



INNOVATIVE PROJECTS OF THE UNIVERSITY AS AN INDICATOR OF THE EFFICIENCY OF ITS ACTIVITIES

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ABSTRACT

Background: The most important task in the work of the university is the creation of highly qualified personnel for the country's economy. The article is devoted to innovative project activities as an indicator of the effectiveness of a university. The authors of the article consider innovative projects from the point of view of three criteria (motivation, self-realization, and professional competence). **Objective:** The aim of the study is to identify criteria for assessing the effectiveness of a university based on innovative projects. **Methods:** The research methodology was based on a systematic approach. The following methods were also used: content analysis of scientific literature on the research topic, sociological survey method, and statistical analysis method. **Results:** The results of the study were the provision that there is a direct relationship between the level of education and motivation to learn. The higher the level of education at the university, the higher the motivation for learning, self-realization, and professional competence as a priority. **Conclusion:** It has been determined that innovative project activity is a promising and comprehensive indicator (qualitative and quantitative) for assessing the effectiveness of educational activities at a university.

Keywords: Innovative projects; Professional competence; Motivation; Students; University performance.

PROJETOS INOVADORES DA UNIVERSIDADE COMO INDICADOR DA EFICIÊNCIA DE SUAS ATIVIDADES

RESUMO

Antecedentes: A tarefa mais importante no trabalho da universidade é a criação de pessoal altamente qualificado para a economia do país. O artigo é dedicado às atividades de projetos inovadores como um indicador da eficácia de uma universidade. Os autores do artigo consideram projetos inovadores sob o ponto de vista de três critérios (motivação, autorrealização e competência profissional). **Objetivo:** O objetivo do estudo é identificar critérios para avaliar a eficácia de uma universidade baseada em projetos inovadores. **Métodos:** A metodologia da pesquisa foi baseada em uma abordagem sistemática. Também foram utilizados os seguintes métodos: análise de conteúdo da produção científica sobre o tema da pesquisa, método de levantamento sociológico e método de análise estatística. **Resultados:** Os resultados do estudo foram a constatação de que existe uma relação direta entre o nível de escolaridade e a motivação para aprender. Quanto maior o nível de formação na universidade, maior a motivação para aprender, autorrealização e competência profissional como prioridade. **Conclusão:** Determinou-se que a atividade de projeto inovadora é um indicador promissor e abrangente (qualitativo e quantitativo) para avaliar a eficácia das atividades educacionais em uma universidade.

Palavras-chave: Projetos inovadores; Competência profissional; Motivação; Alunos; Desempenho universitário.

1 INTRODUCTION

The active and directed movement of the most developed countries towards the knowledge society requires significant changes, primarily in the higher education system, which, being an element of the national innovation system should create the potential for the strategic innovative development of the country. In these conditions, the development of the higher education system should outstrip the development of other sectors in the economy and create prerequisites for their purposeful change. In this regard, in universities, the emphasis should be on innovative development, which is a complex process of integrated implementation of innovative technologies and scientific and innovative activities in all areas in the university (Abramova, 2019).

To find the correlation between the level of education and motivation in the study on the example of a specific university, the project approach was thoroughly studied, the advantage of which is the possibility of its functioning with the traditional organizational structure for universities without inertia and insufficient market orientation (Carl, 2021). One of the most common tools for implementing system changes is the project approach. Moreover, as a system, it is possible to consider both a single university and the entire system of higher education (Carl, 2021). The advantage of the project-

oriented management model is the possibility of its functioning in parallel with the traditional structure of the organization for universities (Carl, 2021). At the same time, the project-oriented approach makes it possible to avoid such shortcomings of the linear-functional structure as inertia and insufficient market orientation (Carl, 2021). In a broad sense, a project can be defined as a non-repetitive, unique action (set of activities) aimed at changing the initial state of an object with a predetermined goal (Conley, 2019). In addition to being unique, a project has characteristics such as time frames, resource constraints, project team and project management system. Thus, an innovative activity carried out in a university can be considered a project if it has the above characteristics (Craig-Wood, 2019). A special place among the projects, implemented in universities, is occupied by innovative projects. We mean those projects, the results of which are:

- the introduction of educational technologies is new for a particular university, the acquisition and implementation of advanced technical teaching aids, the use of new methodological approaches in teaching, etc.;
- modernization of the university management system;
- development and launch of new educational programs on the market;
- specialists training with competencies demanded by the innovative economy (Demin, 2018).

