
The impact of the environment of indoor spaces at universities on student health

Reconstruction Task Force

Levi Kroezen | Christophe Muller | Juliana Möckel | Peter Pelzer | Inez Renne
Honours+ challenge "How does the built environment affect health and wellbeing?"



Student health



Indoor environment

Air quality

Poor indoor air quality is connected to headaches, tiredness, and decreased academic performance. Poor indoor air quality is usually caused by increased CO2 levels and high presence of airborne dust particles and fungi.

Temperature

High indoor temperatures increase students' heart rate and activate the sympathetic nervous system. This negatively affects academic performance and is associated with headaches and nasal symptoms.

Greenery

Window views of greenery can decrease students' heart rate. Indoor nature stimuli stabilise autonomic nervous system activity, which increases relaxation and students' cognitive performance.

Lighting

Natural light synchronizes the circadian rhythm and can reduce potential fatigue and depression. Sunlight impacts physical health by bringing in vitamin D. Natural light can also improve sleep, and may reduce stress and depression.

Openness

For individual study, students prefer open but quiet spaces. For group study, students prefer open and busy places. Autonomy about study spaces is valuable. Flexible spaces reduce sedentary times.



Interior design

Ventilation



Air conditioning equipment requires regular cleaning to avoid poor IAQ. When fresh air is brought into the AC system it can be beneficial for IAQ, but when the same air is "re-used" in the circulation, CO2 concentrations in indoor spaces rapidly rise.

Temperature control



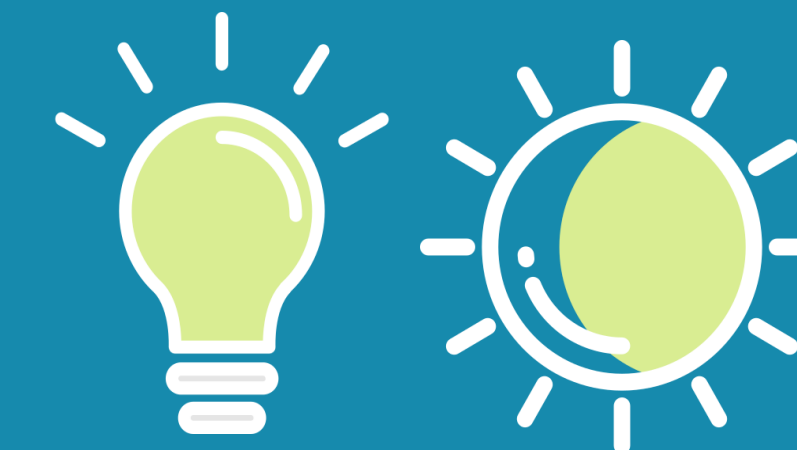
Individualised thermostat control for each room rather than thermostat control that is building-wide (because everyone's thermal comfort is different) allows students to study in their preferred indoor temperature. This can also help avoid headaches.

Green spaces



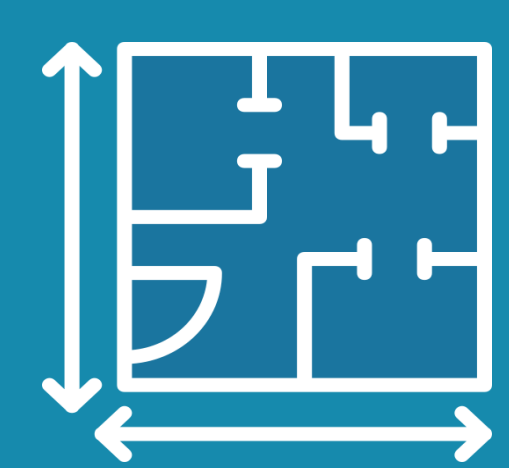
Incorporating indoor plants and green elements in university's indoor spaces can help students feel more relaxed. Ensuring window views on greenery reduces stress and anxiety and improves relaxation and difficult task solving.

Illumination



Adapting light-bulbs allows control of the light temperature. Windows bring in natural light and sunlight, open up the room and allow for natural ventilation, which affects indoor temperature. They also allow for nature views.

Layout



The layout of a space is a fundamental determinant for its openness. The layout also influences air flow and quality. Open layouts let through more light, but make it difficult to adjust the temperature to individual preference.

Our recommendation to universities



- Identify the places most suitable for improvements
- Put emphasis on the openness of an indoor space when redesigning it, which also allows influx of natural light
- Incorporate greenery in as many aspects as possible
- Set an appropriate light temperature for artificial lighting
- Ask students about what they need in their study spaces!

