Project management in the system of education

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Abstract. The purpose of this study is to identify universal methodological characteristics and general aspects of project management in the field of education (general principles, strategy, approaches, terms). The methodological conditions for the effectiveness of the preparation and use of the project are the relationship and interdependence of three approaches: a systematic approach that focuses on the implementation of the principle of reasonable sufficiency in the distribution of structural components in the organization; a situational approach that takes into account the characteristics of the external environment as a significant factor influencing the direction and content of changes in the organization; a behavioral approach that orients designers to understand the need to create conditions that have a beneficial effect on the behavior of people in organizational structures. Project management in education is a method of purposeful influence on the structure and processes taking place in the education system in order to transfer it to a qualitatively new state through a set of measures and actions. It is established that the project management model in education is a set of sequential actions at all stages, which ensures high efficiency of the process of finding a correspondence between the strategy of the organization in society and its basic components.

1 Introduction

The relevance of studying the problem of Project Management (PM) in the system of education is due to a number of factors. First, the need to develop forecasts and strategies for its development and modernization comes to the fore of the educational policy of modern Kazakhstan, and therefore the demand for project technologies is growing. Secondly, the modern education system is experiencing a need for professional management, which is confirmed by such a new trend as attracting project managers to professional activities in educational organizations. Third, there is a growing interest of managers and teachers of educational organizations, employees and managers of educational management bodies, scientific and methodological organizations in innovative activities in the logic of projects, etc. Educational institutions changed in several ways:

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new management approaches, lower level of dependence on governmental standards in terms of finance and educational point of view as well [1]. Hence, it becomes necessary to change the way educational institutions are managed.

The actualization of the project management in education in practice and the study of this phenomenon in theory will contribute to more effective management of the modernization of Kazakhstan's education system. The project approach to education management, according to researchers, allows not only to define the project goals and justify it, but also to identify the structure, its main stages, specify the necessary sources of funding, project deadlines, draw up a schedule for implementation, calculate resources, calculate costs, analyze risks, and organize project implementation. It is important, among other things, to correctly select a team and ensure control over the implementation of the project.

The purpose of the article is to substantiate the essence of project management in the education system and experimental confirmation of the techniques of their implementation.

The goal led to the formulation of such research objectives:

─ To identify the essence of project, which is a way of innovative changes in the education management system.
─ To substantiate the specifics of project management in the education system.
─ To develop and experimentally test a model of project management.

2 Material and methods

A review of the literature on project management theory defines many different definitions of the concept of “project”. The most general interpretation, highlighted from various scientific sources: “A project is a temporary enterprise designed to create unique products or services” [2].

“Temporary” here means that a project can have both a beginning and an end (if the goals are achieved or they are unattainable), and “unique” includes products or services that differ significantly from similar ones.

There are also detailed interpretations of the concept of “project”. According to one of them, the project necessarily represents a purposeful, pre-designed and planned creation (or modification) of various physical or social objects, processes, technical or organizational documents, various resources (material, financial, human, etc.), management decisions and specific measures to implement them [2]. Other concepts are also important for the problem under study. These are “project management”, “project management objects”, “project management subjects”, “project management processes”, etc. In the identified scientific sources, project management is considered as a set of processes (initiation, planning, execution, control, completion) and functional areas of management (integration, content, timing, cost, quality, resources, communications, risks, supplies and contracts) [3]. The concept of “project management” is interpreted by researchers in the same way as the methodology of organization, management, planning and coordination of resources (human, financial, economic and logistical), based on the use of effective management technologies aimed at achieving the desired results in terms of composition, quality, volume of work, its cost and time. You can also find in the scientific literature a point of view on project management as an art [4].

In the theory of the project in education, this situation is called a project situation (Fig. 1): the need for a project arises when there is a situation (1) that does not satisfy, and it should be changed. In this regard, the project assumes a description of a possible desired future (2), which is based on a change in a contradictory situation, and the project clearly outlines the sequence of steps to achieve it.
The researchers determined that the project process, including in the field of education, begins after determining the problem situation and formulating the problem itself. To formulate the problem, it is necessary to select a focus (several focal points) [3-6].