In this regard, it is advisable to single out several types of innovative projects implemented in educational institutions (Demin, 2018):

1. Educational projects - projects related to the proposal of fundamentally new educational services, forms and methods of teaching.
2. Organizational projects - projects, the implementation of which entails changes in the management system of the university, including the system of motivation and communication.
3. Research projects - projects, the result of which can be a new scientific knowledge, model, concept with all their inherent characteristics. A specific feature of scientific projects are: non-commercial orientation; uncertainty of results; long terms of implementation; the difficulty of assessing both the predicted and planned, and the actual results of the implementation of projects; the need for a comprehensive coverage of subject areas and the organization of information exchange; lack of analogies in retrospect; narrow specialization of the participants, which imposes corresponding requirements on the control mechanisms (Ermolaeva, 2020).
4. Entrepreneurial projects - projects for the creation of commercial enterprises

with the participation of universities. Such enterprises can be engaged in the commercialization of research and development, the provision of consulting services, using the potential of the teaching staff, the implementation of the most viable business projects of students and students of the university.

The implementation of this type of projects by the university is consistent with the World Declaration on Higher Education for the 21st Century, which says that «the formation of entrepreneurial skills and incentives for initiative should be the main concern of higher education institutions in order to promote employment of graduates, who will increasingly act not only in the role of those who are looking for work, but above all as job creators» (Heldman, 201).

Thus, the innovative activity in higher educational institutions can and should be based on the integration of education, science and production. An effective combination of these types of activities is possible only on condition of the creation and implementation of an appropriate organizational and managerial model of the university and a system for evaluating the effectiveness for different types of innovative projects (Repnikova, 2020).

The aim of the study is to identify criteria for assessing the effectiveness of a university based on innovative projects. This study examines the role of innovative project activities and the impact on the effectiveness of the university. As part of the transition from the traditional approach, focused on the transfer of knowledge, skills and abilities from teacher to student, to a new, competency-based approach (Khaimuldina, 2021).

This approach presupposes the formation of a complex personal resource by students, which provides the ability of effectively interacting with the outside world in general and to effective professional activity in particular (Kolhekar, 2021). In the course of such training, the student acquires the ability to solve life and professional tasks, fulfill social roles and act in the best way in various situations. Teachers can develop this approach through continuing professional education (Kapustina et al., 2021). The development of computer interactive environments has opened a new stage in forming interactive human experience as the system of informative-technological and social-psychological competencies (Shishov et al., 2021). The strategy for introducing new standards into the educational process in the connection with the transition to digital reality requires changing the methodology of education and creating a new format for developing teaching methods (Motorina and Cherniaeva, 2020).

On the one hand, the competence-based approach implies the formation of a

graduate, based on the results of studying at a university, who is able to solve a variety of problems in the field of his professional activity and in related fields, including new problems, and effectively use non-standard methods of solution (Lebedinskaya, 2020). Kartushina N. V. notes that in this regard, it is also relevant to use a process-oriented approach that meets the appropriate requirements of the competitive market and is capable to provide the consumer with the high-quality final product (Kartushina, 2020).

On the other hand, the teacher must have a wide range of competencies that are required to form such a graduate successfully (Sergeeva et al., 2021). One of the possible tools for the implementation of these requirements is the project method. Contemporary authors analysis different innovative projects in higher education institutions and highly appreciate the importance for the educational activities of future graduates (Liu Zhi-Jiang, 2016), which is especially important in our study and will allow us to identify how number of the projects and their quality affect three criteria: motivation, self-realization and professional competence (Otts et al., 2021).

