

This paper describes the conceptual apparatus for the formation of information spaces of executors of educational projects in a dynamic environment. A multiple model of identification of the executor of an educational project was developed, taking into consideration the competence approach and dynamics of the components of the information space. To assess the competencies of the executors of educational projects, three components are calculated: the grade of the executor's knowledge, the grade of the executor's performance, the grade of the executor's personal qualities. Based on the obtained grades, generalized assessments of the level of competence of each executor are formed. These grades for each executor of a particular educational project are used to determine the level of performance and potential of this project. To find a generalized grade of the project potential, the least square method was used to construct a regression line, which indicates a tendency to develop the competencies of project executors.

The stages of building information spaces of executors of educational projects in a dynamic environment were proposed. The hypothesis of the study that the progressive dynamic development of educational project executors has an impact on the potential of these projects was verified experimentally. To verify the described construction method, ten educational projects, which were implemented in the period from 2014 to 2020, were selected. The results indicate that the grade of the competencies of project executors recorded at the time of completion of a project almost completely coincides with the grade of evaluators after completion of the projects. The ranks obtained after the final evaluation of projects and the ranks according to calculated performance grades coincide by 40 %. Evaluation of projects is mainly focused on the reputation and performance of executors and does not sufficiently take into consideration the transformation of the competencies of executors during the implementation of projects

**Keywords:** information space, executor of educational project, multiple model, scientific communication

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# DEVISING A COMPETENCE METHOD TO BUILD INFORMATION SPACES FOR EXECUTORS OF EDUCATIONAL PROJECTS IN A DYNAMIC ENVIRONMENT

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## 1. Introduction

An important mechanism for stimulating the development of education and professional training is the creation of strategic partnerships and the organization of educational projects. These projects are at the heart of joint initiatives to develop innovative methods of collegial training, exchange of experience, and introduce new practices to improve the quality of education at all levels for relevant target groups. Competitive programs for the formation of strategic partnerships are actively implemented in the European Union (Erasmus+program) [1] and created outside this initiative by separate higher education institutions for the develop-

ment of educational activities. A single European space for research and innovation, including those in the educational field, is created within the European scientific space [2]. The strategic goals that determine the creation of this space are the implementation of reforms to promote digital transformation, expanding access to research of scientists with the possibility of sharing knowledge with partners [3].

Formally, educational projects are created and function in educational and scientific information spaces. These spaces consist of ordered objects or subjects, often with a multilevel structure defined by their dynamically changing identifiers. Each executor of such projects develops in his own information space, which accumulates information

about competencies, his productivity and, accordingly, provides material for assessing his potential in a particular area of activity. For a high-quality organization of implementation of educational projects, the development of methods for constructing information spaces of project executives plays an important role, taking into consideration competencies that are significant for a specifically directed project in a dynamic environment. That is why it is important to formalize the components of the information spaces of executors, which should be based mainly on objective assessments of their activities.

It should be understood that executors of projects are mainly individual subjects of educational and scientific activity since they are mostly employees of institutions of higher or vocational education. That is, their activities are not limited only to educational work, but also include scientific, methodological, organizational activities, etc. In view of this, it is necessary to highlight the competencies of project executors that are key to the effective implementation of project tasks. Since the information spaces of executors include all information about their activities, an important task is its formalization, taking into consideration the dynamics of the development of each executor. This is because an executor is transformed and developed in his own space, eventually acquiring new knowledge and competencies.

Creating a competent method for the formation of information spaces for executors of educational projects is a relevant direction. This will stimulate the development of innovative partnership cooperation in the educational sector, increase productivity and quality of educational and project activities in general.

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## 2. Literature review and problem statement

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Literary data should be analyzed taking into consideration three dimensions of assessing the competence of an individual subject of the educational activity or a project executor: knowledge assessment, performance assessment, assessment of personal qualities. Knowledge assessment involves the separation of the necessary knowledge and experience of the appropriate volume and their expression in quantitative form as a qualification of an individual subject of educational activity for the implementation of a particular educational project. Evaluation of productivity involves a quantitative interpretation of the performance of the project work of an individual subject of educational activity during a certain period in the direction of a particular project. Evaluation of personal characteristics involves taking into consideration the ability of a subject to effectively carry out project activities in terms of attitude to work, individual traits, sociability, etc.

