The received results testify that after passing tap water through the filter zeolite and bentonite complex the composition of water had significant changes. Its organoleptic characteristics significantly improved, in particular, they began to comply with the Sanitary Regulations and Standards in smell and taste of water.

The iron content in water decreased by 9.5 times and began to comply with the Sanitary Regulations and Standards requirements.

In the filtered water pH, the content of calcium, magnesium, silicon, hydrocarbonate ions, as well as the total hardness and dry residue increased. This fact should be assessed positively, since it is known that tap water is distinguished by low content of these essential elements, increased softness and total low salt content.

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DEVELOPMENT OF A METHOD FOR DESIGNING INFORMATION SY STEMS FOR ENERGY COMPANIES

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The creation of information models requires the use of known methods and the development of new methods of formalizing the pre-design research process. The modeling process consists of four stages: data collection on the object of management - pre-project research; creation of a graphical model of business processes taking place in the enterprise; development of a formal model of business processes; business research by optimizing the formal model.

To support the creation of workflow management services and systems, the complex offers methodologies, standards and specialized software that make up the developer's tools.

Key words: *information systems, management information systems (MIS), integrated databases, sadt methodology.*

Ақпараттық модельдерді құру белгілі әдістерді қолдануды және жобалау алдындағы зерттеу процесін формализациялаудың жаңа әдістерін әзірлеуді талап етеді. Модельдеу процесі төрт кезеңнен тұрады: басқару объектісі туралы деректерді жинау – жоба алдындағы зерттеу; кәсіпорында болып жатқан бизнес үдерістерінің графикалық моделін құру; бизнес үдерістердің формальды моделін әзірлеу; формальды модельді оңтайландыру жолымен бизнесті зерттеу.

Жұмыс ағындарын басқару қызметтері мен жүйелерін құруды қолдау үшін кешенде әзірлеушінің құрал-саймандық құралдарын құрайтын әдіснамалар, стандарттар және мамандандырылған бағдарламалық қамтамасыз ету ұсынылады.

Тірек сөздер: *ақпараттық жүйелер, басқарудың ақпараттық жүйелерін (БАЖ), интегралдық деректер базасы, sadt әдістемесі.*

Создание информационных моделей требует использования известных методов и разработки новых методов формализации процесса предпроектных исследований. Процесс моделирования состоит из четырех этапов: сбор данных по объекту управления - предпроектное исследование; создание графической модели бизнес-процессов, происходящих на предприятии; разработка формальной модели бизнес-процессов; бизнес-исследования путем оптимизации формальной модели.

Для поддержки создания сервисов и систем управления рабочими процессами комплекс предлагает методологии, стандарты и специализированное программное обеспечение, составляющие инструменты разработчика.

Ключевые слова: *информационные системы, информационные системы управления (ИСУ), интегрированные базы данных, sadt-методология*

Information support is the basis for all management activities. Here the set of information should be considered as various messages, data, relevant objects, phenomena, processes, relationships about the data. A necessary condition for the successful operation of any enterprise is the normal operation of the following processes:

- targeted collection and primary processing of information;
- organization of channels for users to access the collected information;
- timely use of collected information for decision making.

The main task of gathering the necessary information:

- completeness, adequacy and integrity of information;
- reducing the technological delay between the moment of information generation and the moment of access to information.

This can be ensured only by modern automated methods based on information systems. It is important that the information collected is structured to meet the needs of potential users and stored in a form that allows the use of modern access technologies.

Modern management information systems.

Development of management information systems (DMIS) is a very complex process that requires significant time and resources [1-4]. Modern large MIS projects are usually characterized by the following features:

- the complexity of the characteristics that require careful modeling and analysis of data and processes (there are many functions, processes, data elements and complex relationships between them);
- its local tasks and objectives (for example, the presence of a set of closely interacting components (subsystems) with traditional applications related to transaction processing, regulatory tasks and analytical processing (decision support) applications using unregulated requests for large amounts of data) ;
- lack of direct analogues, which limits the possibility of using any standard design solutions and application systems;
- Significant time duration of the project, based on the limited capabilities of the development team, on the one hand, and the scale of the customer organization and the different levels of readiness of its individual units to implement the MIS, on the other hand.