The project phase in the conditions of the education system is considered by some researchers as modeling, and the model itself becomes an image of the desired future, a way of organizing correct practical actions. Thus, models in the project process in education can be normative in nature, serve as a standard or a model. Then comes the phase of the educational project, which includes a number of stages: decomposition, aggregation, conditioning and program development [2, 3-6].

Based on the studied scientific literature, it was found that the concept of “project team” is one of the key concepts in the field of project management. The analysis of approaches to the formation of project teams in the national management system helped to identify the most common and actively used in science and practice:

— the approach to setting goals helps to develop the ability of team members to navigate when choosing and implementing goals;

— the interpersonal approach is aimed at improving interpersonal relations in the team as an important condition for the effectiveness of its activities;

— the role-based approach is based on the importance of the team's requirements in the role plan;

— the approach to problem solving determines the sequence of developing procedures for solving problems that stand in the way of achieving the team's goal, etc. [3-6].

Analysis of research on the problems of project activity shows that the system-based, behavior-based and situation-based approaches act as its methodological foundations.

The authors believe that all these approaches are competent, interesting and successfully implemented in the field of education. It may also be promising to study an adaptive approach to the formation of project teams as one of the most relevant approaches in the context of active transformation processes, active changes in the socio-economic sphere of Kazakhstan and adaptation to them. It was based on the idea of accepting the fact that an adaptive approach is widely used in management [7], which can be applied both to the system as a whole and to its individual elements.

The scientific literature review offered us the possibility to determine the main differences between project groups and project teams, which is an important aspect in the management of educational projects, since the effectiveness of the team is higher than the effectiveness of the group (Table 1). Table 1 data show the clear benefits of a team approach to project management in education. Therefore, it is necessary to define the main elements of the process of forming project management teams in education.
Table 1. Main differences between groups and teams in project activities.

<table>
<thead>
<tr>
<th>A distinguishing criterion</th>
<th>Project group</th>
<th>Project team</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leadership</td>
<td>Having a strong, bright leader</td>
<td>Leadership is shared among team members</td>
</tr>
<tr>
<td>Responsibility</td>
<td>Personal responsibility</td>
<td>Personal and mutual responsibility</td>
</tr>
<tr>
<td>Purpose</td>
<td>The purpose of the group is the same as the purpose of the organization</td>
<td>The team has its own purpose</td>
</tr>
<tr>
<td>Outcomes of activity</td>
<td>Outcomes of individual activity</td>
<td>Outcomes of collective activity</td>
</tr>
<tr>
<td>Productivity assessment</td>
<td>Indirect assessment, based on the financial performance of the entire business</td>
<td>Assessed directly by the collective outcome produced</td>
</tr>
<tr>
<td>Decision making</td>
<td>Discusses, decides and delegates</td>
<td>Discusses, makes a decision and executes it together</td>
</tr>
</tbody>
</table>

Scientific sources have identified the main principles of team building, which are appropriate to consider in relation to project management teams in education.

The principle of core values implies that all team members have the intention to subordinate their own purposes to common ones;

the principle of harmony - according to it, the distribution of roles in a team is based on personal characteristics and professional competencies, as well as professionally important qualities inherent in its members, which contributes to the ability to reach consensus and resolve conflicts;

the principle of trust - a team member must be open and honest with others, as well as have access to meaningful information to get a high-quality project result;

the principle of equality - project team members adhere to the same rules and regulations, and also have equal rights, especially when expressing personal opinions;

the principle of adaptability involves the redistribution of roles of project team members, including the change of leaders, taking into account changes in the external environment, as well as in order to prepare successors or new leaders;

the complementarity principle means that the weak qualities of one of the team members must overlap with the strengths of the other [8-10].