Paper [4] describes the properties of structural models of competencies in project management. The object of research in paper [4] is a model of competencies in the field of professional project management, proposed by the International Project Management Association [5]. To determine the properties of structural models of competencies, the method of studying the matrices of contiguity of directed graphs was used. However, the disadvantage of the proposed method is the insufficient consideration of the specifics and sequence of project tasks, which can lead to incorrect interpretation of the results, even if it is based on the current version of the international standard. Nevertheless, the standard [5]

and the standard [6], reflecting the peculiarities of competence management, indicates that the qualifications of a project manager and its executors directly correlate with the effectiveness of a project. In research [6], these factors are determined, but not used. Today, the international standard ICB4 [7], which determines the competence of project managers, programs, and portfolios, is in force. Paper [8] describes the developed method for creating a project team that takes into consideration the project requirements, the peculiarities of individual candidates, and the general competencies of a team as a whole, as well as the limitations of a project in terms of budget and complexity. The stages of building a project team in paper [8] are maximization of the competencies of executors directly and maximization of competencies taking into consideration the time and budget constraints of a project. However, in paper [8] the set of competencies of executors is considered static and is fixed at the time of evaluation.

The network approach to the construction of the project team is considered in article [9]. To do this, an analysis of social networks that reflect the relations between executors is used. In research [10], a social network is used for this, taking into consideration the reputation of executors. Paper [11] describes an individually oriented method for selecting subjects of scientific activity as executors of scientific and educational projects, taking into consideration the productivity of their scientific activities in the past and taking into consideration the structure of projects. However, the approaches described in papers [9–11] do not take into consideration the competence of potential executors but are based only on some components that determine the competence of the executor of an educational project. It should be understood that competencies tend to change over time. Accordingly, the mechanisms of the development and erosion of competencies in an innovative project are described in research [12].

Paper [13] describes the concept of construction of information spaces of subjects of scientific activity, based on the assessment of scientific performance. That is, only the performance component is taken into consideration, which, as already indicated, is one of the parts that forms the competence of a project executor. Research [14] already uses a set of competencies of potential executors to form a project team but does not take into consideration the personal characteristics of executors and their performance. The method of expert evaluation for the formation of teams is considered in article [15], the article does not address the management of a project. Consideration of management personnel to improve the efficiency of project team management based on the use of educational-oriented project-vector management methodology is described in paper [16]. Construction of an info-communication system for the implementation of this methodology to assess the performance of subjects of scientific activity was described in research [17]. However, papers [16, 17] deal with a comprehensive assessment of the activities of higher education institutions, which takes into consideration the educational component.

In the context of building information spaces for executors of educational projects, the problem of taking into consideration the dynamics of transformation of executors and their connection with the goals of a particular project is unresolved. That is why the research objectives are to develop a multiple model to identify the executor of an educational project in a dynamic environment and highlight the key stages of building its information space.

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### 3. The aim and objectives of the study

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The purpose of this study is to develop a competent method for the formation of information spaces for executors of educational projects in a dynamic environment. This will provide an opportunity to assess the level of competence of project executors, as well as to determine the level of performance and potential of projects, specifically, in the field of education.

To achieve the aim, the following tasks were set:

- to describe the basic conceptual apparatus that is behind the formation of information spaces for executors of educational projects;
- to develop a multiple model of identification of the executor of an educational project, taking into consideration the competence approach and dynamics of the components of the information space;
- to form the stages of building information spaces for executors of educational projects in a dynamic environment.

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### 4. The study materials and methods

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Ensuring the effective implementation of educational projects depends on understanding the principles of formation and change of components of information spaces of the executors of these projects. To create multiple models of identification of information spaces of executors of educational projects, the theory of sets was used. System analysis was used to describe the parameters of the competencies of project executors.