Gradually, the project method began to integrate into the general education system in educational institutions. The main content of the project method remains unchanged: ensuring a significant increase in the various abilities of students and obtaining practical results for the real sector in the economy. According to Y. Lebedinskaya, G.V. Petruk (Lebedinskaya, 2020), the project method is «an innovative teaching technology in which students acquire new knowledge, skills and abilities in the process of step-by-step, independent (under the guidance of a teacher) planning, development, execution and production of increasingly complex tasks, aspects of the problem, its micro themes» (Lebedinskaya, 2020).

In other words, the essence of the project method consists in the independent solution by students under the guidance of a teacher of a specific practical problem in the field of their future professional activities (Shurygin et al., 2021). In the course of solving the problem, posed within the framework of the project, students develop or improve both theoretical knowledge and practical skills (Levashov, 2016). This ensures the accelerated and effective formation of general cultural and professional competencies in accordance with federal state educational standards in areas of training (Lizunkov, 2016). The project method is an indicator of the effectiveness of the university precisely because it allows finding practical application of students' knowledge already in the course of training and is fundamentally different from the methods traditionally used in the educational process. Students independently formulate the problem, the goal of the study, ways to achieve it, seek and analyze

information, and the teacher acts only as a consultant (Odarich, 2017). That is why it is necessary to study how students evaluate project activities at the university and whether this assessment is an indicator of the effectiveness of the university, whether the number of projects announced in the curriculum of the university for the first year corresponds to the quality of training, how high-quality is the work on projects, what is its volume, and the result (Galizina et al., 2021).

Some researchers identify the following key characteristics that a design method should have:

- the key role of the project;
- openness of projects;
- the key role of students;
- variability;
- cooperation;
- cross-disciplinarity;
- interactivity;
- realistic projects;
- the important role of leaders, etc. (Samerkhanova, 2020).

With these characteristics, the project method is capable of bringing significant results to the educational process. The effectiveness of its use has received wide recognition abroad and is confirmed by a number of studies (Lebedinskaya, 2020; Odarich, 2017; Schlegel, 2021; Stupnitskaya, 2018; Tinaut, 2020, Novikov, Komarova & Dadyan, 2021).

Researchers note that the project method helps to increase responsibility, independence of students, teaches them to manage their own knowledge (Schlegel, 2021). Today the design method is becoming more and more widespread in Russia. It is officially used in training at a number of the country's largest universities (Shiryayev, 2016).

From the point of realizing educational potential, student projects can serve as an indicator of the effectiveness of the entire higher educational institution. The indicator is «a characteristic of the state of the system and the process of its functioning» (Stupnitskaya, 2018, p. 9).

In this study, using a number of indicators, the potential of the university is studied on a specific example, the degree of achievement of strategic goals, the progress of the university's development, its quantitative and qualitative improvements in the development of an educational organization are considered, which will allow tracking

progress (Tinaut, 2020). With the help of indicators, it is possible to describe any system and the process of its functioning (Tinaut, 2020). This implies an understanding of how important is to choose the most significant indicators correctly from the set of possible ones, which fully and reliably reflect the actual state and the degree of university development (Shurygin et al., 2021; Iniesta & Campillo, 2021).

In this study, we refer to the project method for the following reasons. Firstly, in the course of work on projects, students not only gain new knowledge, but also largely independently learn to apply this knowledge in practice, find ways to solve problems, assess their feasibility and effectiveness.

Secondly, teachers, being leaders and mentors of students, gain additional experience of immersion in real activities, build up their potential and increase the efficiency of its use.

Thirdly, the results of students' project activities can be used when writing scientific articles, preparing reports at conferences of various levels (Abramova, 2019), performing work within the framework of grants, etc.

Fourthly, it is possible for students, undergraduates to carry out their final qualifying works in the project form (Kapustina, 2021).

