



Fayoum University
Faculty of Engineering
Department of Architecture.

Biomimicry: Towards a new methodology to improve the thermal performance of buildings in hot dry climate.

BY
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ABSTRACT

The research aims to formulate a specialized and practical biomimicry methodology aimed at creating buildings that can adapt to various environmental factors by imitating natural models "Thermal adaptation mechanism".

The methodology is transformed into a matrix to monitor and document all steps and stages of the design process (natural simulation) and present the results for each step. Two checklists were derived from various stages of the "Biomimicry Methodology" to measure the extent to which the product of imitation (whether projects or design principles) applies the philosophy behind biomimetics (mimicking nature for sustainability), one for projects "Criterion List of Projects", and the other for design principles "Criterion List of Principles".

The methodology is supported by providing a structure for a primarily database for classifying, analyzing and storing thermal adaptations of biological systems. This database will be used as a tool to extract biological models that will be imitated during the application of the methodology (design process).

The possibility and validity of the "methodology" was verified by applying it to a case study (Kharga City) to extract an initial list of "passive design principles" derived from natural biological adaptation mechanisms. The list will be evaluated against the "Criterion List of Principles". The methodology was also

validated by analyzing several important projects mimicking nature according to the steps of the methodology, and then evaluating them against the " Criterion list of projects".