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International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies

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DEVELOPMENT OF HOSPITAL TEMPLES WITH ENGINEERING DESIGN CONSIDERATIONS

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ARTICLEINFO

Article history:
Received 04 January 2019
Received in revised form 14 February 2018
Accepted 18 February 2019
Available online
19 February 2019

Keywords:
virtual routing; built environment; health care workspace design.

ABSTRACT

The work is an original design project of interactive social map of Russian hospital temples. The goal of the work is a detection and virtual routing of hospital temples as locus of orthodox socio-cultural space. The sociological methods of collection and processing of information (continuous interrogation, diagrammatic construction, scaling, etc.), design methods are used. First, all hospital Orthodox churches in Russia are detecting. The presented design project is oriented on application in sociocultural research and in different provinces of humanitarian and social activities of the Russian Orthodox Church, information provision of patients who in need of spiritual support, directly social consolidation within the framework of a religious (orthodox) community, medical staff and social workers provided complex care for the patient and creating optimal conditions for his recovery. The hospital design has been tested and the good result has been obtained.

1. INTRODUCTION

Health insurance premiums and the cost of hospital services and care have risen significantly over the past few years. Public and private data recently analyzed by [1-3] for the American Hospital Association and the Federation of American Hospitals confirmed that from 1997 to 2001 spending on hospital care increased by $83.6 billion [4, 5]. In present Russia, keen on revising their own life bases - from spiritual and religious to only practical, the problems of the new social consolidation of society are becoming more and more clear. In the activities of the Russian Orthodox Church after the so-called “the second Christening of Russia” it made itself felt in various ways - in the creation and implementation of various charitable programs, the organization of new communities (including the sisterhoods of mercy), spiritual and educational centers in areas of compact residence or professional activity, virtual social sites . Hospital temples have become a special form of social care [6].

During the two thousand year church history of Christianity, hospitals were built at the temple. The present history of Russia began with the restoration of hospital temples and the construction of new ones at the already existing medical institutions. Work on the revival of hospital churches was

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carried out and is ongoing. In accordance with the Agreement on Cooperation between the Russian Orthodox Church and the Ministry of Health and Social Development of the Russian Federation dated July 8, 2011, these structures are supposed to cooperate in creating conditions for the activities of Orthodox religious organizations and Orthodox social services, including the holding of religious services and the organization of home temples in inpatient health care and social development [7]. The social-cultural disposition "hospital - hospital temple" is unique and needs special study [8].

2. METHODOLOGY

Today, medical environments are heavily dependent on the type of building structures, the type of unit design, decoration and medical equipment to complete the diagnosis and treatment of diseases. In addition, in contrast to the competitive and complex face of the health care system, hospitals must also meet and control costs in response to these conditions. The medical equipment management system is mainly used in data collection and management. This system integrates the existing equipment, the order system, the maintenance/prevention of equipment, the management of outsourcing contracts and all service services. In addition, as a management tool for tracking equipment, starting work orders, obtaining performance indicators, determine the failure process of identifying educational needs and generating management reports.

2.1 THE SIX PHASES OF THE BUILDING PROCESS

Any time an organization embarks on a large project, it can be helpful to reduce that project to small, easy-to-manage parts. With that in mind, most building projects can be organized into six distinct phases:

1. Planning. This includes "blue sky" ("wish list") considerations, master planning, and pre-design efforts.
2. Schematic design. This involves drawing a rough outline of the project, including preliminary room layout, structure, and scope.
3. Design and development. This includes adding details to the design, including fixtures, furniture location, and decor.
4. Construction documents. This requires converting all aspects of the design into a template from which contractors can estimate costs, identify issues, and plan construction activities. At this point, organizations will discuss contract conditions—the rights and duties of all participants, including the owner, the contractor, and the architect.
5. Construction. This is the phase in which the building or facility is actually built.
6. Commissioning. Before taking ownership of a building, project, or renovation, an organization must make sure that all specifications are met and that all systems, components, equipment, and so forth are fully operational.