To find a generalized grade of the project's potential, the least square method was used to approximate the regression lines, indicating the trend of the project development.

The hypothesis of the study is that the progressive dynamic development of the competencies of the executors of educational projects has an impact on the potential of these projects.

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### 5. The competence method for the formation of information spaces of executors of educational projects

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#### 5.1. Basic conceptual apparatus, which is the basis for the formation of information spaces of executors of educational projects

An educational project is an orderly totality of processes, which is represented by work packages or stages and is integrated into the structure of a project. Processes have certain limitations in resources, time, and conditions for achieving a new quantitatively or qualitatively measurable value in the field of education. A project is a system that has its own life cycle and requires an adequate level of management. Management of an educational project is the process of organizing, planning, control over the quality of implementation of project tasks in accordance with the structure of a project to achieve the goals of a project in the field of education. An educational project functions due to the achievement of goals by the project executors, each of which is dynamically developing in their own information spaces. The components of the information spaces of the executors of educational projects are identifiers that determine their competence in the implementation of educational projects and are transformed in the process of activity of executors in this project

or beyond it. That is why such information spaces should be considered not statically, but dynamically taking into consideration possible transformations in time.

Consider three dimensions of assessing the competencies of project executors: knowledge assessment, assessment of performance and personal characteristics of executors. This is explained by the fact that to assess the potential executors of an educational project, these characteristics are sufficient to rank executors and they are measurable. When assessing knowledge, we highlight a list of levels of knowledge and experience regarding specific project tasks related to the relevant work package, for example, availability of certificates for project management, participation in seminars, conferences. The specified list of criteria is formed by the project manager when selecting executors. Evaluation of the performance of an executor provides for a quantitative interpretation of the effectiveness of project work for a certain period when it comes to an educational project. For example, the number of projects in which an executor participated, the role in them, the existence of scientific articles within the project topics in the relevant journals. Evaluation of personal characteristics involves taking into consideration the ability of the subject to carry out activities with high quality: attitude to the implementation and timeliness of the implementation of specific tasks of the work package, individual features of an executor, sociability, etc. The choice of executors of an educational project is a process aimed at forming an effective team for the implementation of a project from specialists in educational activities. To do this, you need to form information spaces of potential executors. This can be done based on the competence method.

The result of an educational project is to obtain new fundamental or applied knowledge in the field of education. This process is collective. Accordingly, the evaluation of a project, considering the information space of a particular executor of an educational project, for example, a manager, without taking into consideration the spaces of other executors, is incorrect. It should also be understood that educational activity is impossible without scientific activity. These are two complementary processes that, together with the results of activity, form the informational educational, and scientific space [13].

That is, according to the described concept, the information space of the executor of an educational project includes an executor and retrospective information from the identifiers that determine these executors and are formed based on the results of their educational activities and competencies. The hypothesis of the study, as noted, is that the progressive dynamic development of the competencies of executors of educational projects has an impact on the performance of these projects.

Project productivity is a quantitative indicator of performance. This concept is introduced to determine the quantitative measure of project achievements in accordance with the set tasks. The potential of a project is determined by the accumulated performance of project executors and indicates the possible values that can be obtained if research in this project continues.

#### 5.2. Multiple models of identification of executors of educational projects

Let us assume that  $E = \{e^1, e^2, \dots, e^m\}$  is the set of executors of educational project  $A$ ,  $m$  is the number of executors. Executors are mostly individual subjects of the educational and scientific activity: the staff of institutions of higher edu-

cation and vocational training. Each element of set E matches three competencies  $K(t)$ ,  $P(t)$ ,  $I(t)$ , the values of which change discretely over time. If  $t_0, t_1, \dots, t_{w-1}$  are moments of time at which the values of specified indicators are recorded,  $t_0$  is the initial moment of time. Then it is possible to write down time series of grades of executor  $e_j$ :