This idea is supported by the rectors of a number of universities in the country and many experts (Schlegel, 2021). This can be regarded as a revolutionary change in the final certification of students in a higher educational institution. However, only in isolated cases a high-quality students' project can be made «from scratch» by graduates who have not previously been involved in project activities during their studies. In order for the final work performed a useful effect, and its results can be successfully implemented in practice, the project activities of students at the university should become systematic and begin from the first year of study (Odarich, 2017). The effective capabilities of the project-based teaching method make it very promising, but the formation of methodological support for its implementation is highly required (Zaripov et al., 2020).

Our study, which determines the effectiveness of project activities based on surveys of students and graduates of universities, characterizes the effectiveness of the university as a higher educational institution. At the same time, the number of projects declared in educational programs does not always coincide with the quality. In our research, we came to the conclusion that three or four serious major international projects per year for the university give a greater result in terms of the formation of practical competencies of students than 10-12 formal projects per year.

2 METHODS

The research methodology is based on a systematic approach and includes the methods of the general scientific group (analysis, synthesis, induction, deduction); as well as special methods: sociological survey method; statistical data analysis; method of content analysis of scientific literature on the research topic.

The empirical research methodology included three stages: the first stage consisted of a questionnaire survey of 1st year students (two groups of 25 people), the second stage included a questionnaire survey of graduate students (two groups of 25 people), at the third stage, we interviewed two groups of university graduates of 25 respondents. The representative sample consisted of 150 respondents.

All the obtained results were processed using the special Neural Designer program – a software tool for advanced analytics and includes tools for descriptive, diagnostic, predictive and prescriptive analytics (Korotaeva, 2020).

All the respondents' answers on the criterion «project influence on the development of professional practical competences» were converted into points (on a 10-point scale), based on the results of content analysis: from 1 to 3 - low level of influence of project activities; from 4 to 6 - an average level of influence and from 7 to 10 points - a high level of influence. For each of the received 150 questionnaires, we calculated the average score using the software. This made it possible to generalize and systematize the obtained qualitative data into quantitative indicators.

Students and university graduates were interviewed using questionnaire № 1.

Questionnaire № 1 (rate on a 10-point scale).

1. How interesting was the work on the project to you?
2. How deeply involved were you in the project?
3. How important was the knowledge that you gained from working on the project?
4. How satisfied are you with the results of your work in the project?
5. How much have you learned to work in a team?
6. To what extent are you ready to implement the acquired knowledge in your future professional activity?

Questions 1-2 are an indicator of motivation to learn; questions 3-4 are an indicator of self-realization; questions 5-6 are an indicator of the level of formation of professional competence.

Conditions for experimental work on projects are: 1st year students participated in 12 mini-projects, graduate students participated in 4 large projects with international

participation.

This made it possible to reveal how the number of projects and their quality affects three criteria: motivation, self-realization, professional competence.

These indicators underlie the effectiveness of any higher educational institution, since they directly affect the successful self-realization and professional career of university graduates.

3 RESULTS AND DISCUSSION

The first stage of the research gave the following results: 1st year students rated the project activities at the university not higher than the average level.

The survey results of students and graduates are presented in Figure 1.