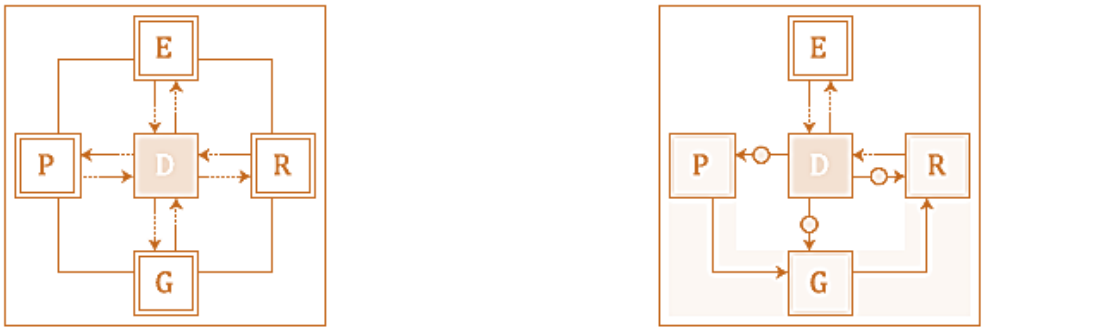
When developing a design-project for an interactive map of hospital temples in Orthodox Russia, we turned to sociological research methods that allowed us to identify the main body of hospital churches in Russia (60 metropolitan and 1 Moscow diocese (city and regional) were surveyed, of which 273 hospital churches were counted and that 105 temples are located in the premises of medical institutions). The results of the study were the primary information base for the development of a design project of a social (interactive) map of hospital temples. Work on the creation of an interactive map was carried out in the program Visual Studio Code. This program is designed to edit the source code, developed by Microsoft for Windows, Linux, and macOS. After exporting our map to svg, all the points on which the regions were drawn, we moved to one structured file in the program. Then

the information about the regions of the map was streamlined and systematized, and there was a need to connect it with a newly created file, including information about the presence of hospital churches in each region, which would allow the user to find out how many hospital churches there are in the cursor on the region. A separate page was created to display extended information about hospital churches in each metropolis. Thus, the system of subordination of all elements and user interaction with them on the site was written in the Visual Studio Code program [4]. This development is original and has no analogs.

3. RESULTS

The design project of the social (interactive) map of the Orthodox hospital temples in Russia creates new virtual opportunities for research in various areas of the humanitarian and social activities of the Russian Orthodox Church. The practical significance of the proposed project is to provide information to patients who need spiritual support and immediate social consolidation within the religious (Orthodox) community of a medical institution that provides comprehensive care for the patient and creates optimal conditions for his recovery [5].

The new room design balanced privacy with high observation and created a healing environment for the patient. The windows facing the interior hallway were electronically charged. With the flip of a switch located on the wall, the window in front of the decentralized nursing station could become clear or opaque. (The same effect could be provided with an inexpensive blind.) The nurses used an infrared tracking system to reduce hunting and gathering time to find each other on the unit. The phone was modem capable for family or patient use, and blood analysis modules were in each patient room, so routine blood tests could be done quickly, at the point of care, to reduce lead time for physicians and caregivers.



The generic design model The performance-based generation model

Figure 1: Designer in center interacts with the activities
(R: Representation, G: Generation, E: Evaluation and P: Performance)

3.1 DESIGN OF HOSPITAL

The numerical design models can apply quantitative and qualitative knowledge and thereby include a broad understanding of performances as generative parameters or evaluators. The performance-based models intend to act directly upon analysis and simulation for the specific design [9]. The chosen performances or functionalities actively generate the design. As illustrated in Figure 1, by a generic schema of components, relationships, and properties. The models contain four

basic components of the traditional design activities of Representation, Generation, Evaluation and Performance. In the performance-based design models, performance data drives the form generation. The designer interacts with the three modules, defining the respective criteria in the respective modules while interacting directly through the digital representation

The formalization of the functional, architectural and engineering objectives defines the framework of performances and evaluations in the design model, as illustrated in Figure 2.

