



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم



MONA MAGHRABY



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شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



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Biophilic Design as an Approach for Enhancing the Quality of the Views Out and Indoor Daylighting in Intensive Care Units

A Thesis Submitted
In partial fulfillment of the requirements of the
Master of Science Degree in Architectural Engineering

Submitted By

Nada Tarek Abdelraouf Esmael

B.Sc. in Architectural Engineering, Faculty of Engineering,
Ain Shams University, 2014

Under the Supervision of

Prof. Dr. Samir Sadek Hosny

Professor of Architecture and Design Computing, Department of
Architecture, Faculty of Engineering, Ain Shams University

Prof. Dr. Hanan Mostafa Kamal Sabry

Professor of Environmental Design and Control, Department of
Architecture, Faculty of Engineering, Ain Shams University

Associate Prof. Dr. Sherif Morad Abdelmohsen

Associate Professor, Department of Architecture, Faculty of
Engineering, Ain Shams University

Cairo, Egypt.

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Name: Nada Tarek Abdelraouf Esmael

Thesis Title: Biophilic Design as an Approach for Enhancing the Quality of the Views Out and Indoor Daylighting in Intensive Care Units

Degree: Master of Science Degree in Architectural Engineering

Thesis Defence Date: / /

The Jury Committee:

Prof. Dr. Zeinab Youssef Shafik

Professor of Architecture, Department of Architecture, Faculty of Engineering, Cairo University

Prof. Dr. Mostafa Rifat Ismail

Professor of Environmental Design and Control, Department of Architecture, Faculty of Engineering, Ain Shams University

Prof. Dr. Samir Sadek Hosny

Professor of Architecture and Design Computing, Department of Architecture, Faculty of Engineering, Ain Shams University

Prof. Dr. Hanan Mostafa Kamal Sabry

Professor of Environmental Design and Control, Department of Architecture, Faculty of Engineering, Ain Shams University

Post Graduate Studies:

Approval Stamp

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The Thesis was Approved on

..... / /

Faculty Council Approval

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University Council Approval

..... / /

Disclaimer

This thesis is submitted as partial fulfillment of M.Sc. degree in Architecture, Faculty of Engineering, Ain Shams University. The work included in this thesis was carried out by the author and no part of it has been submitted for a degree or qualification at any other scientific entity. The candidate confirms that the work submitted is her own and that appropriate credit has been given where reference has been made to the work of others.

Name: Nada Tarek Abdelraouf Esmael

Signature:

Date:

Examiners Committee	Signature
Prof. Dr. Zeinab Youssef Shafik Professor of Architecture, Department of Architecture, Faculty of Engineering, Cairo University	
Prof. Dr. Mostafa Rifat Ismail Professor of Environmental Design and Control, Department of Architecture, Faculty of Engineering, Ain Shams University	
Prof. Dr. Samir Sadek Hosny Professor of Architecture and Design Computing, Department of Architecture, Faculty of Engineering, Ain Shams University	
Prof. Dr. Hanan Mostafa Kamal Sabry Professor of Environmental Design and Control, Department of Architecture, Faculty of Engineering, Ain Shams University	

The application of biophilic design metrics in healthcare buildings has positive impact on enhancing users' health and their emotional wellbeing. Moreover, the thoughtful applications of these metrics can resolve the noticed division between human need and buildings performance. So, these metrics should be taken into consideration since the beginning of the design of intensive care units (ICUs).

This thesis aims to enhance the quality of both the views-out and indoor daylighting in ICU patient rooms, through the biophilic design approach, which will consequently improve patient's health, sleep, and reduce his stress levels. In order to achieve this goal, two methods (deductive/ inductive) followed by two tools were used.

The first tool was a theoretical study of; the biophilic design concept, its metrics and their design considerations, intensive care units (ICUs) design parameters and considerations, buildings that successfully incorporated biophilic patterns in their design, and the methods used for enhancing both the views-out, and indoor daylighting quality in patients' rooms. As well as, methods used for enhancing ICUs medical process to promote user health and experience. This is in order to cover all the definitions, concepts, design considerations needed for the case study.

The second one was an analytical study used to enhance daylighting performance and the views-out of the chosen ICU single patient room case study through the thoughtful applications of biophilic design daylighting and views-out metrics. And that was through using simulation/optimisation analysis, to identify the optimal design of the parametric combined light shelf installed over the chosen case study window, which achieves both daylighting and the views-out metrics. And through, using survey analysis to measure the quality of case study proposed views-out, through measuring people degree of satisfaction towards these proposed views-out designs, which is based on the biophilic approach.

The thesis findings resulted from discussing and analysing the results of base case performed daylighting simulation and case study multi-objective optimisation. As well as, discussing the findings of the performed questionnaire, aims to introduce the application techniques used in the case study that led to enhancement of daylighting and the views-out quality of this case study, which consequently leads to improvement of patient's health. Moreover, it aims to introduce proposed application techniques for enhancement of daylighting and views-out quality of different ICU patient room cases.

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