EFFECT OF INTERIOR PLANTSCAPING ON INDOOR ACADEMIC ENVIRONMENT

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ABSTRACT

This study was conducted at the Institute of Horticultural Sciences, University of Agriculture, Faisalabad during September-October, 2004.The objective was to observe the role of interior plantscaping in academic environment and its contribution in improving the health, feelings and educational performance of the students and teachers. The classrooms of University College of Education, Faisalabad were ornamented with suitable indoor plants and then a comparison between scaped and unscaped classrooms was made through a social survey. It was found that mental tiredness (34.2%), lack of concentration (18.6%) and respiratory congestion (16.6%) were the major problems faced by the students in unscaped classrooms. However, most of the teachers community (66.7%) felt no such problem. The respondents felt improvement in air quality (77.6%) and academic performance (76.8%) and addition of pleasant view (81.2%) in plantscaped classrooms. More than 84 percent respondents agreed to participate voluntarily in plantation campaigns and the same percentage was ready to donate for the purchase of indoor plants for keeping these in their classrooms. It was inferred that indoor plantscaping improved the academic performance, air quality in the classrooms and passion of the respondents for plants.

KEYWORDS: Pot plants; microclimate; education; students; teachers; Pakistan.

INTRODUCTION

Interior plantscaping means the dressing and filling of spaces at indoor premises (rooms, corridors, halls, classrooms, etc.) with suitable plant species and some hard elements to incorporate natural beauty. Indoor decorative vegetation was developed from the use of container grown plants in China 3000 years ago. In 11^{th} and 12^{th} century, potted plants were used over walls in hanging baskets in China for natural beauty. In 18^{th} century, with the introduction of glass, Romans copied Greek traditions of growing plants in orangeries. In this era, roses and grapes were grown in heated gardens and conservatories. The idea has got immense popularity for last few decades and now educational institutes, homes, offices, shopping centers, hotels, lobbies, high level public and private official meetings and all kinds of indoor

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environments are being designed with spaces, which are reserved for installing the plants. The objective of the research project was to observe the positive role of indoor plants in improving the health academic performance of students and teachers and development of passion for these environment friendly living entities.

Stiles (6) described that Americans and lower middle classes of Europe were the pioneers of interior plantscaping in 19th century. She concluded that modern trend for house plantation first appeared at the end of 1940s along with wider use of central heating. By the 1960s houseplants and modern interior designs had become inseparable. Interior scaping a source of pleasant and conducive environment is rapidly flourishing and is attaining the status of industry. Wood (13) presented that people living in cities spend about 80 percent of their life time indoors and indoor air represents a major proportion of their exposure to air pollution. In some circumstances, poor indoor air quality may pose serious health risks, particularly in susceptible individuals. Especially studies in class rooms feel boredom and lose interest owing to lack of oxygen, polluted air with dust, excessive carbon dioxide, volatile molecules of paint and varnishes from furniture and noise produced by fans, air conditioners, etc. Costa (3) reported that plants had measurable beneficial effects on room acoustics, absorbing, diffracting and reflecting sound. He also found that plant leaves play an important role in the process of removing toxic chemicals from the air. Tereshkovish (7) concluded that working with plants has healing quality and is relaxing and satisfying activity. Manaker (5) reported that working among plants provides a means of exercise and mental relaxation. Ulrich (9) reported that hospital patients placed in rooms with windows facing plants heal faster and require shorter hospital days. Waliczek *et al.* (10) revealed that gardens have been used for therapy and as a mean for rehabilitation of mentally ill persons, disabled soldiers, school children and hospitalized people.

The objective of the project was to observe the positive role of indoor plants in improving the health, academic performance of students and teachers and developing the passion for these environment friendly living entities.

MATERIALS AND METHODS

The study was conducted at the Institute of Horticultural Sciences, University of Agriculture, Faisalabad during September-October, 2004. The college building, especially classrooms of University College of Education, Faisalabad

were renovated with different suitable species of potted indoor plants. The respondents, who were mainly concerned with the academic activities in indoor college environment, were chosen for this study. They were distributed a questionnaire seeking their perception about effects and benefits of indoor plants installed in their classrooms.

Sampling

For this purpose the respondents were categorized into students and teachers. They were also stratified on the basis of gender. The students were first categorized according to different levels of their studies (Post Graduate Level: M.A. Education, M.Ed. and Under Graduate Level: B.Ed.). In all 250 respondents were interviewed using a preformatted questionnaire.

Data collection

The students were interviewed according to questionnaire. The information was collected through open ended and closed questions. The questionnaire was based upon personal information, sorting out the problems faced by the students and teachers in classrooms, benefits of plants in academic environment, opinion of the students if they would strive for interior plantation in their classrooms and to have a measure of passion among students for plantation. A pilot survey of University College of Education was conducted to determine the response and availability of persons involved in academic activities and to find out any error in questionnaire. In second phase a detailed survey of the college was conducted to collect the required data. The duration of the said survey was 30 days.

Analysis of data

The collected data were arranged and analyzed using SPSS (Statistical Package for Social Sciences). Required cross tables were formed for analysis of data. Then using these cross tables, pie charts and bar charts were constructed. Chi-square test was applied to analyze the data because there was non-parametric population and there were nominal variables in the data. Statistical difference of different parameters was tested at 0.5 percent probability. For some questions where evaluation was essential, digital values (1-6) were assigned as per requirement of analysis.

