Bulletin of the Kazan Technological University. No. 15. pp.229-231.

Krupoderova E.P. (2011). Proektnaya deyatelnost v shkole i vuze [Project activities at school and university]. N. Novgorod, NGPU. 115 pp.

Krylova, L. A., Zhundibayeva, A. K., Kadyrov, Z. T., Talaspaóeva, Z. S., Fatkiyeva, G. T., & Sabiyeva, Y. V. (2020). Portrait image in Pushkin’s prose of the thirties in the 19th century. *Media Watch*, *11*(4), 630-647.

Kulikova, TI (2021). Interconnection of Temporal Competence and Stress Resilience of Teachers with different length of service. *Russian Journal of Education and Psychology* , *12* (3), 86-105.

Lee, N. (2009). Project methods as the vehicle for learning in undergraduate design education: a typology. *Design Studies*, *30*(5), 541-560. https://doi.org/10.1016/j.destud.2009.03.002

Lefebure, C. (2019). Translating letters: criticism as a perspective for a translator. *Applied Translation*, *13*(1), 32–39. Retrieved from https://appliedtranslation.nyc/index.php/journal/article/view/317

Lozano, R., Lukman, R., Lozano, F. J., Huisingh, D., & Lambrechts, W. (2013). Declarations for sustainability in higher education: becoming better leaders, through addressing the university system. *Journal of Cleaner Production*, *48*, 10-19. https://doi.org/10.1016/j.jclepro.2011.10.006

Magsumov, T. A. (2017). Family and School in Russia at the Beginning of the 20th Century: Attempts to Bridge the Gap. *European Journal of Contemporary Education*, *6*(4), 837-846.

Malegiannaki, I., & Daradoumis, T. (2017). Analyzing the educational design, use and effect of spatial games for cultural heritage: A literature review. *Computers & education*, *108*, 1-10. https://doi.org/10.1016/j.compedu.2017.01.007

Mikhalkina, E. V., Kit, O. I., Fomenko, Y. A., & Mikhalkina, D. A. (2021). New strategy formation outlines for the organizational and managerial support of The Southern Federal District oncology service activities. *Journal of Economic Regulation*, *12*(2), 58-67.

Molodykh Y.O., Prudkovskaya O.M., Lepyoshkin I.A., & Fedoseev A.I. (2016). Organization of project activities (On the example of the Moscow Polytechnic University. Quality of education №9. pp.12-17.

Morozova, M. M. (2005). Metod proektov kak fenomen obrazovatel'nogo processa v sovremennoj shkole.[Project method as a phenomenon of the educational process in modern school]: dis.... cand. ped. sciences.

Polat, E. S. (2006). Project method: history and theory of the question. *Journal of School Technology*, *6*, 43-7.

Puryaev, A., & Puryaev, A. (2020). Evaluating the effectiveness of projects of global and national economic significance level. In *Proceeding of the International Science and Technology Conference" FarEastCon 2019"* (pp. 317-331). Springer, Singapore.

Sapugoltseva M.A (2012). Tvorcheskaya proektnaya deyatelnost kak faktor sotsializatsii lichnosti studenta [Creative project activity as a factor of socialization of the student's personality]. Orienburg: OOO IPK “Universitet”. 104 pp.

Savinova S.Y., & Shubnyakova N.G. (2017). Proektnaya deyatelnost v professionalnoy podgotovke studentov-menedzherov [Project activity in the professional training of management students]. N.Novgorod: NIU RANHiGS,. 178 pp.

Sergis, S., Sampson, D. G., Rodríguez-Triana, M. J., Gillet, D., Pelliccione, L., & de Jong, T. (2019). Using educational data from teaching and learning to inform teachers’ reflective educational design in inquiry-based STEM education. *Computers in human behavior*, *92*, 724-738. https://doi.org/10.1016/j.chb.2017.12.014

Shmalko, YV, & Rudakova, OA (2021). Language Barrier As A Result Of Ruminations In The Conditions Of Distance Learning. *Russian Journal of Education and Psychology* , *12* (3), 74-85.

Suryasa, I.W., Sudipa, I.N., Puspani, I.A.M., Netra, I.M. (2019). Translation procedure of happy emotion of english into indonesian in kṛṣṇa text. *Journal of Language Teaching and Research, 10*(4), 738–746

Tatyanina, E.P. (2016). A model for preparing future teachers for the automation of processes in network project clusters. *Bulletin of the South Ural State Humanitarian Pedagogical University* , (10).

Tolboom, J., & Kuiper, W. (2014). Quantifying correspondence between the intended and the implemented intervention in educational design research. *Studies in Educational Evaluation*, *43*, 160-168. https://doi.org/10.1016/j.stueduc.2014.09.001

Vakulenko O.V. (2015). Pedagogicheskoe soprovozhdenie proektnoy deyatelnosti studentov vuza (v sfere sotsialno-pedagogicheskoy deyatelnosti) [Pedagogical support of project activities of university students (in the field of social and pedagogical activity]. Shadrinsk, SHGPI.142 pp.

Van Dinther, M., Dochy, F., & Segers, M. (2011). Factors affecting students' self-efficacy in higher education. *Educational research review*, *6*(2), 95-108. https://doi.org/10.1016/j.edurev.2010.10.003

van Kruiningen, J. F. (2013). Educational design as conversation: A conversation analytical perspective on teacher dialogue. *Teaching and Teacher Education*, *29*, 110-121. https://doi.org/10.1016/j.tate.2012.08.007

Woolf, J. J. R. (2020). An examination of anti-doping education initiatives from an educational perspective: Insights and recommendations for improved educational design. *Performance Enhancement & Health*, 100178. https://doi.org/10.1016/j.peh.2020.100178

Zhamkeeva, M. (2012). World experience in customs tariff regulation of external economic activities. *ACTUAL PROBLEMS OF ECONOMICS*, (135), 303-310.

Zimnyaya, I. A. (1997). Educational psychology. Textbook. *Rostov on Don: Phoenix Publishing House*.