The essay follows the presentation slides.

Greening Classrooms

Caitlin Kennedy, Kenneth Jinkens, Erin Kennedy, & Liam Delanoy

Office Building History

- During the 1960, office building started implementing air conditioning and HVAC systems.
  - Hysteria around sick building syndrome in offices increased.
  - Fears of volatile organic compounds in the air.
- AC and HVAC made it cost efficient to heat and cool buildings.
  - Hermetically sealed building.
  - Air is recycled through the building.

NASA History

- Many people in the world have allergies. In 1989, NASA did a study about plants and they found that indoor plants filter out air pollutants like carbon dioxide, cigarette smoke, etc. This helps with allergies because studies have shown that plants can purify the air.
  - C02 and cigarette smoke can affect a person's allergies. Symptoms of these pollutants are headaches, difficulty breathing, eye irritation, skin rashes, etc.

What A Classroom Looks Like At UCBA:

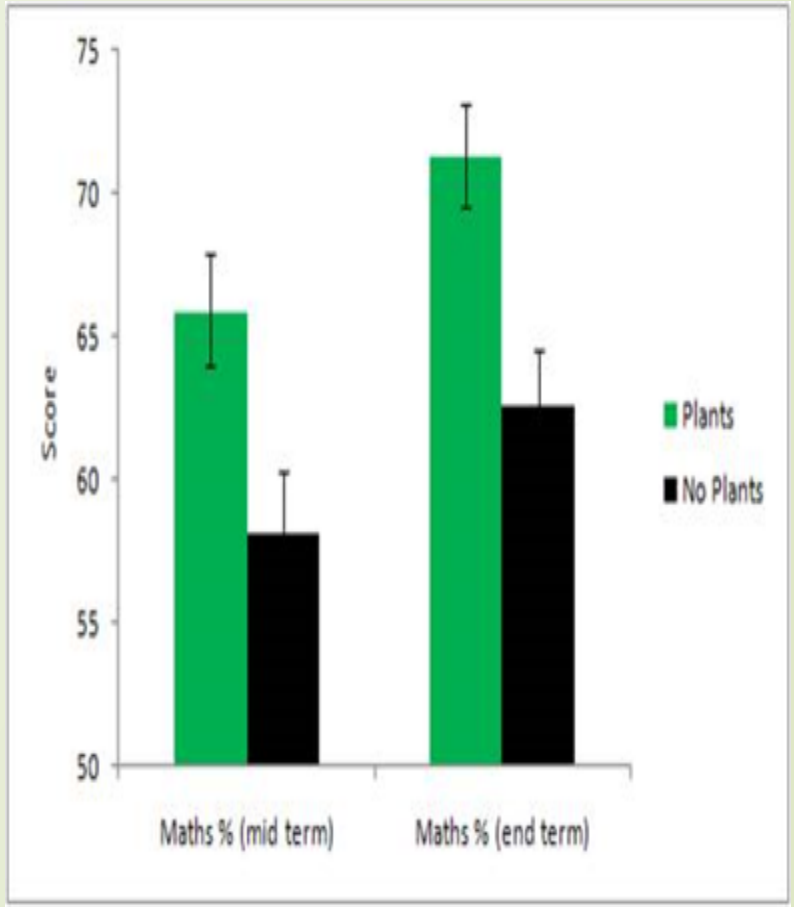
- White walls
- A couple of windows
- Lacks comfort and personality
- Fluorescent lighting

Issues At The University of Cincinnati Blue Ash College

- At UC Blue Ash our classrooms mostly consist of white walls and a few windows.
    - Some buildings offer more light through windows and have a single-colored wall.
- Students spend most time indoors surrounded by white walls and can be mentally and physically draining.
- Adding a few plants in classrooms can help reduce CO2 concentrations and help alleviate allergy symptoms.
- Indoor plants offer a calming and comfortable environment and help improve air quality.

Benefits of Indoor Plants

- Increases air quality.
  - Filters air pollutants.
    - Reduces indoor CO2.
- Mental health and physical health benefits
  - Helps reduce stress.
  - Boosts people's moods.
  - Increase productivity & concentration.
- Relatively low maintenance and inexpensive.
- Provides a more comfortable and colorful classroom.



Study On How Plants Affect People

The pie charts shows that people say that plants help make them more happier and their mental health is increasing. The second graph shows that people do better on exams with plants in classrooms than without plants in classrooms.

