Design and quality in the project for health buildings

The horizons of innovation

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keywords
health buildings
design
project quality
scales of innovation
healing process

Introduction

For centuries, buildings for health care have often been considered as some of the highest moments of the architectonic discipline becoming a reference both from a compositional point of view and for technological contents.

In parallel, the issue of spaces in health care facilities has been continually stressed in the past since the concept of curing was born.

It is well-known that Asclepiades of Bithynia wrote in 50 B.C. about the influence of dark places on sick recovery, and Florence Nightingale's ideas explored the links between the environment and patient recovery (Tartaglia, 1998).

But the quality of spaces nowadays copes also with the fact that the speed of medical science evolution and of the transformation of social demands produces a quicker and quicker reduction in modern health building performances. In fact, as Romano Del Nord stressed in a conference in 2010[1] the "perturbations" that make hospitals obsolete and which call for renewal actions are increasingly frequent and sudden: evolution of the concept of health; biotechnology innovations; renewed hospital standards; changes in the way of providing care and assistance. The growing dichotomy between the timescale necessary for diffusion of medical-scientific knowledge, technological

and instrumental updating, and the timing not only of renewal but also of project definition of new and adequate typological and morphological models is increasingly evident. Too often a new building for health care is born "old" (Tartaglia, 2006).
For this reason, in the health sector the anticipation qualities of the design and project activity are a fundamental element that must characterized every intervention. Innovation and quality are the indispensable contents to sustain the durability of health buildings.
In a book of 1992, the urbanist and sociologist Roberto Guiducci stated that we do not have to look to or to predict the future: the future must be invented (Guiducci, 1992). This is much truer when we talk about the construction of services and facilities for the collectivity such as health buildings.

The scales of innovation
The actual organizational approach of health systems is based on a network model in which every facility represents a node of the net. For this reason, a proper design approach needs to consider the different scales of the network. The three scales (territorial, urban and building) are transversally connected and influenced by the system of strategies, actions and projects.
The territorial scale is the one at which regions and cities compete to attract interests, capital, businesses and people.

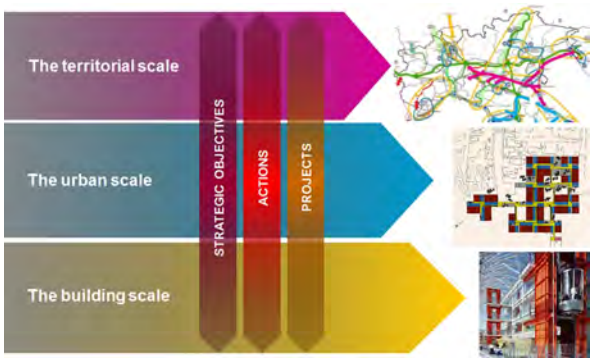

fig01 – The scales of innovation and their integration.

At this scale is measured the efficiency, implementation effectiveness, results and quality of programmatic frame.
The contemporary challenges, also concerning heath, demand for new design skills, new administrative and decision-making behaviors, and stress the need for new levels of co-participation in the construction of the future of the city and the territory.
In this scenario, hospital facilities can be considered as a supralocal service qualifying the entire territory with a double value: multifunctional polarities (university, research and experimentation in the medical-pharmaceutical field and biotechnologies), coordinated with a support territorial system; compendium of services to the citizen and to the territory related to the broad theme of health and prevention. But, also at this scale, the role of local services is as well important for the quality of the entire system and their design must consider their strategic role.

At the urban scale, health services play a strategic role in defining the urban structure. The reorganization of the health system in a city cannot be developed separately from a broader strategic vision for the transformation and development of the city itself. Functional synergies, mobility system, environmental impacts are only few of the possible issues related to the transformation of the health services and the connected facilities in an urban environment.
The building scale is the one in which territorial and urban strategies must find a specific answer by a project in which innovation and research of quality take in consideration laws and regulations, economic and environmental sustainability as efficient use of the resources.
In this scenario, innovation can be declined in different contests and not only with reference to new architectonic and morpho-typological models. Process and product technologies can produce significant feedbacks regarding life cycle performances also in terms of service quality, resource management and cost control. Of course, the need of innovation is strictly connected to the idea of quality and standards.