Thus, the principles of core values, trust, and equality are the main principles for creating an organizational culture and rules for effective interaction in a team, and taking into account the principles of harmony, adaptability, and complementarity, a team is built. For this purpose, it is necessary to choose such methods of team building that would be acceptable for project management.

By analyzing scientific sources, it was found that there are three levels of organization of team building processes. They can also be applied to education.

the level of individual counseling consists in managing difficult situations that arise in the field of education, through consultations.

The level of direct team building is an active involvement in planning changes in the field of education: a team is formed as a group of two or more people who interact and depend on each other, who are focused on a common goal/mission. In addition, the team member must play a specific role, take a clear position, and perform a prescribed function in the team.

The level of forming of inter-team relationships: the organization may have several independent groups and teams. The skill to interact is important for them; for this, counseling is used, aimed both at forming teams and organizing their relationship.

The discipline of the empirical and theoretical foundations of project management in education showed several issues which consider the specifics of the education processes.

First, the authors put a stress on the necessity to implement the project with concentration in process, that meet particular assumptions:

The project plan should consist of set of steps to complete which are obligatory and satisfactory towards goal-orientation; continuity and control under planning process, which
assume that there are connections among actions that have to be correlated according to structure and regulations.

the trade-off between human capital, research and development, logistics and finance.

the formulation of short-term objectives, which should be assessed to those which are achieved and which are not [11].

Finally, while stating project goals, steps towards goal-achievement should be identified, as well as expected outcome of each step; the timing; responsible individuals of each step; and allocation of resources.

Hence, the significance of planning from the very beginning and well-timed corrections in plan are emphasized. The theory suggest using the “tasks – actions” technique (Table 2).

Table 2. Method of planning project activities in education “tasks-actions”.

<table>
<thead>
<tr>
<th>Change objectives</th>
<th>Content of actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>The transition to …</td>
<td>1. 2….</td>
</tr>
</tbody>
</table>

The implementation of a project in education have to contain four levels:

— project coordination;
— project creation;
— putting project into action;
— outcomes assessment.

First stage: Organization of the process is based on the following decisions: defining problem and parties, identification in relation to it, search for partners, selection of executors, identification of positive prerequisites for the implementation of the project; b) analysis of the situation, identification of the mission of the project and identification of its implementation; c) identification of competent specialists for project development; d) determination of the resources of an educational institution (organization). This stage ends with the formation of the project team.

The second stage is, firstly, setting the mission, goals and objectives of the project, developing a scheme, test results of the project and methods for their verification. Secondly, the analysis of theoretical sources on the fundamental problem of production to the understanding that projects in education and the logic of their construction are in many ways similar to the logic of scientific and pedagogical research. According to the authors, linear logic is unacceptable in such cases due to the discovery of new data that require the return of results from results to a task, or from a schedule to a task, and their correction is necessary to form a logical correspondence [9]. On the basis of fixed assets, an assessment of the quality of project development in the field of education is paid (Table 3).

Table 3. Project examination descriptors in education at the development stage.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Characteristics of the criterion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuousness</td>
<td>Consistency of parts (elements) of the project and the absence of contradictions in its application are active (missions, goals, objectives, means, etc.)</td>
</tr>
<tr>
<td>Relevance</td>
<td>Timeliness of the problem, its priority</td>
</tr>
<tr>
<td>Being in demand</td>
<td>The current need for a significant number of intended customers and consumers of the results of projects in the field of education</td>
</tr>
<tr>
<td>Complicity</td>
<td>Criteria for examination of the project in the field of education at the development stage</td>
</tr>
<tr>
<td>Effectiveness</td>
<td>Compliance of project results with its goals</td>
</tr>
<tr>
<td>Efficiency</td>
<td>Compliance of educational services provided with project costs</td>
</tr>
<tr>
<td>Optimality</td>
<td>Minimization of costs and time to get the expected results</td>
</tr>
<tr>
<td>Sustainability</td>
<td>The extent of compliance of the allocation of resources with the goals and objectives, stability assurance, security and risk cut.</td>
</tr>
<tr>
<td>Outcome</td>
<td>Nature of changes as a result of project implementation</td>
</tr>
<tr>
<td>Long-term benefits</td>
<td>The skill of follow-up projects implementation</td>
</tr>
<tr>
<td>Manageability</td>
<td>Assessment and control towards quality project corrections.</td>
</tr>
</tbody>
</table>
We should agree with the authors that the direction of the project in the field of education should determine which and how widely the factor will be used.

