بسم الله الرحمن الرحيم

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تم رفع هذه الرسالة بواسطة / مني مغربي أحمد

بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى مسئولية عن محتوى هذه الرسالة.

ملاحظات: لا يوجد

The impact of design configurations of educational spaces on indoor air quality (IAQ)

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A Thesis

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Statement

This thesis is submitted as a partial fulfillment of Master of Science in Architectural Engineering, Faculty of Engineering, Ain shams University.

The author carried out the work included in this thesis, and no part of it has beensubmitted for a degree or a qualification at any other scientific entity.

Nourhan Alaa Eldin Sary Eldin

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Date

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Abstract

There has been a growing interest in investigating indoor air quality levels in complex buildings such as primary schools to assess the impact of students' performance and well-being. Concerns are raised towards identifying the parameters that negatively affect indoor air quality in classrooms. Poor indoor air quality is expected to play a vital role in the prevalence of allergic and respiratory diseases.

Indoor air quality in schools plays an important role in assessing student exposure to air pollution as children are more sensitive when exposed to unhealthy air because they breathe more air than their body weight and at a faster rate.

This study shows measurements of carbon dioxide (CO_2), particulate matter (PM2.5) and volatile organic compounds (VOCs) on indoor air quality for classrooms in a primary school in Cairo, Egypt, and discusses the concentration levels of these parameters on indoor air quality. Readings of the measurements were applied on an air quality monitoring system that is developed by the author. This study raises awareness towards considering indoor air quality in schools designs with the purpose to minimize health risks and improve students' Learning performance. This research follows the deductive method. It hypothesizes that school designs, typologies, and configurations affect the extent of natural airflow and ventilation within classrooms, and thus air quality.

These factors are:

1- Orientation of the classrooms
2- design configuration of school buildings (clustered, linear -single or double loaded corridor-, central around courtyard)
3- Effect of surroundings such as distance from the street - the operation type of the surrounding buildings.

Therefore, measurements of the air quality parameters will be taken on several different designs, typologies and configurations in order to:

1- Evaluate the current situation in some primary educational schools in downtown Cairo
2- Measure the effect of these parameters on air quality
3- Compare these measurements with the international guidelines.

Keywords: Indoor air quality, primary school, natural ventilation, carbon dioxide (CO_2), particulate matters (PM2.5), volatile organic compounds (VOCs).

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