Quality in health facilities

Design quality is one of the key elements for the success of a health facility, but the verification of the quality of a project is an activity that presents multiple difficulties. It is evident that quality is a complex value related to cultural and conceptual tools and related to the subjectivity of the point of view from which is analyzed. The concept of quality with respect to health facilities has varied greatly in centuries. If initially the quality resided mainly in the symbolic value that the project was able to transmit, later attention has shifted to functional answers that the building was able to give respect to the needs of the medical and health personnel. Nowadays, however, attention seems to have moved more on the user (patient, visitor, health staff, non-healthcare personnel) and how the user receives the services that are provided through the facility.
There are different models to evaluate the qualities in healthcare design and almost all of them consider wide range of parameters. Of course, the specific build characters (performances, technological solutions, construction qualities, etc.), but also functional elements (accessibility, usability, organization of the spaces, etc.) and then all the characteristics that can be perceived by the users (materials and shapes, indoor environments, integration with the urban system and functions, etc.). But there is an important element often underestimated. The quality in the design is strictly related to the social model of care. As already stressed each facility is part of a wider network and it is characterized by a specific role. So, it is not only a problem of performance of the

building, quality of the construction and accessibility, but also it is relevant how each structure can participate to the correct functionality of all the other facilities that constitute the network of health service supporting an integrated patient pathway. On the other hand, the quality of the experience of the patients must be balanced with the sustainability of the intervention.
This integrated view of a facility/service centered on the person has been clearly systemized in a scheme developed some years ago by Medical Architecture Research Unit (MARU) based in London.

fig02 – A customer focused model to pursue efficient innovation in healthcare developed by Medical Architecture Research Unit – MARU, LSBU (credits: MARU).

Among the different element of attention during the design phase to pursue quality there are two aspect that have assumed a strong centrality: one is synthetized in the issue of flexibility; the second is related to the existing link between architectonic solutions and healing process.

Flexibility

In recent years, many authors have identified in flexibility the proper answer to change (Capolongo, 2012). But flexibility in health facilities can assume different meanings and interpretations. In fact, health care can demand flexibility in the design, in the construction, in the use and in the management. The result of the design activity is not simply a plan for a building, but it must be a strategy able to open to different occupancy scenarios that can change and evolve during the time. Not an open project, but a project able to guarantee different configuration and adaptability without diminishing the quality and the performances of the services. Moreover, to ensure "real efficiency of the services provided with respect to continuously changing systems, epidemiological trends, social and economic needs, it is necessary flexibility weaves together the planning level, the network system of local services, the health buildings in which delivers all the services and the mono-functional environmental units. All these layers should be structured with respect to organizational and managerial levels in an adaptive and resilient

way" (Astley et alii. 2015:168). Of course, physical flexibility is normally related to design and technical solution supporting adaptability, transformability, enlargeability, reconfigurability and integrability (technologies, functions, etc.). But it is also true that in health facilities in the recent past there was the tendency to overspecialize each space reducing the normal flexibility in the use and sharing of the rooms. This penalizing the environmental quality of the spaces that is an important element to support the job of staff and the wellbeing of patients too. An emblematic case of this is the Infectious Diseases Department of the Hospital of Sant'Angelo Lodigiano (Italy)[2]. Planned under the strict regulation of the nineties to cope with HIV epidemic, that was perceived as an acute disease, had to respect very specific and rigid standards. But the attempt was to respect all these functional and regulatory needs, renewing however the consolidated and often obsolete types in favor of a better environmental quality for all users. It was not limited to the creation of functional spaces for medical activities, but it recovered a central role for environmental and perceptive quality. The three major functions (outpatient clinic, day-hospital and ward for infectious patients with treatment rooms) were designed according to all the specialistic contents related to the specificities of the illness. But all the traditional solutions were reinterpreted to give new perceptive values to the spaces.

Each room differs from the next in shape and color; the walls facing the beds are slightly curved to stimulate the patient's attention with shadows and shades that vary with changes in natural light. The patient's gaze is free to flow along the walls without having the negative feeling of being in a close box. The lowering of the windows and the conformation of the rooms leads the patient to turn his/her attention to the park. The zenithal illumination of the corridor avoids the formation of shaded areas and a punctual color plan (floors, walls, doors, electrical conduits) allows an understanding of sanitary spaces. A winter garden, which divides and unites the outpatient clinic and the day-hospital area, is a necessary element to improve the quality of life of health workers and daily patients (Tartaglia, 2000).

In any case, a structure with no specific solutions or techniques in favor of flexibility and transformation in use. However, the quick change in medical knowledge regarding HIV – from acute illness to chronic condition - has rapidly pushed the hospital management to change the functions and the services hosted in this building. For example, different medical specialties were hosted in the outpatient clinic, but no modification was necessary or was simply requested by the entrant medical staff. The environmental qualities of the spaces overpassed any need of adaptation. This example stresses the fact that quality is not always related to an overspecialization of the spaces and to a strongly functional image, but the environmental qualities can be the key element.

fig03 - Infectious Diseases Department of the hospital of Sant'Angelo Lodigiano.