The third stage is the implementation of the planned activities and the assessment of the fulfillment of the tasks and tasks of the project.

The fourth stage of the project includes an assessment of its results and consequences, as well as important indicators and high indicators, as well as means of measurement [2–6].

The organization of a project in education usually contains following factors: analysis, necessity proof, areas of implementation, functional objectives, naming the problem; the statement of purpose and objectives (specific, measurable and achievable); management-personnel control mechanism and staff; content and implementation mechanisms (stages, forms, methods, structure, action plan); method for evaluating expected results; material and technical support (budget).

Thus, an educational project is a set of managerial functions in educational organizations aimed at achieving certain goals. The world experience of project management in education shows the peculiarities of their implementation, which is important for the Kazakh education system. The international experience of project management is reflected in both national and international standards of Kazakhstan.

Management processes are divided into manageable stages, which contributes to effective resource management. It should be emphasized that the PRINCE2 methodology is also adaptable to IT projects, and also provides project management methods of any scale.

Thus, it is necessary to develop more widely and vigorously the ideas and technologies of project management in Kazakhstan's education, taking into account the experience and achievements of the world community, especially since they are significant and positive, and in the context of modernization are more promising than traditional Kazakh approaches to planning and implementing innovations in education.

3 Findings and discussion

Project in education is characterized as a set of procedures developed over time, which allows you to form a system of activities of an educational institution. In a static form, it is its structure in all its manifestations; in a dynamic form, it is a set of various activity processes that take place in an organization. Among the project methods that are most important for the research, the methods of analogies, expert analysis, goal structuring, and organizational modeling are distinguished

*Project management in the education system* is a method of purposeful influence on an educational organization in order to transfer it to a qualitatively new state through the synthesis of organizational measures and actions aimed at implementing the project plan in a limited period, within real resources. Project management may require the creation of new management structures in educational systems: matrix, project-modular, integrative. The choice in favor of any one of them is made only after taking into account the specific goals of the project, the complex of internal and external conditions, as well as the “human factor”, which plays an important role in all processes related to the life of an educational institution [12-15].

A model of the project management in education is a set of actions that consistently replace each other at all stages of project, ensuring high efficiency of the process of finding a correspondence between the organization’s strategy in society, on the one hand, and its basic components (structure, systems, resources, staff), on the other (see Fig. 2).
Its distinctive features are the focus on creating such new objects that the practice of education really needs and for which there is a specific order; a hypothetical model of the phenomenon under study, created on the basis of using several subject idealizations; studying the new in the process of its formation; focusing on creating the conditions necessary to ensure the viability of innovations.

### Comprehensive functional assessment of activities

<table>
<thead>
<tr>
<th>Stage 1</th>
<th>Situation Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resources</td>
<td></td>
</tr>
</tbody>
</table>

- Task: Mission statement, definition of project goals

<table>
<thead>
<tr>
<th>Stage 2</th>
<th>Conceptualization</th>
</tr>
</thead>
<tbody>
<tr>
<td>The development of alternative scenario</td>
<td></td>
</tr>
</tbody>
</table>

- Task: List of potential participants

<table>
<thead>
<tr>
<th>Stage 3</th>
<th>Programming</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure</td>
<td></td>
</tr>
</tbody>
</table>

- Task: Complete study | Full compliance | Partial correspondence

<table>
<thead>
<tr>
<th>Stage 4</th>
<th>Planning</th>
</tr>
</thead>
</table>

- Task: A Decision Making on project implementation

<table>
<thead>
<tr>
<th>Stage 5</th>
<th>Implementation</th>
</tr>
</thead>
</table>

- Task: Project implementation, project performance assessment

**Fig. 2.** A model of managing the development and implementation of projects in education

The project “Development of monitoring of professional activity of school teachers” is an initiative and was developed by school-lyceum №8 as part of the preparation of the professional program for the modernization of the education system in Almaty (Kazakhstan).