RESULTS AND DISCUSSION

1. Stratification of the respondents

The analysis of results concluded that on an average the teachers remained busy in academic activities for 4-5 hours and students remained busy for 5-6 hours daily and for six days a week. The stratification of the respondents indicates that majority (88.8%) of them were students and rest (11.2%) were teachers. The respondents were also stratified on the basis of gender. The results showed that females were slightly more (52%) than males (48%). The students were further stratified on the basis of their study level and it was found that a considerable majority (66.4%) was undergraduate students while rest (33.6%) belonged to postgraduate classes. The respondents who belonged to age group of 18-25 years was the largest (80.4%) section, whereas those who were either 36 years old or more were only 6 percent and all of them were teachers.

2. Plantscaped and unscaped classrooms

In order to get the initial impact, respondents were asked if the plantscaped rooms were better than unscaped rooms. Significant majority (83%) declared that plantscaped were better. Only 0.8 percent people rejected the idea while 15.6 percent respondents did not respond. However, all the teachers (100%) supported the introduction of plants.

3. Problems felt in indoor college environment

The analysis of the data reflects that 98.5 percent students felt many health problems among which mental tiredness is the major one (34.2%). Lack of concentration (18.6%), respiratory congestion (16.6%) and heavy head (14.6%) were other major problems while visual disorder and headache were minor problems faced by the students. Only 1.5 percent students said that they had no problem in the classrooms. Wood *et al.* (12) estimated that 20-30 percent of Western European and North American buildings are "problem buildings" (buildings in which more than 20-30 percent of employees have health complaints). However, contrary to the students, majority of the teachers (66.7%) reported no problem in the classroom (Table 1). Among the reported problems by the teachers, heavy head (14.8%), headache (7.4%) respiratory congestion (7.4%) and visual problems (3.7%) were common. Carrer *et al.* (2)

concluded that indoor allergen exposure is recognized as the most important risk factor for asthma in children. The above said results conclude that students are the most exposed group to face the indoor problems due to dull appearance, poor air quality, over work and lack of ventilation. The teachers were found relatively satisfied as they have their own comfortable rooms and have time to rest there for a few minutes between two consecutive classes, while the students stay in the classroom for most of the time and take classes continuously.

Table 1. Health problems faced in indoor college environment.

Respon-dents category	Head-ache (%)	Respiratory congestion (%)	Visual problems (%)	Heavy head (%)	Mentally tired (%)	Lack of conc. (%)	No Problem (%)	Totals
Students	7.0	16.6	7.5	14.6	34.2	18.6	1.5	100
Teachers	7.4	7.4	3.7	14.8	0	0	66.7	100

4. Benefits of indoor plantation

(a) Indoor air quality

When the respondents were asked if the plants improve the indoor air quality, a significant majority (77.6%) answered in affirmative. Only 3.2 percent reported in negative and 19.2 percent did not respond. William (11) reported that low levels of chemicals such as carbon mono oxide and formaldehyde could be removed from indoor environment by plant leaves. The data were also cross-tabulated across the profession of respondents. The results showed that all the teachers (100%) agreed that plants improved the air quality of the indoor. Besides, 81.2 percent respondents opined that plants also added a pleasant view to the classrooms. Only 1.2 percent rejected the statement by saying that they did not feel any major difference. However, a considerable section (19.2%) failed to respond. This discussion concludes that indoor plants not only improved the air quality of the indoors but also added a pleasant view.

(b) Performance of the respondents

The results indicated that a significant majority (76.8%) agreed that indoor plants helped improve the performance of the respondents while only 8.4 percent rejected the idea. However, 14.8 percent respondents did not answer to

this question. Aatiqa (1) concluded that plants in offices develop deeper concentration of office workers, which ultimately leads to increase in work efficiency. The results are in accordance with Kaplan *et al.* (4) who reported that workers with a view of natural elements, such as trees and flowers, experienced less job pressure and were more satisfied with their jobs and reported fewer ailments and headache. The data were also cross-tabulated across the profession of respondents. According to data 89.8 percent students and 92.3 percent teachers opined that indoor plantation helped increase their educational performance while, only 10.2 percent students and 7.7 percent teachers rejected the statement. No significant differences were found across the other groups stratified on the basis of gender, age and study level (Table 2). Tonneson and Cimprich (8) during a study of university residence hall occupants; evaluated and compared their directed attention between groups who had different amount of nature visible from their windows. They found that students with all natural views scored significantly higher in several tests.

Table 2. Performance of respondents.

Parameter	Yes (%)	No (%)	No response (%)
Improved air quality	77.6	3.2	19.2
Addition of pleasant view	81.2	1.2	17.6
Improved performance	76.8	8.4	14.8
Students participation in plantation campaigns	84.8	1.2	14.0
Consent for donation	86.8	3.6	9.6

(c) Passion for plants

The data indicated that a significant majority (84.8%) was ready to participate in the plantation campaigns at national and regional levels. Only 1.12 percent refused while 14.0 percent did not respond. They were also inquired if they would like to donate for the purchase of indoor plants to be kept in their classrooms. Significant majority (86.8%) supported the idea while only 3.6 percent replied in negative and 9.6 percent did not answer. The above results reflect that the respondents showed high degree of interest and passion for plantscaping. These results also indicate that introduction of plants improved the perception of respondents, particularly on the basis of benefits of indoor plants.

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