Proposal

- Adding two- three plants per classroom.
- Could be hanging plants, small or large potted plants.
- We would adjust different plants based on amount of natural light.
- We propose that these plants could be watered by custodians, student volunteers, members or the sustainability club or even student ambassadors here at UCBA.
- The average cost for plants is around $17.00-$30.00 depending on what type of plant.

Best Types[1] Of Plants For[2] The Classrooms[3]

1. **Pothos**
   a. Removes indoor air toxins.
   b. The top air purifier according to NASA.
   c. Tolerates cooler temperature, and lower humidity and light.
   d. According to NASA the best plant to teach pruning and plant care.
2. **Ficus Alii**
   a. Purifies the air.
   b. Resistance to insects.
   c. Best in low to medium sunlight.
   d. Less difficult to take care of compared to other plants.
3. **Peace Lily (Spathiphyllum)**
   a. Removes air pollutants.
   b. Removes acetone, trichloroethylene, benzene and formaldehyde.
   c. Best in low to medium sunlight.
   d. NASA's top air purifier.

1

2

3

Best Types Of Plants For The Classrooms

1. **Rubber Fig Plant**
   a. Easy to grow.
   b. Removes chemical toxins.
   c. Best in low to medium sunlight.
2. **English Ivy**
   a. Can adapt to a variety of environments.
   b. Very easy to grow.
   c. Best in hanging plant.
3. **Dracaena "Janet Craig"**
   a. Removes highly toxic chemicals that can be found in cleaning products.
   b. Tolerates dimly lighting environments.

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Greening Classrooms

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Classrooms here at UCBA, lack comfort and personality. These barren classrooms do not contribute to creativity or reduction of stress. Adding plants to classrooms would help make spaces for students and teachers more healthy, enjoyable and comfortable. We propose to add two-three plants to each classroom. These could be large or small potted plants. We would adjust the type of plants in different classrooms based on the amount of natural light and the space offered within each classroom. These plants could be watered by custodians, staff, student volunteers, members of the sustainability club or even student ambassadors at UCBA. On average, plants cost $17.00-$30.00 per plant. We could also collect small stems from different succulents to grow into new plants. This could be a more cost effective way for getting this type of plants into classrooms. To really make sure this plan goes well, we could start a trial in either Walter's Hall or Muntz Hall. These are the busiest buildings, so we could get the most data on how effective it is in boosting student and staff productivity and mental states.This would offer us a way to see real data from real students and staff here at UCBA.

To address the problem of barren classrooms, let us first understand some of the history. "The first American college established was Harvard University in 1636 by a group of about 100 Cambridge and a third as many Oxford men that emigrated to New England before 1646" (Fredrick Rudolph pg13). Colleges in the United States were established by Englishmen so the design was that of most colleges,

closely integrated with the city town itself. Traditionally most colleges and universities get their name from their parent cities much like University of Cincinnati.

The advent of twentieth-century transport and communications technologies offered escape routes to an idealized natural landscape such as suburbs. During the postwar period, people started leaving in droves from the city into suburbs to escape the blight and pollution that had grown in cities. The move was also spurred by a new mortgage structure that made it very easy to take out a loan for housing and new mass produced single family homes that are cheap and easy to construct. In 1961 Governor Nelson A. Rockefeller's passed legislation for 63 campuses for the State University of New York, that were premised on acquisition of extensive greenfield sites. Analyzing the process and the outcomes, Polyzoides (2000) defines successful campus design as 'figuration of the void'. It implies making the outdoor space of the campus as legible as the buildings that define it; in Gestalt terminology, solid and void should form a reversible figure-ground (Hebbert 2017). Legibility is linked to walkability, liveability, safety, identity and sense of community – values that recur repeatedly in recent campus plans (Hajrasouliha 2017)

During the last century universities have migrated out-of-town to seek a better future in the open landscape. Marmot (2014) writes, "New architecture and high-quality landscaping evince vitality, attract students and draw investment." Simply put, investing in the landscape is an investment in not only the school but also its students, faculty, and future. Here we see the growth of pastoral landscapes for not only homes but also campuses and large corporations. These pastoral landscapes give not only the idea of man's dominion over nature, but it is also a sign of prosperity with large carpeted areas of grass with little foliage or objects blocking the pristine neatness of the landscape surrounding the buildings. These pastoral landscapes combined with new, mighty edifices were not only designed to convey the stature of the resident or business, but also make for a clean and comfortable hermetically sealed environment to

work in. But with this came a fear of sick building syndrome from being in the sealed building. People were worried about pollution and volatile compounds in the air. In the 1960's, we saw the advent of AC and HVAC in buildings, making the buildings not only comfortable but much cheaper to heat and cool throughout the year easing workers' woes.

