

Impact of Classroom Plants on Students' Comfort and Performance in UAE

تأثير النباتات في الفصول على الراحة وأداء الطلاب في دولة الإمارات
العربية المتحدة

By

Hadil Al-Bustami

ID: 110154

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Dissertation Supervisor

Professor Bassam Abu-Hijleh

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Abstract

This study investigates the impact of green-wall inside a classroom on students. The aim of this study is to verify what previous studies affirmed as of a positive relationship between the existence of plants in a room and performance and psychological state. The methodology of this study was experimental. A green-wall was placed inside a classroom and indoor air parameters and thermal comfort levels were compared before and after placing the green-wall by using indoor air quality devices and locating them in the middle of the classroom. The measured factors were: TVOCs, CO₂, Ozone, CO, TPM, Temperature, RH and Acoustical levels. Then, changes were done to the way of measuring the parameters by locating the devices near and far the green-wall. A survey was conducted to take students' opinions before and after placing the green-wall. It was found that not all indoor air parameters were affected after locating the green-wall. Three main factors were changed positively; TVOCs, CO₂ and Temperature levels. As for the opinion survey, responses showed a positive difference after placing the green-wall and the difference between their opinions before placing the green-wall and after placing it was significant. Furthermore student's scores were analyzed at the end of the semester and were found a significant change between student's marks in the green-wall classroom and other student's scores in the basic classrooms.

It was concluded that the impact on the students was more psychological than tangible as the measurements did not differ to the extent to affect indoor quality. Moreover, the researcher concluded that the amount of plants placed inside a classroom should be calculated according to three ratios: amount of plants, size of the room and the average amount of air pollution found in the space.

Since the psychological impact on the student was significant, the researcher recommended that green-wall should be part of each classroom in order to improve the sense of comfort among students and more than one green-wall should be placed in each classroom to make a difference in the parameters that increase the level of comfort.

الملخص

تبحث هذه الدراسة في تأثير الجدار الأخضر داخل الغرفة الصفية على الطلاب. وتهدف هذه الدراسة إلى التحقق مما أثبتته الدراسات السابقة من أن هناك علاقة إيجابية بين وجود النباتات في الغرفة وبين الأداء والحالة النفسية. وقد اتبع المنهج التجريبي في هذا البحث حيث تم عمل تجربه أولى بوضع جدار أخضر داخل الغرفة الصفية والقيام بقياس مكونات الهواء قبل وبعد وضع الجدار, ثم تم اجراء التجربة مرة اخرى ولكن بتغيير طريقة اخذ القياسات وهي بقرب الحائط الاخضر و بعيدا عنه. ثم أجري استطلاعاً لآراء الطلاب لمعرفة أثر الجدار على الطلاب من الناحية الصحية والادائية و الذهنية. وقد وجد أن بعض مكونات الهواء قد اختلف بعد وضع الجدار الأخضر عما قبله و أن آراء الطلاب عكست ارتباها كبيرا بعد وضع الجدار الأخضر. وقد تم الاستنتاج أن تأثير النفسي للجدار الاخضر كان اكبر بالنظر إلى تأثير الجدار على قياسات الهواء الداخلي للصف, ولكن وجود النباتات في الغرفة الصفية بعث على الشعور بالارتياح. كما تم الاستنتاج أنه لكي يكون هناك تأثيراً للنباتات على نوعية الهواء الداخلي لا بد من أن تكون نسبة النباتات إلى حجم الغرفة و نسبة التلوث فيه نسبة فعالة , كأن يكون هناك أكثر من جدار اخضر. اوصت نتائج هذه الدراسة بضرورة وضع المزيد من الجدران الخضراء او النباتات داخل الغرف الصفية لبعث الشعور بالارتياح لدى الطلبة لتصبح جزء رئيسيا من تصميم الفصول الدراسية .

ACRONYMS

ACGIH/ TLV: American Conference of Governmental Industrial Hygienists / threshold limit value

ASHRAE: American Society of Heating, Refrigerating and Air-conditioning Engineers Inc

IEQ: Indoor Environment quality

IAQ: Indoor Air Quality

IDPH: Illinois Department of Public Health

OSHA/ PEL: Occupational Safety and Health Administration/ permissible exposure limit

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