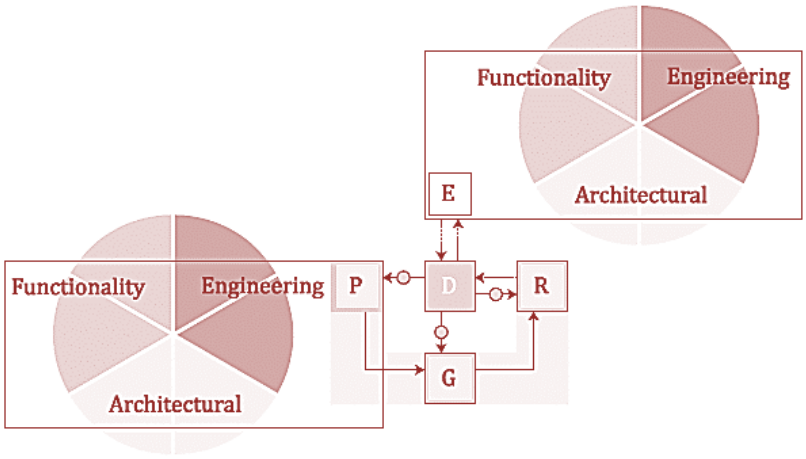


Figure 2: The performance-based generation model based on functionality, engineering and architectural parameters formally described as performance input parameters in the correlation matrix and as evaluation parameters as constraints

Figure 3: Typical critical-care patient room.

As electronic medical records become more prevalent, hospitals should think about changing how they use the space of a centralized nursing station. This centralized space could become a business/care center for interdisciplinary practice (nurses and physicians), which would, in turn, make physician office and department practices more efficient. The nursing stations could be decentralized to reduce travel time and workload index and increase direct-care time. Problems relating to cultural change and human factors (nurses are most familiar with centralized stations) can be resolved with concerted effort. The data are clear—decentralized stations reduce the waste and inefficiency of typical work patterns of hospital nurses (see Figure 3).

The Department of Medical Engineering of the Hospital has been established as a medical equipment engineer since 2000 and is currently one of the best and most advanced medical engineering centers in the world, and has been active annually for a number of undergraduates and graduate students Medical engineering (biotechnology, biomechanics, biotechnology, radiation therapy and electronic engineering) to attend training courses from top universities of the country.

In this department, which is under the supervision of the hospital's paraclinical management, the specialties related to medical engineering are combined in a way that includes all the fields related to medical devices. These specialties include medical engineering, electronic engineering, mechanical engineering, Management of medical engineering. In this department, all the affairs related to medical devices and activities related to medical equipment engineering, such as medical device identification, are available in the comprehensive software engineering system of medicine, and this information is visible in all parts of the hospital. Among the most important activities are:

- Establishment of medical equipment management system in the form of software automation
- Establishment of the PACS Medical Upload and Archiving System and the establishment of standards related to radiological images and digital radiology devices for the first time in the country since 2006.
- Periodic inspection visit of the medical equipment and preventive maintenance of the PM equipment, performing all repairs of the devices that are outside the coverage of the warranty or commitment of the company.
- Performing qualitative control and comparing the performance of the devices with a standard sample (calibration) carried out periodically and all calibration reports are available both in software and in the written report.
- Monitoring the performance of medical equipment companies in connection with the installation of new devices, as well as repairs performed inside and outside the hospital, and the quantitative and qualitative review of the reports, as well as the costs of the devices according to the current regulations of the Ministry of Health
- Carrying out cross-sectional studies on the effectiveness of existing equipment in the hospital and field assessment and the effectiveness of their use.
- Perform training on the operation and operation of medical devices in general, special units, operating rooms and other parts of the hospital for users routinely or on request of departments Planning and forecasting replacement of old hospitals with new and needed medical equipment in the hospital
- Preparation and planning of the required future devices, procurement, and procurement procedures, as well as the needs assessment of the devices and the preparation of technical comparisons for submission to the hospital procurement commission
- Scientific and technical support of hospital Scientific and Applied Science Center and the launching of medical equipment technology fields in various operating room equipment, infective control equipment, CSSD and laboratory equipment.

4. CONCLUSION

The built environment, enabled by technology, provides an enormous untapped opportunity for reducing waste and improving care when non-value-added analysis is used to improve caregiver workspaces. The development of new care delivery models to match new hospital environments will be an imperative for the future. This demonstration unit, which provided a healing, patient-centered design to support the patient and caregivers, improved both clinical and fiscal outcomes. The design has been tested and the good result has been obtained.

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