$$\begin{aligned} K^j &= (K_0^j, K_1^j, \dots, K_{w-1}^j) = \\ &= (K^j(t_0), K^j(t_1), \dots, K^j(t_{w-1})), \\ P^j &= (P_0^j, P_1^j, \dots, P_{w-1}^j) = (P^j(t_0), P^j(t_1), \dots, P^j(t_{w-1})), \\ I^j &= (I_0^j, I_1^j, \dots, I_{w-1}^j) = (I^j(t_0), I^j(t_1), \dots, I^j(t_{w-1})), \end{aligned}$$

where  $K^j$  is the discrete-time series of evaluation of knowledge of executor  $e_j$  of educational process  $A$  in the educational sphere according to the tasks of project  $A$ , that an executor must perform,  $P^j$  is the discrete-time series of evaluation performance of executor  $e_j$  of educational project  $A$ ,  $I^j$  is the discrete-time series of evaluation of personal characteristics of executor  $e_j$ ,  $j = \overline{1, m}$ .

Thus, executor of educational project  $A$  at the  $i$ -th moment  $i = \overline{0, w-1}$  is represented by a totality of identifiers that determine it:

$$e_i^j = (K_i^j, P_i^j, I_i^j), \quad j = \overline{1, m}. \quad (1)$$

These identifiers are not limited to setting the information space of the executor of an educational project. However, after calculating these parameters, it is possible to solve problems that will enhance the project performance. Assessments of executors or competencies obtained in educational projects in the process of their implementation form a system of values acquired by executors in the process of their own activities.

If  $F: e^j \rightarrow \mathbb{R}^n$ , it is possible to form a discrete-time series for educational project  $A$ , which are obtained due to the activity of executors  $e^j$ . That is the chain of values for project  $A$ , which is given by executor  $e^j$ , takes the form:

$$\{F(e^1), F(e^2), \dots, F(e^m)\}.$$

Accordingly, the total value, which educational project  $A$  will receive, consists of the sum of values for each executor, that is:

$$F_A = \sum_{j=1}^m F(e^j).$$

Having a system of competencies during the time period  $i = \overline{0, w-1}$  for each project executor of project  $A$ , it is possible to normalize the grades of competencies:

$$\overline{K}_i^j = \frac{K_i^j - \min_{j=1, m} K_i^j}{\max_{j=1, m} K_i^j - \min_{j=1, m} K_i^j},$$

$$\overline{P}_i^j = \frac{P_i^j - \min_{j=1, m} P_i^j}{\max_{j=1, m} P_i^j - \min_{j=1, m} P_i^j},$$

$$\overline{I}_i^j = \frac{I_i^j - \min_{j=1, m} I_i^j}{\max_{j=1, m} I_i^j - \min_{j=1, m} I_i^j},$$

and find the mean value of grades of executors of project  $A$  at each moment of time  $i = \overline{0, w-1}$ :

$$\tilde{K}_i = \frac{1}{m} \sum_{j=1}^m \overline{K}_i^j, \quad \tilde{P}_i = \frac{1}{m} \sum_{j=1}^m \overline{P}_i^j, \quad \tilde{I}_i = \frac{1}{m} \sum_{j=1}^m \overline{I}_i^j.$$

The average grade of competences  $\tilde{A}_i$  for all executives and criteria at each moment  $i = \overline{0, w-1}$  are determined from the formula:

$$\tilde{A}_i = \frac{1}{3} (\tilde{K}_i + \tilde{P}_i + \tilde{I}_i),$$

then we will have  $w$  points  $\{(i+1, \tilde{A}_i), i = \overline{0, w-1}\}$ , in this case the relations between the points are established from the formula:

$$\tilde{A}_i = a + b(i+1) + \varepsilon_i, \quad (2)$$

hence the task of minimizing the sum of square errors arises

$$\sum_{i=0}^{w-1} \varepsilon_i^2 = \sum_{i=0}^{w-1} (\tilde{A}_i - a - b(i+1))^2 \rightarrow \min.$$

Hence the estimate of slope  $\hat{b}$  for line (2) is determined from the formula:

$$\hat{b} = \frac{\text{cov}(i+1, \tilde{A}_i)}{\text{var}(i+1)},$$

where cov is covariance, var is variance.