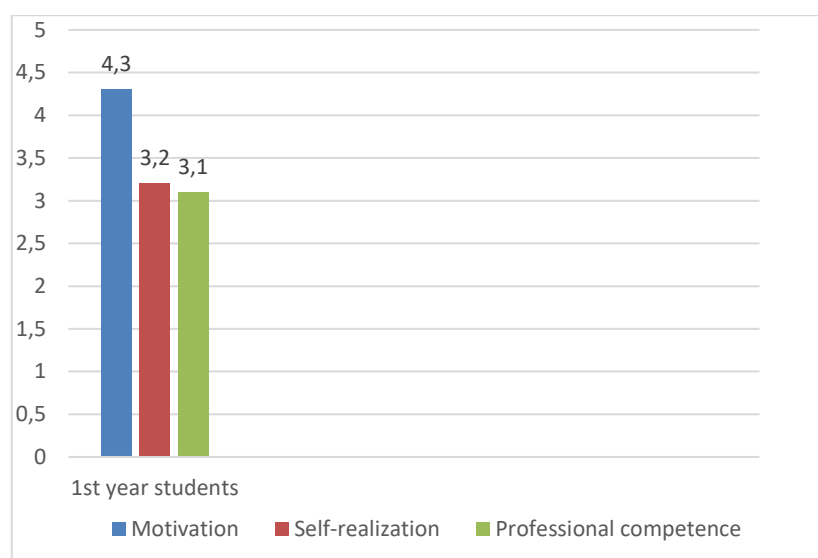


Figure 1. Project activity evaluation as an indicator of the university effectiveness by 1st year students (compiled by the author using the Neural Designer program)

According to the Figure 1, we pay attention to the fact that students' motivation is rather high, in comparison with the other two indicators. However, work on a large number of projects did not benefit the effectiveness of learning: 1st year students could not give the highest assessment of their project work by any criterion.

This means that the number of projects, announced in the curriculum of the university for the first year, does not correspond to the quality of education.

Most of the 1st year interviewed students noted that working on projects in such a number was very tedious and did not bring in-depth knowledge (12 projects per year, one project per month for 6 academic disciplines).

Master's students, who worked on only four projects a year, showed the following results: most of the respondents showed a high score for each of the criteria (Figure 2).

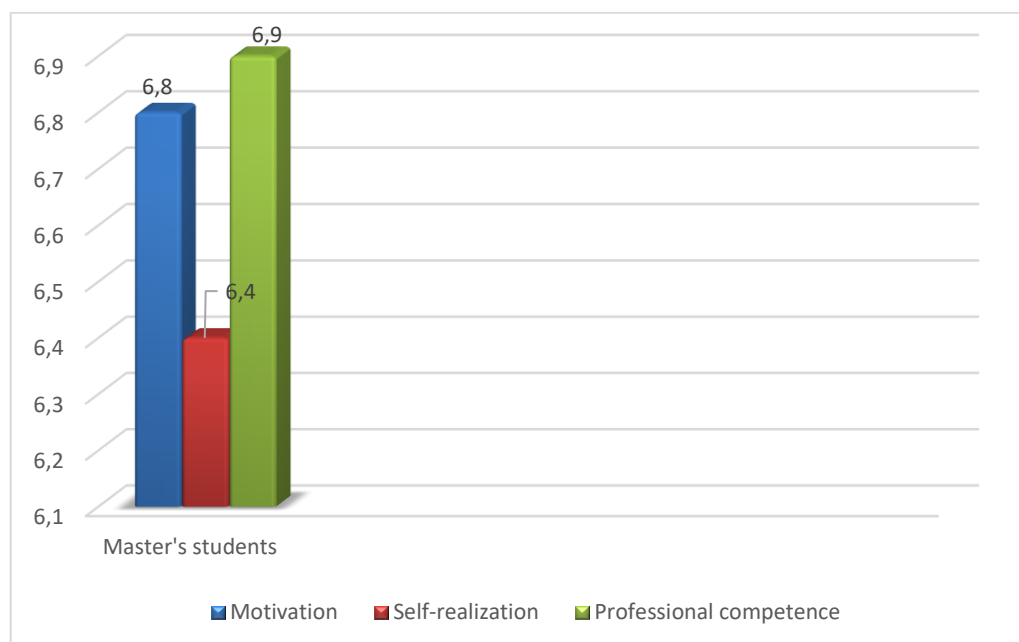


Figure 2. Project activity evaluation as an indicator of the university effectiveness by master's students (compiled by the author using the Neural Designer program)

The highest results were shown by the university graduates we surveyed (Figure 3). As it is shown in Figure 2, the masters' students rated their achievements at the threshold of a high level in the course of the project details. The highest of all criteria was the criterion of professional competence. That is, graduate students highly appreciated the educational potential of project activities for their professional training.

Moreover, since the students were not overwhelmed by a large number of short-term projects, but only worked on four large international projects per year, they were able to gain deeper knowledge of the topics developed in the projects.

