Ain Shams University
Faculty of Engineering
Department of Architecture

Implementation of Building Information Modeling Technology in the Design Process

A Thesis Submitted to the Faculty of Engineering in Partial Fulfillment for the Requirements of the Degree of Master of Science in Architecture

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Statement

This thesis is submitted to Ain Shams University for the degree of Master in Architecture. The work included in this thesis was accomplished by the author at the Department of Architecture, Faculty of Engineering, Ain shams University from 2010 to 2013.

No part of this thesis has been submitted for a degree or a qualification at any other university or institute.

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Abstract

Title: Implementation of Building Information Modeling technology in the design process

Description: Building design process involves dealing with a lot of information. With the advent of computers, many improvements were made to this process and many of the manual processes associated with it were automated. But this progress has been constrained by the limited intelligence of computer applications in representing buildings and the capability to extract the relevant information needed for design, causing problems with conveying design intent, speed and accuracy. That led to the development of Building Information Modeling (BIM) technology. BIM involves the use of information rich models to simulate the design, construction and operation of a facility in a more convenient way.

This research aims to explore the new and changed methods and activities of design as affected by BIM. It presents a new theoretical framework of dealing with design activities in the new BIM-enabled environment. This was done through discussing traditional computer aids for design, highlighting the limitations and inefficiencies in the design process under a pre-BIM design environment. Next the main principles of BIM were discussed highlighting the problems it addresses and what changes it may cause in traditional projects' duration and staff configuration. Then the research deduced eleven BIM applications in architectural practice, varying from academic experimentation phases to established professional practice. Next the nature of the design process, the activities it involves and the stages it goes through were investigated to produce a map of design activities. Then the eleven BIM applications were superimposed on the map of identified design activities, highlighting the areas of change and improvement, producing a theoretical framework of dealing with design activities in the a BIM-enabled design environment. Finally three case studies were presented to illustrate the practical implementation of the technology in the design process.

Keywords: Computer aided design (CAD), Parametric Design, Building Information Modeling (BIM), Architectural Technology.

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