Then an estimate  $\tilde{O}_A$  of the performance of educational project  $A$  can be determined by the latest fixed estimate of competencies of project executives:

$$\tilde{O}_A^1 = \tilde{A}_{w-1} \cdot 100\%. \quad (3)$$

The potential of a project, taking into consideration the growth of the level of competencies of project executors during its implementation, is determined as a normalized magnitude of the angular coefficient of the line, which approximates the trend of changing the indicators of the level of competence of project executors:

$$\tilde{O}_A^2 = \frac{1}{5} \arctg \hat{b} \cdot 100\%. \quad (4)$$

Normalization is calculated by the maximum based on the numerator of the ratio that corresponds to the derivative of the equation of the straight line  $\tilde{A}_i = \frac{1}{5}(i+1)$ , by the abscissa axis.

If it is necessary to estimate the performance and potential of educational projects  $\{A_1, A_2, \dots, A_r\}$ , for each of them we calculate grades according to (3), (4), in other words,  $\tilde{O}_{A_k}^1, \tilde{O}_{A_k}^2, k = \overline{1, r}$ . An educational project has the highest performance if

$$k^1 = \arg \max_{k=\overline{1, r}} \tilde{O}_{A_k}^1,$$

where  $k^1$  is the number of the educational project that has the highest performance,  $k^1 \in [1, r]$ .

An educational project has the greatest potential if

$$k^2 = \arg \max_{k=\overline{1, r}} \tilde{O}_{A_k}^2,$$



where  $k^2$  are the numbers of educational projects that have the highest potential,  $k^2 \in [1, r]$ .

The projects, the potentials of which do not exceed the fixed threshold corresponding to the evaluation system, are considered to be the ones that may be inappropriate to finance.

**5. 3. Stages of building information spaces for executors of educational projects in a dynamic environment**

The stages of the formation of information spaces of executors of educational projects were determined. The first stage is the calculation of grades of the competencies of project executors, which includes: the grade of the executor's knowledge, the performance grade, and the grade of personal qualities:

1. Assessment of executor's knowledge: availability of project management certificates, participation in seminars, conferences, etc. The grade is calculated automatically by the system: certificates of executors are loaded into the system, according to which the quantitative indicator is calculated. Compliance with certificates and documents is checked by an expert.

2. Assessment of the executor's performance: the number of projects in which the executor participated and his role in them, availability of scientific articles within the project topics in the relevant journals, etc. The grade is calculated automatically by analyzing portals of scientometric databases and national libraries. More details about the method for assessing the performance of executors of educational projects are described in paper [18].

3. Assessment of personal characteristics: attitude to execution and timeliness of specific tasks of the work package, individual features of an executor, sociability, etc. The survey was conducted according to the OPQ system.

The level of competence of executors is calculated every year or quarterly. Updated data are added to the previous ones. Thus, a trail with the grades of the levels of competencies of executors or a time series that meets the purpose of an educational project, in which they participate, is formed. Time series of grades of the competencies of executors are important for the formation of the organizational and functional structure of new educational projects, which will include these executors. Depending on the type of educational project, several time series of different lengths can be stored in the information space of an executor at the same time. If an executor joins a project, the time series of which has already been formed in the information space of an executor, the data of this series can be used to assess the potential of an executor.

To verify the described method, ten educational projects, which were implemented at Yancheng Polytechnic College for the period from 2014 to 2020, were selected. The duration of the projects is 3 years. On average, from 5 to 8 executors participated in each of the projects. Each executor was analyzed, and their competence grades were calculated during the implementation of projects. For the first component of the executor's competence, the grade of the level of knowledge, it was calculated how many certificates of advanced training courses, diplomas of graduation were obtained by executors within the framework of the project topic. The performance grade was also calculated as an objective indicator by counting the total number of scientific publications that were published by project executors within its field. The number of reports at conferences on the project, the number of workshops and seminars, etc. were also taken into

