

THE OBJECTIVES AND PRINCIPLES OF THE AUTOMATED INFORMATION SYSTEM OF PROJECT MANAGEMENT IN THE FIELD OF HIGHER EDUCATION

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The article includes analytical materials on the creation of an automated information system of project management, as well as the use of information technologies and their application in each phase of the project life cycle. In addition, the article provides a brief overview of the objectives, methods and tools of project management in the organization.

ЦЕЛИ И ПРИНЦИПЫ СОЗДАНИЯ АВТОМАТИЗИРОВАННОЙ ИНФОРМАЦИОННОЙ СИСТЕМЫ УПРАВЛЕНИЯ ПРОЕКТОМ В СФЕРЕ ВЫСШЕГО ОБРАЗОВАНИЯ

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Статья включает аналитический материал по созданию автоматизированной информационной системы управления проектом, а также использование информационных технологий и применение их на каждой фазе жизненного цикла проекта. Кроме того, в статье приведен краткий обзор задач, методов и инструментальных средств управления проектами в организации.

Higher Education - a key strategic resource for the development of society. In the modern era, the state and prospects of development of higher education are of particular relevance. Education becomes a basic social mechanism for the development of man, his intellectual abilities and prognostic features.

Processes related to the social and economic sphere set new value orientations of Uzbek society. The concept of education of the XXI century highlights its quality and leading role in culture and spirituality, education and in the implementation of innovations. At the same time, the basis of modern educational paradigm are such priorities as the self-development and self-education. The main capital of the individual act of knowledge today, the activity, the ability to innovate. In a market economy the personal characteristics of the person are the foundation on which to build the economy and politics, the culture develops. A special role in this discharged project management ability. Since the leaders of different levels have been discussing at meeting different projects, projects introducing new systems and technologies. Virtually every manager from time to time turns out to be involved in planning activities business goals and ways of achieving them, the appointment of executors to perform the task is, justifies and supervise the execution of the budget. Drawing up plans and the tracking performance of work, the Chairman, in essence, provides the project management functions. However, despite the growing need for streamlining and improving the efficiency of project management in the modern organization, the basic concept and system of project management methods are still unknown a significant number of managers.

The decision to use the automated information system for project management is primarily associated with the response to the need for a control system. A non-systemic (non-formal) project management can work well for small projects with limited objectives and resources, but ceases to work on projects already relatively low complexity. Without a formalized management, system manager and project participants will inevitably face problems related to conflicts of objectives, priorities, deadlines, appointments and reporting. Losses related to error management and with

additional expenditure of time and resources spent on the resolution of conflicts that arise, will inevitably affect the quality of the results and lead to a rise in the cost of the project.

In this situation, to keep the project under control allows the development and implementation of formalized information system that would support the implementation of the basic functions of control and management.

The greatest benefit brings the use of automated model to support major projects planning. The main advantages of this approach include:

- centralized storage of information on the work schedule, resources and costs;
- Ability to quickly analyze the impact of changes in the schedule, resource provision and financing in the project plan;
- The ability to support distributed and update data in a network mode;
- The possibility of automated generation of reports and graphical charts, the development of the project documentation.

Automating routine data collection and processing procedures, leaving managers more time for analysis and decision-making for creative approaches to management.

Before we proceed to the definition of EMIS and the description of its structure, it is important to understand why there is a need for a specialized system for managing projects.

In the modern organization, as a rule, it operates a number of automated systems that provide information support for the current management. Decision support systems (Decision Support Systems - DSS) developed and used to support specific management procedures. The structure of these systems usually corresponds to the functional structure of the organization and management levels. For example, corporate financial accounting applications may include automation systems, payroll, and benefits planning providers. To automate the sales department can use accounting system products in warehouses, invoicing, customer database, etc. Information Systems senior management (Executive Information Systems - EIS) provide summarized information on the performance and status of the company in a form convenient for making strategic decisions.