For the successful implementation of the project, the design object (DO) must first be adequately described, complete and functionally non-contradictory MIS and information models must be built. In addition, the information needs of users may change or be clarified during the creation and operation of the fee, which makes it difficult to develop and maintain such systems. Currently, one of the most complex and important stages in the development of MIS, the stage of creating an information model, remains largely informal. The initial phases of the project have a decisive impact on the achieved result, as they make key decisions that determine the quality of the information system. The share of the final result of the conceptual phase reaches 30%.

The creation of information models requires the use of known methods and the development of new methods of formalizing the pre-design research process. The modeling process consists of

four stages: data collection on the object of management - pre-project research; creation of a graphical model of business processes taking place in the enterprise; development of a formal model of business processes; business research by optimizing the formal model. In addition, it is the most promising method among the known methods of pre-design research in terms of its automation. The method involves the collection and initial processing of information. As a result of the initial processing, we obtain a database containing data on the enterprise, which is suitable for further automated analysis, rather than a mass of unsystematic primary information. We will use the same presentation of research results in future work.

We set the task to create an information model that allows not only to show the relationship between the structural units of the enterprise and their weight, but also to assess the nature of the processes taking place in the organization. In this case - what operations (functions) are performed on the information (documents) within the organization. Hereinafter, such an information model is called functionally oriented. Obtaining such a model allows to set the task of optimizing the organizational structure of the enterprise on new criteria, for example, on the loading of individual functions, uniform loading, etc. b. on.

The obtained functional-oriented model allows to implement the technique of creating an organizational model of the enterprise "from below": in the first stage to determine the full list of functions that must be implemented in the enterprise for effective management and achievement of goals; identify internal and external relationships between functions; estimate the amount of information passed on these contacts; reorganization of departments and services by redistribution of these functions on a similar basis. At this stage, communication between departments is carried out automatically - through communication between newly created departments and services. New features, document management can be included.

A wide class of mathematical theories (third and fourth stages) can be used to formally describe and analyze the graphical model of business processes, which we will discuss in detail in this paper.

Analysis of existing approaches to building an information model of the enterprise.

At present, the automation of enterprise (organization) management is still an important and topical issue [4, 16, 19, 23], the intuition and personal experience of the leader is often insufficient to make effective and timely management decisions. Therefore, a modern approach to management involves not only a large investment in the purchase of expensive equipment, but also the creation and implementation of automated management decision support systems (SS). Creating an SS has always been a complex system process and still remains:

- a modern enterprise is a complex system of interacting elements (divisions);
- each enterprise requires unique and standard design solutions that require complex adaptation;
- unique and flows (information and material) that connect the subsystems of the enterprise, as well as the enterprise with the environment. Therefore, it is necessary to carefully study the information flows during the development of the SS. To do this, it is necessary to create an adequate information model of the enterprise [13]. This process is not simple.

Currently, there is a set of tools that facilitate the process of creating an information model, such as CASE-tools [9]. They can significantly simplify the modeling process. However, the preliminary stages related to the description of the subject area are beyond the competence of CASE-tools and are performed informally at the verbal level [13]. In addition, the adequacy of the information model depends on the quality of their implementation. We note that the information model is very important for them (in terms of functionality), as it significantly determines the efficiency of all SS. For them, only the document flow (traffic or traffic) is important and can be optimized only after a careful study of this traffic, that is, it should be organized so that the documents arrive on time and without queuing. In other words, it would be possible to make timely management decisions at all SS levels. Of course, a lot depends on the technical implementation of the IS, but this is only a necessary but insufficient condition for the effective operation of the IS.

One type of MIS is called corporate information systems (IS) [20]. Recently, great results have been achieved in the practice of creating such IS [20]. This was largely due to the fact that

all information available to the corporation was entered into a common integrated database (IDB) and that all divisions of the corporation were included in this database in accordance with its competence. IDB is a multidisciplinary database. IDB is the most important, but not the only, component of IS. Another important part of it is the telephone, telegraph, etc. is a communication network that includes typical communication channels. That is, the communication network is gradually called an integrated service network. The information component is present in any MIS, thus defining it as an information subsystem and having a significant impact on the structure and effectiveness of the duty. Thus, it makes sense to study and optimize individual IS. You can do this by building an IS model. At the same time, it is always necessary to take into account in what subject area and to what extent the information is adequately collected in the IP.