The school administration undertook to participate in the city competition, seeing this as one of the means to solve the problem of improving the quality of education. The first step on this path was a comprehensive assessment of the school's activities, which identified a number of problem areas that are important from the point of view of developing a project strategy.

As part of the conceptualization stage, the project team (having decided on the composition of potential participants) began to form a strategy and goals for the proposed activity. As a result, the following hypothesis was formulated: improving the quality of education can be achieved through diagnostics of the results of pedagogical activity and its rating.

According to the project developers, the conditions for achieving the stated goals should be to optimize internal resources and attract external ones, as well as to ensure timely
changes to the systems that accompany the activities of an educational institution, corresponding to the project stage.

The presence of a well-formed concept and a project team allowed us to move on to the next stage of activity - programming. The first task was to develop a project management structure. Based on the specifics of the educational institution, as well as specific conditions, it was decided to build the work according to the modular-project method. To optimize their own activities, members of the creative community were divided into groups, each of which worked on its own direction, determining whether the characteristics of alternative options correspond to the overall outline of the project.

Continuing to specify the strategy, the project authors formulated the initial version of the program. General meetings of the project team were held periodically to discuss the interim results of activities, critically evaluate the progress of work, and make constructive comments.

As a result of the project implementation, the linear-functional control system was replaced with a modular-project one; new job responsibilities for school staff have been developed; the number of methodically active teachers increased from 59% in 2018/2019 to 90% in 2019/2020, and the number of passive teachers decreased from 40% to 9.5%, respectively. There was an overall improvement in the school’s performance indicators: school attendance increased from 99% in the 2018/2019 academic year to 100% in the 2019/2020 academic year, the quality of education increased from 43% to 47.5%, respectively, including in the cycle of Natural Sciences disciplines from 63.4% to 70.5%, in the cycle of Humanities from 63% to 65%.

In order to provide additional resources (as part of the project), the school received a development grant from the City Department of Education in the amount of 1000000 tenge, and assistance from sponsors in the amount of 300,000 tenge was allocated.

Also, because principles and stages of project management in education are clear now, we can suggest following options of project management in professional guidance among schoolchildren as a part of education and knowledge transmission and this would be one of our following subjects of research:

─ The project of creation of a single national center for career guidance, responsible for the centralized maintenance and implementation of career guidance policy, implementation of general methodological work and coordination throughout the country and monitoring the work of regional offices, whose functions include collecting and distributing professional information at the local level.

─ The project of creation of information centers for career guidance, which coordinate vocational guidance work in schools, supervise the work of school teachers and parent organizations participate in career guidance activities.

─ Project of providing mass internships during holidays for schoolchildren.

4 Conclusion

Using the synthesis of universal design characteristics and project specifics in education as a methodological approach allows us to get a static idea of the desired structure of the projected system and a dynamic idea of the set of expected conditions for its transition to a new quality, the purpose of which is to provide a more effective solution to social and personal needs in education.

The most effective method of managing organizational projects in education was found in an experiment on project transformation. Its basic principles are aimed at creating new tools that are not used in educational practice: a hypothetical model of the phenomenon under study based on the use of several subject idealizations; the study of the new in the
process of its formation; orientation to creating conditions necessary to ensure the viability of innovation.

The results of the experimental work showed the presence of a general innovation shift, qualitative changes in the components of the organization, as well as the importance and advantages of project activities. Innovative management structures have been proposed, new systems have been introduced to ensure the vital activity of the organization, and the resources of each participant in the experimental work have been optimized.

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