Among the surveyed university graduates, we received more complete information about the potential of project activities and its benefits for the further professional activities of students and their employment. The results are shown in Figure 3.

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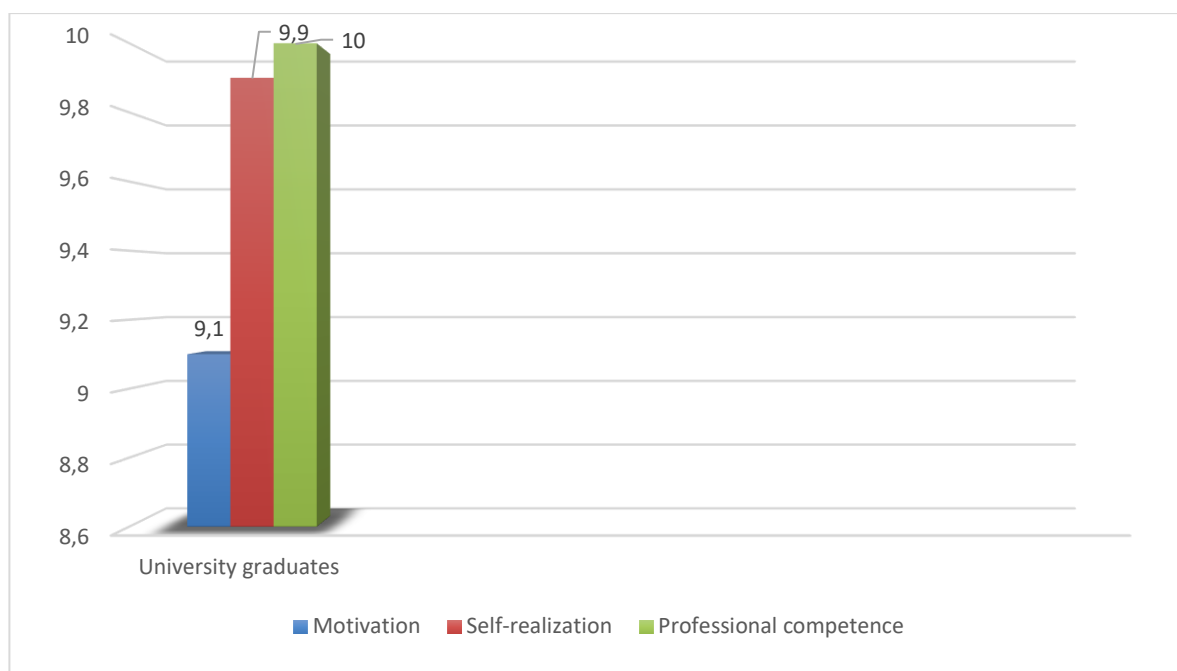


Figure 3. Project activity evaluation as an indicator of the university effectiveness by university graduates (compiled by the author using the Neural Designer program)

The results obtained allow us to say that the university graduates highly value their practical skills and knowledge acquired at the university over the years of study by the project method.

Most of the respondents in this group indicated that in their professional activities they often use the experience gained in project activities in the process of studying at the university. The practical use of the knowledge and skills gained while working on innovative projects allowed the university graduates to get good employment and get high self-realization in their professional activities.

For most graduates, working on innovative projects in the learning process provided an opportunity to gain broad advantages in the labor market, the ability to work effectively in a team and take leadership positions with their employer.

To get a clearer picture of the empirical study results, we conducted a comparative analysis of data obtained from a survey of students and university graduates. The summary chart is shown in Figure 4.