However this does not solve the problem in buildings. Many people in the world have allergies. These comfortable hermetically sealed buildings we built for ourselves still had a flaw. Without usable windows, the air in the buildings is still stifled with CO2 and other pollutants like cigarette smoke. In 1989, NASA did a study about plants, and they found that indoor plants filter out air pollutants like carbon dioxide, cigarette smoke, etc. This helps with allergies because studies have shown that plants can purify the air. CO2 and cigarette smoke can affect a person's allergies. Symptoms of these pollutants are headaches, difficulty breathing, eye irritation, skin rashes, etc. These symptoms create an uncomfortable work space that is hard to work in, affecting people's capacities to think and go about their duties making work even harder and more draining than it already is. So the question is, can indoor plants help alleviate this problem and improve our work environments in a cost effective and reasonably maintainable solution?

At UC Blue Ash our classrooms mostly consist of white walls and a few windows. Some buildings offer more light through windows or a single-colored wall, but on average, the classrooms are very bland. As students, we spend most of our time indoors for class. The lack of good lighting, color and comfort makes it hard for students to be enjoyably productive. Most students already have a hard time getting out of bed or not going to work to come to school, and having a mentally draining room isn't helping. All classrooms aren't the same throughout each building, but the majority are depressing and not a good place for students to spend their day. Bringing in a few plants to each classroom would

dramatically brighten up each room for the students and teachers. School should be somewhere everyone feels comfortable with their surroundings and adding plants would help that.

Studies have been done in classrooms that compare scores on math exams in the classroom with plants and some without (e.g. Kuo et al. 2021). The study showed that the test scores in the classrooms with plants had a 10% higher score than scores in classrooms without plants. Other sources of research have had similar success, and they link it to the reduction of stress that comes with having plants in rooms that increases productivity (Han 2009). This would be super beneficial at UCBA because it would offer students a less stressful time testing or learning and let them be more productive. It could improve studying, learning, taking notes and even test scores. Overall, having students and even our staff feel less stress in classrooms would be extremely useful getting through each semester with good grades and productivity here at UCBA.

Due to the design of hermetically sealed buildings, the air that circulates throughout the building is recycled, and most carbon dioxide released from people is sealed inside. Plants are known for their ability to photosynthesis carbon dioxide from the atmosphere and create energy for themselves while producing oxygen as a byproduct. Bringing plants to an indoor setting such as a classroom provides increased air quality by reducing the amount of CO2 trapped inside the classroom. Certain plants are more fit to be used indoors but the main qualities of these plants are being relatively low maintenance and inexpensive. Plants such as the Pothos and Ficus Alli only need to be watered once or twice a week and cost around $17- $30. Plants also provide mental and physical health benefits

The best types of plants that fit a college classroom are Pothos, Ficus Alli, Peace Lily, Rubber Fig Plant, English Ivy, and Dracaena. The Pothos and Peace Lily plants are one of the top air purifiers according to NASA. All of the plants that are recommended are best in low to

medium sunlight but the English Ivy can adapt to a variety of environments. The six plants all can help remove air toxins and purify the air. The Ficus Alli is the easiest to take care of compared to other plants and it is resistant to insects. The Dracaena is one of the best plants to put in a classroom because it can remove highly toxic chemicals that can be found in cleaning products.

We created two pictures that show what we are proposing. Adding 2 to 3 plants per class would tremendously help out students and staff at UCBA. In the two pictures we put a few diverse types of plants around the classroom which really brightens up the room and makes it look more comfortable to be in. Bright and comfortable rooms make for happy and healthy people, this can also be a positive way to draw in future students who come to campus for an open house/college tour. This new class environment may very well set it apart from other colleges and become a stepping stone for change for future students' better classroom standards.

Whether someone cares about the environment or not, we all care about our personal health and mental health. This proposal is an easy and cost effective way to better UCBA's environment for everyone in it. It isn't just an investment into the school but also into the people who work and learn inside its facilities by making for a cleaner and healthier UCBA.

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