consideration. The third indicator of competence, the grade of personal characteristics of an executor, was determined by a survey of other project participants working together with this executor, according to the classic professional Occupational Personality Questionnaires [19]. All grades of competencies were normalized in the segment  $[0, 1]$ , where 0 is the lowest score of the parameter, and 1 is the highest score. The grades were recorded every six years, respectively, for each project, six assessments were obtained for each criterion for each executor. The calculated mean values of grades for educational projects (I-X) during their implementation (6 periods), normalized to the maximum in the segment  $[0, 1]$ , are shown in Fig. 1–10. The first grade of project performance (4) is determined as the last total grade for each project. To calculate the second grade (5), an analytical view of regression lines was found using the least square method for each project and angular coefficients of the lines were calculated. The results were compared to the grades of each project, which were given after its completion based on the results of the final grade as a percentage (Table 1) using the scale:

- 1. A – 90–100 %;
- 2. B – 80–89 %;
- 3. C – 70–79 %;
- 4. D – 60–69 %;
- 5. F – 0–59 %.

The results of verification indicate that the grade of the competencies of the project executors, which was recorded at the moment of the project end, almost completely coincides with the grade of the evaluator after the project completion (Table 1). However, the grade, taking into consideration the trend of an increase in the competence level of project participants, differs significantly from the grades of evaluators, although there is a coincidence in some positions. This indicates that the grade of a project is mainly focused on the weight of each executor, his reputation, performance, accumulated over time. However, the rapid development of each executor personally in a particular project, his transformation, which enriches the project with relevant values, were not sufficiently taken into consideration by the evaluators.