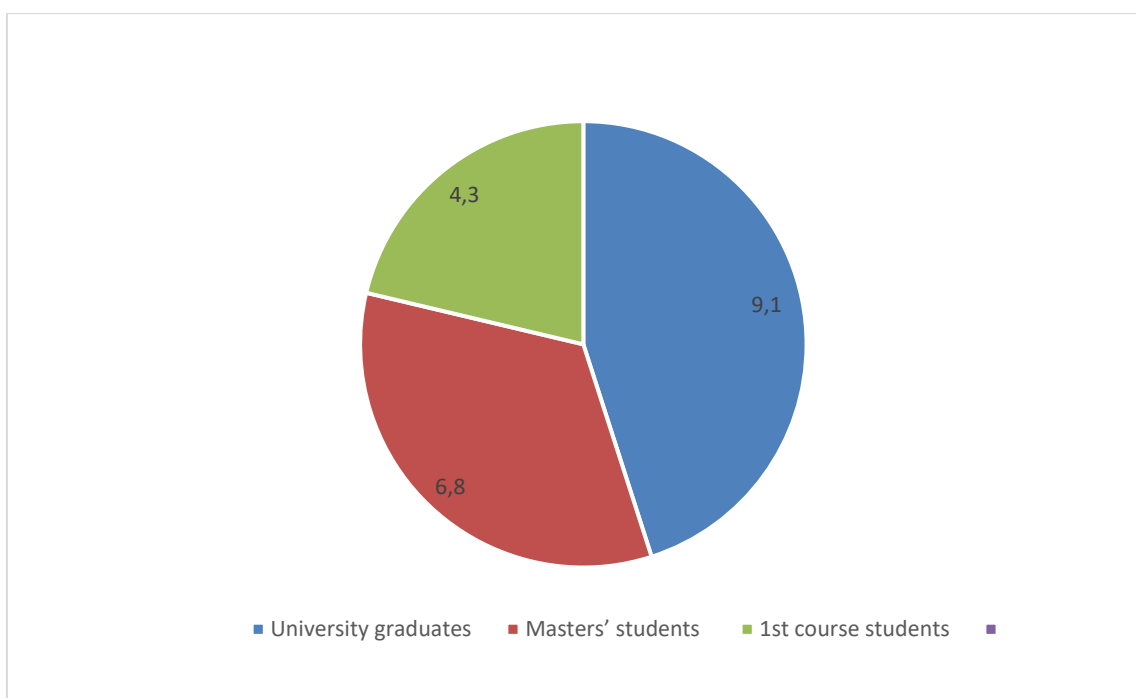


Figure 4. Project activity evaluation as an indicator of the university effectiveness by 1st course students, masters' students and university graduates (compiled by the author using the Neural Designer program)

As it can be seen in Figure 4, we found an interesting trend: the higher the course, the higher the motivation and professional competence. The highest score is given by university graduates.

The data we have obtained allow us to say that innovative project activity can serve as an indicator of the university's effectiveness according to three criteria: motivation of students and graduates, self-realization of students and graduates, as well as the professional competence of students and graduates.

The results we have obtained are of unmatched scientific value, since they allow us to assess the significance of an innovative project for the effectiveness of a university.

Researchers around the world are working to build a system of indicators that would give the most complete and reliable picture of the university's performance. Most developed countries have national research programs on this issue. It should be noted that domestic and foreign researchers of this issue with the same frequency use the concepts of «indicators» and «criteria» to measure the effectiveness of the university (Tinaut, 2020). The group of specialists of the seminar «Measuring the innovation activity of universities by indicators of technology transfer and innovative activity (TTI)», A. Tinaut, C. Ferrús-Clari, N. Falcó-Crespo, F. de Borja, P. Domínguez, J. Casaña-Granell noted that there is the following difference between the two terms: the role of indicators is to evaluate and indicators are to measure. Authors noted that measurable

indicator has a real result (Tinaut, 2020). Therefore, on our point, the most interesting are indicators that are amenable to metric assessment. Within the framework of this article, we used the term «indicator» to assess the development in the effectiveness of the university activities. For a comprehensive assessment of the university's activities, it is necessary to use not only project activities - one indicator but also an integral system of indicators. So we can not only most accurately and fully reflect the quantitative results of the activities of a higher educational institution, but also achieve a better understanding of the impact of the effectiveness of the university's activities on its other main types activities: educational and research.

