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ABOUT CLASSIFICATION OF THE METHODS IN DESIGN OF MEDICAL INFORMATION SYSTEMS

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Today, medical information systems (MIS) – are a necessary guide for establishing interaction between different institutions and appeals [1-13]. During the pandemic, the demand for information systems in the hospital was increased as never before, so competition among medical information system developers increased too. Therefore, to compete with other MIS, developers need to improve systems or immediately create a level of functionality that will allow the facility to provide a better level of service for its patients.

Developing and then putting into operation the MIS, require a lot of human and material resources [11-13]. The MIS, which has either better functionality or a lower price, will also be in demand in the marketplace. For this purpose at the beginning of designing of system it is necessary to define a technique which will allow to reduce cost and to increase efficiency of MIS.

The project – is a documentation that describes the design decisions for the creation and use of MIS, they define [1]:

– System architecture;
– Structure;
– Information storage conditions;
– Characteristics of technical means;
– Composition and functional characteristics of software components.

MIS design is the process of converting input data into an MIS project, namely the transformation of information about the object of automation and system requirements [14].

It will also be useful to study design methods in analog systems.

The objects of design can be both individual elements of the system and sets of elements that belong to the functional subsystems or subsystems of support [15].

Functional subsystems implement the main functions of the system – business functions.

Support subsystems support service functions – authorization in the system, data archiving, etc.

The algorithm is the basis of any design method. It determines the project actions, their sequence, resources, composition of performers, the funds needed to perform

these actions. The MIS design process is divided into a set of interrelated actions, each of which can have its own object [16].

Actions are divided into:

– Design (to form or change the current project);

– Evaluation (to produce evaluation of design results according to the established criteria).

We will assume that the total number of states that MIS undergoes during its development, from the moment of the decision to create systems to the moment of its full implementation – is the life cycle of the medical information system.

Basic requirements for technological design:

– The chosen technology should maximally reflect all stages of the project life cycle and serve as a basis for the connection between the design and maintenance of the system during its operation;

– The project created with the help of this technology must meet the requirements of the customer as much as possible; these requirements can be replaced, edited during the creation of MIS;

– The chosen technology should ensure the efficiency and economic profitability of the system, namely the minimum cost of resources for the design and subsequent maintenance of the information system.

Consider the classification of MIS design methods.

Classification according to the degree of use of standard design solutions and the level of automation [17].

According to the degree of use of standard design solutions, the following methods of MIS design can be distinguished:

– Standard design methods that involve the assembly or configuration of MIS from ready-made standard components of the system;

– Methods of individual design, in which design solutions are developed from the beginning independently, in accordance with the requirements of information systems and without relying on ready-made standard components for assemblies.

According to the degree of automation, design methods can be divided into two categories:

– Automated design methods, design solutions are generated or configured using special tools;

– Methods of manual design, MIS design is carried out manually, without the use of special tools.

The combination of different features of the classification of design methods determines the nature of the design method. There are two main classes of methods: canonical and industrial methods.

Canonical methods are based on the technology of manual individual design. Industrial methods are based on computer-aided design technology.

The design technologies currently in use involve the development of the system in several stages [18-21].

The typical content of the life cycle of the information system is reduced to the implementation of the following stages:

1. Planning stage and analysis of MIS requirements (pre-design stage). Includes research and analysis of the facility and the existing medical information system, determination of requirements for MIS, preparation of feasibility study and terms of reference for system development. In the feasibility study should be presented economic calculations that confirm the feasibility of developing MIS. The terms of reference reflect the purpose of the MIS, the requirements for the MIS, its subsystems and types of support, as well as restrictions on design resources.

2. MIS design (technical design, logical design). Development of the composition of automated functions and the composition of support subsystems, information storage structure, design of the technical project of the information system in accordance with the formulated requirements.

3. Implementation (working design, physical design). Includes program development, information filling of databases, creation of work instructions for the personnel, registration of the working project. Implementation is based on the MIS technical project.

4. Implementation (testing, proven operation). Complex adjustment of subsystems of information system, training of the personnel, step-by-step introduction of information system on divisions of the enterprise, carrying out acceptance tests, transfer of information system in operation.

5. Operation (maintenance, modernization). Collection of statistics on the functioning of the information system, correction of errors and shortcomings, adaptation of the system to the changed conditions of functioning, formulation of requirements for the next version of the information system.

Thus, a well-chosen method of designing a medical information system will provide a comprehensive software product, the main purpose of which is to automate all the main processes associated with the work of medical institutions of general and narrow specialization.

The developed automated medical information system will quickly and efficiently establish electronic document management, work with patients, carry out operational accounting of administrative staff, control all organizational and financial issues.

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