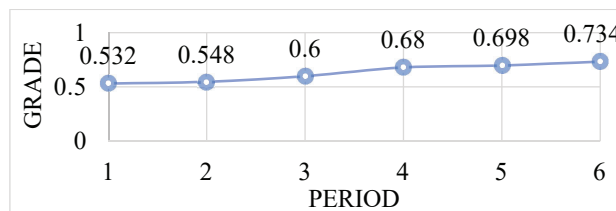


Fig. 1. Mean values of the grades of competencies of executors of project I

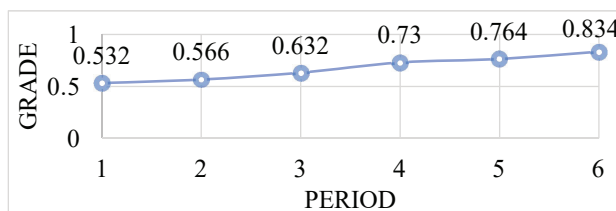


Fig. 2. Mean values of the grades of competencies of executors of project II

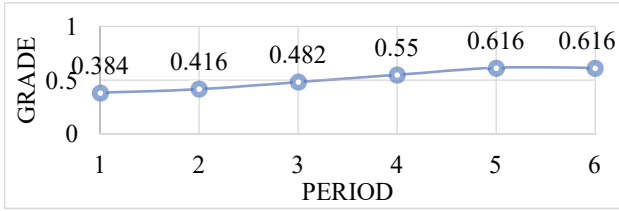


Fig. 3. Mean values of the grades of competencies of executors of project III

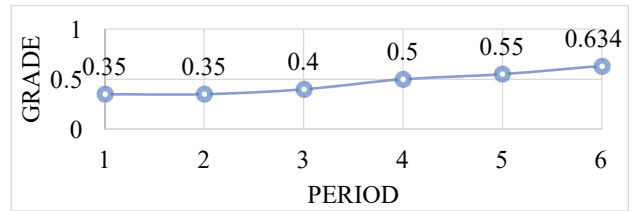


Fig. 9. Mean values of the grades of competencies of executors of project IX

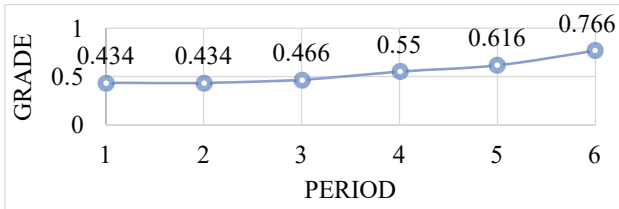


Fig. 4. Mean values of the grades of competencies of executors of project IV

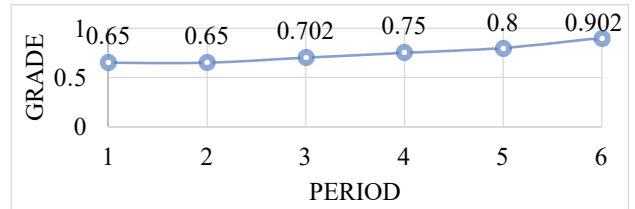


Fig. 10. Mean values of the grades of competencies of executors of project X

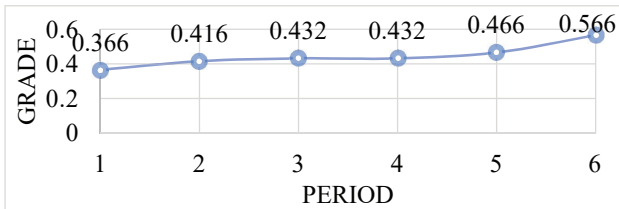


Fig. 5. Mean values of the grades of competencies of executors of project V

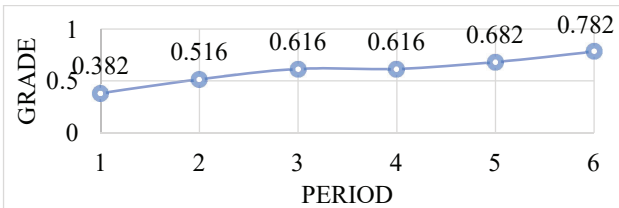


Fig. 6. Mean values of the grades of competencies of executors of project VI

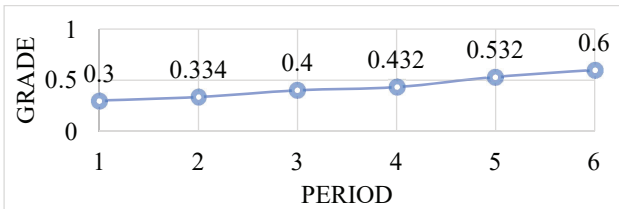


Fig. 7. Mean values of the grades of competencies of executors of project VII

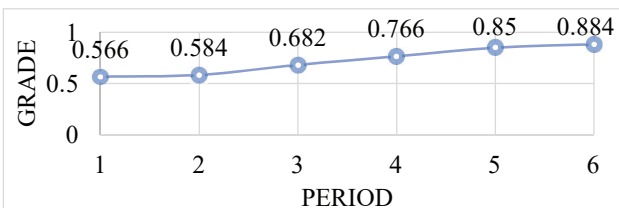


Fig. 8. Mean values of the grades of competencies of executors of project VIII

Table 1

Comparison of the grades of educational projects based on the results of the final assessment and grades of the competencies of executors, calculated by (3), (4). Projects that received a grade above 60 % are bolded

No. of educational project	$\tilde{O}_A^1$ (3) and rank $R(\tilde{O}_A^1)$		$\tilde{O}_A^2$ (4) and rank $R(\tilde{O}_A^2)$		Final grade $O$ and rank $R$		$ R - R(\tilde{O}_A^1) $	$ R - R(\tilde{O}_A^2) $
	grade (%)	rank	grade (%)	rank	grade (%)	rank		
I	73,4	6	22,0	9	67	4	2	5
II	83,4	3	31,5	4	73	3	0	1
III	61,6	8	26,1	7	55	7	1	0
IV	76,6	5	32,7	3	60	6	1	3
V	56,6	10	16,4	10	47	10	0	0
VI	78,2	4	35,7	1	65	5	1	4
VII	60,0	9	30,4	5	48	9	0	4
VIII	88,4	2	35,3	2	78	2	0	0
IX	63,4	7	30,3	6	51	8	1	2
X	90,2	1	25,1	8	79	1	0	7

**6. Discussion of results of studying the formation of information spaces of executors of educational projects**

The developed multiple model of identification of the executor of an educational project makes it possible to present it using a totality of identifiers (1). This makes it possible to take into consideration the dynamics of the components of information space when determining the performance of an educational project (3) and its potential (4).