The project manager can use this or that information derived from corporate information systems. However, in general, data is structured to support the functional activity of the heads, are redundant and eventually useless for the project manager.

Therefore, the following differences from the PMIS corporate information systems are crucial:

- If the corporate information system is mainly designed to support individual functional units, the EMIS integrates data from different departments and organizations related to a specific project;
- If the cycle is to collect and analyze information and issue reports on corporate information systems are usually tied to the calendar periods (month, quarter, year), the PMIS management information is collected, stored and analyzed with respect to the degree of achievement of project objectives (tasks, milestones, milestones).

Attempts to create a system of information support of project management only based on existing information systems function encounter problems:

- Low efficiency of obtaining and quality of information - due to data redundancy,
- Low degree of integration of information - due to the heterogeneity of information systems used by different departments (and even more so, different organizations) involved in the project.

Project Management Information System (PMIS) provides support and improving the efficiency of planning and project management. Thus, the structure and the contents taken in the framework of the organization and management processes largely determine the structure of the information system.

Project information management system can be structured:

- The stages of the project cycle;
- Function;
- Management levels.

The main functional elements of the PMIS on project execution stage include:

- Module planning and control work schedules;
- Module reference project accounting;
- Financial control and forecasting module. Module planning and control schedules.

This module is used to support formal monitoring process execution and coordination of interdependent tasks and functions of the project. commonly used in network planning packages based planning and control module, based on the algorithms for the calculation of the ITUC. These calculations work schedule are the basis for the development and support the implementation of specialized graphs of functions (e.g., the development and transfer of technical documentation, ordering and delivery of resources).

In addition to the above basic modules of information system, a significant amount of information subsystems that support certain management functions (change management, quality, and risk) can be developed and integrated into a single system.

Note that each of the main elements of EMIS should include means of collection, transmission and documentation of information. These funds generally make up an automated communication system to support the project.

Structuring system management levels. As a minimum, three levels can be allocated to the organizational structure of the project:

- Strategic level project portfolio management (management of the organization High School).
- The level of the project management (project management).
- The level of execution of the project (the project team).

Requirements for information support PMIS users (and, respectively, the submission of the functionality of the information system) at various levels of the project management differ significantly (see. Table 1.).

Table 1. Requirements to the PMIS according to management levels

Strategic level project portfolio management (management of the organization High School)	Project management level (project management)	Project execution level (the project team)
<ul style="list-style-type: none"> • Easy to use • Means of collection and compilation of data • reporting tools • Possible consolidation plan 	<ul style="list-style-type: none"> • Powerful and flexible means temporary, resource and cost planning and control • Powerful analytical capabilities • Tools for creating and distribution of reports • Means of data collection and transmission 	<ul style="list-style-type: none"> • Easy to use • Convenient data entry

Strategic level management project complex is responsible for making decisions related to the approval of objectives, priorities and funding of projects, monitoring achievement of milestones, outputs and outcomes of the project. Information system at this level of government should ensure the collection of data from various sources (mainly information subsystems of the lower levels of management), summarizing and presenting the data in a form convenient for intuitive perception.

On the detailed planning of the complex work of the project management level is carried out, the operational management and control of the project on time and cost. This level of management is primarily interested in a powerful way to create an adequate informational model of work packages and resources that support the calculation of models with different input parameters, providing data exchange with other levels of government and to obtain reports for analysis and management purposes.

At the level of project objectives fulfillment requires detailed information, and ensuring regulatory tasks. This information comes from the project management level and from the

functional units. At the same time, at this level are collected and transferred to the higher management evidence on the performance of work and use of resources.