Our results confirmed in data, obtained by an international research group, which for three years studied the impact of the project method on students' abilities and the effectiveness of their learning. The results showed that, according to the students themselves, the use of the project method increases their role and the degree of participation in the educational process, and has a positive effect on its results.

Our results are confirmed by the conclusions of such authors as M.A. Stupnitskaya, S.I. Alekseeva (Stupnitskaya, 2018). Such researchers as T. Schlegel, C. Pfister, D. Harhoff, U. Backes-Gellner (Schlegel, 2021:28) agree with theses of these authors.

In the works by E.K. Samerkhanova, L.N. Bakhtiyarova, A.V. Ponachugin, E.P. Krupoderova, K.R. Krupoderova (Samerkhanova, 2020), as in our study, three criteria of the effectiveness of the project activities in the university in the field of innovation are shown.

The tendency that we have identified for the growth of students' professional competence as they gain experience in innovative project activities is confirmed in the works by such authors as M. Kolhekar, M. Shah, A. Jadjav (Kolhekar, 2021). In general, it can be argued that our research substantially supplements the historiography of scientific work on the topic under study. The results and conclusions of our study can be the basis for the further development of criteria for a qualitative assessment of the effectiveness of Russian universities.

4 CONCLUSION

The key contribution of the research is that the article considered the innovative projects from the point of view of three criteria (motivation, self-realization, professional competence) for defining educational treatment at the university. It is determined that the project method is an indicator of the effectiveness of the university, as it allows to

overtake practical solution to the knowledge of the students in the learning process and fundamentally different from the methods traditionally used in it. Specific indicators are identified by which it is possible to assess the potential of the university, to judge the degree of achievement of strategic goals, the progress of the university along the trajectory of its development, quantitative and qualitative improvements in the functioning and development of the educational organization. An empirical study was conducted, the results of which were processed using a software tool for advanced analytics, including tools for descriptive, diagnostic, predictive and professional analytics.

Also the contribution is to create the background to form a system of indicators that gives a complete and reliable picture of university activity. It was found the higher level of education in the university the higher motivation for learning self-realization and professional competence of the students working at the innovative projects. The tendency for the growth of professional competence among the students is revealed as they gain experience in innovative project activities. Also they assume the underlying principles in the selection of the project. It is established that innovative project activity can serve as a multi-purpose indicator (qualitative and quantitative) to assess the effectiveness of educational activities at the university.

According to the research results, a direct relationship between the level of education and the motivation for learning among students was found. The higher the level of education at the university, the higher the motivation for learning, self-realization and professional competence of students working on innovative projects. Also, all the criteria: motivation, self-realization, professional competence are equally priority for students. It is established that innovative project activity is a promising indicator, a qualitative and quantitative indicator in assessing the effectiveness of educational activities at the university.

It is also determined that the fundamental principle of the selection of projects should be compliance with the content of the direction and profile of training students. Otherwise, the project, although it can bring a certain effect, including a practical one, will not ensure the formation of the required competencies of students. Their knowledge, skills and abilities will certainly increase, but this increase will not be related to the field of future professional activity. The second principle - the focus on the formation of competencies specified in the educational standard for a given area of training - is essentially a concretization of the first. The project should not only contribute to the growth of knowledge, skills and abilities of students, but also at the

same time bring some kind of positive practical effect in itself (the principle of focusing on obtaining a specific effect). This effect can be of economic, social, environmental, technological or other nature, or (which is most expedient) be combined.

Even if the project is predominantly theoretical in nature, already at the first stage of work on it, it is necessary to show how its results can be used in practice, either when working on subsequent projects, or already outside the university. In development of this provision, the following principle is proposed: the possibility of substantiating and evaluating the results and effectiveness of the project. It is necessary that the expected result can be formulated as concretely and, if possible, using quantitative indicators, as well as correlated with the projected costs. Otherwise, later it will be impossible to objectively assess to what extent the project has been implemented, what is the efficiency. Compliance with these principles requires a clear formulation of the project topic, so that within the framework of work on it, it would be possible to reach a tangible and measurable result on university effectiveness.

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