Thus, when studying the IP, it is necessary to take into account that the information contained in it is a model of some areas of the real world. The main requirement for any IS is to ensure the adequacy of this model. The main tools to improve the efficiency of complex information systems are: operational analysis of the situation, development of operational and calendar plans, modeling of management processes. Modeling is the study of the properties of the original by replacing one object (the original) with another object, called the model, and studying the properties of the model. The need to use models arises when it is expensive, difficult or impossible to make a decision on a particular object. The model simplifies, reduces and speeds up the process of studying the original.

Nowadays, the sadt method is widely used. (Structured Analysis and Design Tecchnique) ─ Structural analysis and design methodology that provides a number of advantages in control systems:

- formalize the description of the workflow;
- tolerance: process models created within one system can work under the control of another system;
- universality: the use of a single mechanism for describing the management of workflows in different areas of activity.

Currently, a number of standards have been developed to describe specific workflows that can be divided into two categories:

- Graphic models depicting the tree-like structure of the process.
- Block models closest to the block structure of programming languages.

Thus, the above models are suitable for use in a number of cases to effectively describe the system environment and its operation. In addition, information about the flows that serve the system is a determinant of any system. Therefore, it is important to study not only the model of the system, but also its information model to the level of functions in detail and its filling with information flows, not blocks of the system. Such a model can be called functionally oriented (FIM). The use of FIM is also important for modeling the functional structure of the system. The use of FIM allows you to set and solve new tasks at the level of organizational and functional structure, for example, to determine the load of functions, their full load, etc. b. redistribution (optimization) of document flow between individual functions in order to ensure

Before discussing the effectiveness of FIM, it should be noted that the basic concept of information itself is still not the same. In a pragmatic way, it is a set of messages in the form of an important document for the system. Information can be evaluated not only by volume, but also by various parameters, the most important of which are: timeliness, relevance, value, aging, accuracy, etc. in addition, the information may be clear, probable and accurate. The methods of its reception and processing are different in each case.

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STUDY OF EFFECTIVE METHODS OF TEACHING CHEMISTRY

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The purpose of the study is to scientifically substantiate the effectiveness of teaching chemistry in secondary school using modular technology and to develop a specific methodology. The scientific and methodological foundations of the effective use of modular technology in the learning process" shows the educational process of its activation, the theoretical and practical significance of the development of learning technologies, the features of the use of modular learning in chemistry lessons in secondary schools, the problems of applying the principles and criteria for building a modular program, the requirements for a modern school not only for the assimilation of theoretical knowledge in chemistry, but also to the active methods and techniques of its assimilation. the application of modular chemistry teaching, improvement of the content of chemistry teaching at school has been established.

Key words: *high school, chemistry, modular technology, effective methods, practice works.*

Бұл мақалада – орта мектепте химияны модульдік технология арқылы оқытудың тиімділігін ғылыми тұрғыдан негіздеп, нақты әдістемесін жасау. Модульдік технологияны оқыту үрдісінде тиімді пайдаланудың ғылыми – әдістемелік негіздері» оқу процесі оны жандандыру, оқыту технологияларының дамуының теориялық және практикалық маңыздылығы көрсетілді, модульдік оқытуды орта мектептерде химия сабақтарында қолдану ерекшеліктері, модульдік бағдарлама құру ұстанымдары мен өлшемдерін қолдану мәселелері айқындалып, қазіргі мектепке қойылатын талап химиядан теориялық білімді игерумен қатар, оны меңгерудің әдіс – тәсілдерін белсенді іс – әрекетке үйрету, мектепте химияны оқыту мазмұнын жетілдіру, химияны модульдік оқытуды қолданылуы анықталды.

Тірек сөздер: *орта мектеп, химия, модульдік технология, тиімді әдістер, тәжірибе жұмыстары.*

В этой статье дается научно обосновать эффективность преподавания химии в средней школе с помощью модульной технологии и разработать конкретную методику. Научно – методические основы эффективного использования модульной технологии в процессе обучения» показан учебный процесс ее активизации, теоретическая и