The main functionality is usually evaluated when assessing the capacity of the system for project management:

1. Means describe the complex work of the project, relations between the works and their timing:

- Support for the project calendar (the maximum size of the calendar, the most recent date, the maximum number of events in one calendar, ability to specify weekdays and different weekdays for different weeks, the ability to set regular business hours);

- Restrictions on the operation of the project (type of work (as soon as possible, as late as possible, work with a fixed start date / end), the ability to perform work planning for individual calendars);

- the possibility of appointing the temporal characteristics (maximum duration of a particular task, the maximum duration of the project, the unit of time available in the system, tasks, milestones, calculated reserves of time (full, free), the possibility of the system will automatically assign the duration of individual tasks, the ability to bind the durations of tasks to the volume designated resources);

- Links between tasks (maximum number of previous and subsequent problems, the permissible types of links, types of permissible delay / overlap);

- The maximum allowable number of tasks in the project, the length of the task name, encoding capabilities, the automatic conversion, multi-level view of the project.

2. Means of support information on resources and costs of the project and assignment of resources and costs to individual work project.

Resource information (the maximum amount of resources for the project, the opportunity to describe the various types of resources (Stored and Nonstick, cost items, the range of materials) to support resource with a fixed cost and resources, the value of which depends on the duration of use, support for information on the required and available volumes resource, ability to set the normal and the maximum amount of resources possible to set variable resources, the ability to specify the individual resource calendars);

Assign resources to tasks (the maximum amount of resources to the problem, the possibility of a partial assignment of resources, ability to set the delay when using the resource);

Scheduling with limited resources (allocation of congested resources and the use of their tasks, the resolution of resource conflicts, Automatic / team alignment of resources, variety of resources for leveling, alignment, taking into account problems of priorities, alignment with the restrictions on time or subject to resource constraints, optimality obtained plans).

3. Means of control progress of the project.

- Means of tracking project objectives state (fixing project plan, means to support the actual performance of tasks status (percent complete));

- Controls over the actual use of resources (budget amount and value of the resource, the actual quantity and value of resource quantity and cost of resources required for completion of the work);

- Means of project cost status analysis and analysis based on work performed.

4. Convenient graphical representation of the project structure (figure Ganga, network diagram, hierarchical diagram of the project), as well as tools for creating various project reports.

- **Gantt chart** (a map of the critical path, the calculated and actual start and end dates of works, provision of works, the ability to change the timeline, displaying the current date, the mapping component tasks, display of additional information);

- **PERT diagram** (map of the critical path, the calculated and actual start and end dates of work, duration, provision of works, multilevel display detailed tasks, the ability to specify different types of network diagrams, manual and automatic placement of work and relationships, identification of additional information);

• **Tools for creating reports** (reports on the status of the schedule, reports on resources and resource assignment, profiles download resources, reports on costs (which may include the cost of individual tasks, detailing the value of the resource problems, the cost of a resource on the tasks planned and actual costs), reports on cash flow reports for the analysis of the actual state of the project objectives and the comparison with planned).

In addition, the following additional features should be considered when choosing a planning package:

- Sorting data (the maximum number of criteria, sort code tasks and dates);
- Criteria for selection of the data (excluding releasing and selection);
- Printer features (types of printers, plotters, multi-page report);
- Communication tools (support client / server, SQL³ and ODBC⁴ standards, integration with Web resources⁵, Import / Export (ASCII⁶, dBase, Lotus, other systems for project management) ;
- Networking;
- Work on multiple projects (multi-project planning, the association projects, communication projects, the maximum number of related projects, joint resource planning);
- Programming languages and macro development.

Important for the user is the ease of learning and use of the system, as well as additional consulting support of this system on the market.

In general, the creation of an automated information management system project, in varying degrees, leading to the development of the organization. A distinctive feature of this trend is that the effectiveness of the functioning of the organization may depend on the success or failure of the project as a whole or its individual units. For this reason, careful planning and monitoring is not only technical, but also the human aspects of the implementation of the system is of particular importance.

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³ SQL (Structured Query Language) - a standard interactive and programming language for getting information from and updating a [database](#).

⁴ ODBC (Open Data Base Connectivity) - an [open](#) standard application programming interface ([API](#)) for accessing a [database](#).

⁵ Web - World wide web, Internet.

⁶ ASCII - American Standard Code for Information Interchange, format structured text file.