Chapter 5.3 describes the method that determines the stages of building information spaces for executors of educational projects in a dynamic environment. The results of the application of the method for building information spaces are shown in Fig. 1–10. The result of the verification of the method for educational projects at Yancheng Polytechnic College (Table 1) showed that the grade of the competencies of project executors obtained according to the proposed

method correlates with the grade of evaluators after the project completion with a coefficient of 0.97.

The advantage of the proposed method is that the grade of competencies of the project executors is considered in dynamics, unlike paper [8], where these grades are considered static since an executor also develops along with the project. This reveals the possibilities of studying the trend of increasing the level of competence of executors during the project implementation, taking into consideration all components of competencies. This also makes it possible to analyze the potential and performance of an educational project, taking into consideration the change in the level of competence of executors. The development of a multiple model for identifying the executor of an educational project in a dynamic environment and highlighting the key stages of building its information space made it possible to quantify trends in changing the level of competencies of project executors. This completely solves the problem of taking into consideration the dynamics of transformation of executors and their relation to the goals of a particular project in the context of building information spaces for project executors. The result is in line with paper [7], which states that the magnitudes of the level of competence of executors have a direct impact on the effectiveness of projects in general.

The limitation of the study is that in order to calculate quantitative assessments of competencies, it is necessary: to assess the level of knowledge, calculate the number of certificates, conduct testing with a certain frequency. To evaluate performance, if performance is determined by publishing activity, you need to collect data from the international scientometric database Scopus, WoS, Orcid, Publons, etc. Citation data are presented in scientometric databases and communities of CrossRef academic publishers, etc. To assess personal qualities, it is required to conduct a survey on the OPQ system or in another way. Without automating this process, this approach to evaluation is cumbersome. This study develops an information system that makes it possible to automatically collect data on the first two components of competencies, writing down the result in the profile of executors of educational projects. For the third component, executors are periodically (every 6 months) invited to take a test that complements the assessment of the competence of each project executor, holistically taking into consideration all its components.

The constructed method for identification of information spaces of executors of educational projects in a dynamic environment offers opportunities for a comprehensive study of the connection of the level of competence of executors and their changes in dynamics with the project performance as a whole.

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## 7. Conclusions

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1. The conceptual apparatus used in the competence method of formation of information spaces of executors of

educational projects in a dynamic environment was developed, which makes it possible to systematize information and formalize the components of spaces, providing them with quantitative interpretation, and explore in dynamics. This made it possible to assess the performance and potential of educational projects and show the relation of the level of competence of executors with the project performance as a whole.

2. A multiple model of identification of information spaces of executors of educational projects was developed. The components of the competencies of the executors, which include assessment of the knowledge, performance, and personal characteristics of project executors, were identified. This makes it possible to set the information space of an executor through a trio of quantitative identifiers and display development through discrete time series. Formal ways of calculating the project performance and potential were described, taking into consideration the grades of the level of competence of project executors in a dynamic environment. The calculated potential of projects is an objective criterion for project management, which is important for the distribution of funding.

3. The stages of the formation of information spaces of executors of educational projects were determined. The key task is to calculate the grades of the competencies of project executors, which include: the grade of the executor's knowledge, the performance grade, and the grade of personal qualities. The level of competence of executors is calculated every year. The updated data are supplemented with the previous ones. Thus, a trail with the grades of the levels of competencies of executors, which meet the goal of an educational project in which they participate, is formed. Verification of the obtained results made it possible to prove the hypothesis of the study of the relation of the level of competence of project executors with the grade of project performance. The ranks obtained after the evaluation of ten selected projects and the ranks according to calculated performance grades coincide by 40 %, and the rank difference does not exceed 2 units. However, as a result, it was found that during the evaluation of projects, the trend of increasing the level of competence of project executors in the process of its implementation is insufficiently taken into consideration. This characteristic makes it possible to assess the potential of educational projects, which is important for their further funding at the level of the state or that of a certain region.

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