Design and healing process

The attention to environmental components in health facilities design – overpassing the simple aesthetic issues - is something that in the last decades has become more and more central. In modernity we can identify the moment of change with the sixties. Prior to the first studies of environmental psychology the therapeutic environment was merely a place in which therapy happened (Canter and Canter, 1979). In that period, following the publication of research studies, the therapeutic environment started to indicate a major agent and, subsequently, an environment designed to positively influence medical outcomes. This awareness – supported by new studies such as probably the most famous were carried out by Roger Ulrich - has leaded to new models to consider environmental and social variables in health facilities design. After the first phase of the generalist therapeutic environment, architects and experts talked of healing environments, health-promoting design to arrive to the more structured models called evidence-based design[3] and salutogenic design[4].

fig04 - Psychiatric unit for diagnosis and treatment of the Hospital of Codogno.

The common element is the awareness of the possible relationship between the designed environment of health facilities and the wellbeing of patients and users coming to the possibility to have positive feedback on the healing process.
A positive example of this approach is the project for the Psychiatric unit for diagnosis and treatment of the Hospital of Codogno (Italy)[5]. As the medical director stressed in a paper: "the idea of operating in a very large structure, with open and bright spaces and well-separated patients, was apparently in contrast with the custody rules that have so far characterized psychiatric wards, especially for cases of mandatory medical treatment.
On the contrary, it has been observed that - by having spaces with such characteristics and, in particular, offering even to more problematic patients greater privacy and greater freedom of movement – extremes of patients' character were attenuated, which immediately improved their behavior.
Several months after the activation of the structure, no vandalism was recorded, there were only 2 attempts to repatriate (also returned immediately) and only one self-injurious attempt, with evident demonstrative characteristics and therefore independent by the type of structure" (Gatti Tartaglia, 2006, p. 79-80). These results were also due to the uncommon - according to period of the construction - design solutions.
The realization of the psychiatric center inside a park and close to a rationalist building are some of the factors that determined the final innovative articulation of the building that consists of five units of hospitalization assembled around common areas and identifiable as individual "cottages".
The internal space, designed to meet the needs of the sick, can only be perceived by following it, stimulating on the one hand the ambulation and on the other the aggregation in specific places suitable for group activities. Moreover, three winter gardens are the elements of continuity between outside and inside but are also space for socialization and common activities.
The solution was designed in a strong discontinuity with traditional and standard typologies, but the results stressed also a significant gap with the typical performance in terms of wellbeing and therapeutic outcomes.

Conclusion

During the planning of a healthcare facility there are many factors - such as regulatory and technological constraints, costs, construction and planning times - that must be considered and that can limit the degrees of freedom of the project. But these constraints must not hinder the activation of a synergic process of collaboration to be established among technicians of the building sector, experts and health operators, managers and administrators, and users, aimed not only at defining functional spaces for the provision of

services for which the structure is appointed, but above all to the definition of environments characterized by intrinsic qualities which, in addition to facilitating the activity of health workers, favor a state of well-being in all users of the structure.
In this scenario, a systemic and multiscale approach able to lead the process from the programming to the management phase is an indispensable necessity.
Some experiences, such as the two presented in this paper, demonstrate the importance and the impact of a correct use of design for health facilities. But this knowledge cannot be an eventuality left to the good will of designers and clients but must be considered as a benchmark to evaluate every single project in health sector.

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Notes

1 - "Romano Del Nord, speech at the international Seminar "Designing the flexible hospital", Politecnico di Milano, 5th of February 2010.

2 - Designed by Studio Tartaglia Partnership, Studio Rozza Associati and Studio Ferraro, it was the first hospitals in Italy equipped with a winter garden to allow users to use the green and a tranquilizing environment even during the cold seasons.

3 - According to The Center for Health Design, "Evidence-Based Design (EBD) is the process of basing decisions about the built environment on credible research to achieve the best possible outcomes. Included in this process are the following eight steps: define evidence-based goals and objectives; find sources for relevant evidence; critically interpret relevant evidence; create and innovate evidence-based design concepts; develop a hypothesis; collect baseline performance measures; monitor implementation of design and construction; measure post-occupancy performance results" (https://www.healthdesign.org/certification-outreach/edac/about).

4 - "The theory of salutogenics has a basis in the

empirical testing and ideas of Antonovsky (Unravelling the mystery of health, 1987) which find that health outcomes improve when a sense of coherence is fostered. A sense of coherence (SOC) in turn, depends on the net resources that support meaning, comprehensibility or manageability… Ultimately, the healthcare designer has to juggle two narrative concerns. On one hand, vigilance is needed to avoid any typologies, symbols and settings that may be associated with negative outcomes. On the other hand, the team should look for opportunities to imbed positive experiences for all the facility users. Not only are all good things expected to improve the outcomes for patients, but to improve the environment for the entire facility including the staff and guests" (Golembiewski 2012: 63/37)..

5 - Designed by Studio Tartaglia Partnership, Studio Rozza Associati and Studio Ferraro, the Psychiatric unit is constituted by an historic ward used for the medical rooms, the canteen and the public services and an enlargement for the inpatient rooms and the spaces for common activities and services.