8th REA Symposium Embracing Resilience: Scaling up and Speeding up
Kalmar, Sweden, June 24-27, 2019

FUNCTIONAL AND STRUCTURAL REQUIREMENTS IN HEALTHCARE SYSTEMS: A METHOD FOR THEIR INTEGRATED MANAGEMENT

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Healthcare systems are well-known as Complex Socio-Technical Systems (CSS), in which patient outcomes may be framed as emergent phenomena arising from the Joint Cognitive System formed by the interactions between social and technical agents. The built environment is a key part of the technical dimension of healthcare, as it encompasses the physical space, technologies and furniture that support the functions performed by agents. Several studies indicate that the built environment plays a role in both patients 'outcomes and providers' performance.
However, the interactions between the built environment and the activities carried out by the agents in healthcare systems are usually modelled based on work-as imagined (WAI) by regulations, without accounting for the understanding of work-as-done (WAD). This may hinder the resilience and safety in healthcare, given that WAD differs from WAI. Furthermore, the design of the built environment in healthcare facilities needs to address the requirements of a diversity of users, which may involve trade-offs.
These requirements must be identified from techniques that account for WAI and WAD, such as the Functional Resonance Analysis Method (FRAM). In turn, to support the management of requirements, the use of Building Information Modeling (BIM) is an alternative to store and connect the requirements with the modelled tridimensional spaces. It enables a better visualization and updating of the evolving nature of the requirements in the design of the built environments.
The objective of the research study is to propose a method for the integrated management of functional and structural requirements in healthcare systems, analyzing the influence of meeting these requirements on resilience. Functional requirements are defined as the users´ needs related to the functions they perform. Structural requirements are defined as the characteristics that must be present in a physical space for those functions to occur. The interactions between the requirements, and between these and the functions, were modelled through the FRAM. The FRAM model considered the functions from the admission to discharge of patients in an Intensive Care Unit (ICU). The aforementioned requirements were regarded as preconditions for the functions, in the FRAM model. Instances of not meeting the requirements implied in the variability of the output of functions, thus triggering the need for reactive resilience from the agents. BIM platforms was used in order to facilitate the requirements management. The study results supported decision making in the design of a new ICU, which is currently under construction.

ISBN: 978-91-88898-41-8