

A Student-Led Fume Hood Project

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Learning Objectives

- Describe the process of developing a student-led fume hood project
- Analyze data collected by sensors
- Discuss strategies used to influence more sustainable behavior
- Identify successes and areas for improvement

Background

- 1 full-time Green Labs employee and 1,200+ fume hoods
- Engineering professor with new “Sustainability in Engineering” course focused on real-world experience



Developing A Student-Led Project

- Meet with instructor to learn course objectives
 - Fume hoods weren't focus of class; four groups of 3-4 students working on different projects
- Costs
 - Instructor budget and Green Fund grant allowed for Sustainable sash height sensors
- Present to class on fume hoods

Project Design

- Combine sash-height monitoring with low-barrier behavioral interventions
- Phase 1: Pre-Intervention monitoring
- Phase 2: Intervention

Methods

- Student consultations with Sustainability
- Lab safety training from EHS
- Identified volunteer labs
- Sensor installation
- Data Collection



Pre-Intervention

- Data collection March-April

| Lab | Department | # Fume Hoods |
|------------|---------------------------------------|---------------------|
| Lab A | Chemical and Biomolecular Engineering | 3 |
| Lab B | Bioengineering | 4 |
| Lab C | Material Sciences | 3 |
| Lab D | Chemical and Biomolecular Engineering | 2* |

Table 1: Pilot fume hood lab information

*Data obtained from one hood only due to technology difficulties

Intervention

Sticker Design Weekly “Mini-Reports”

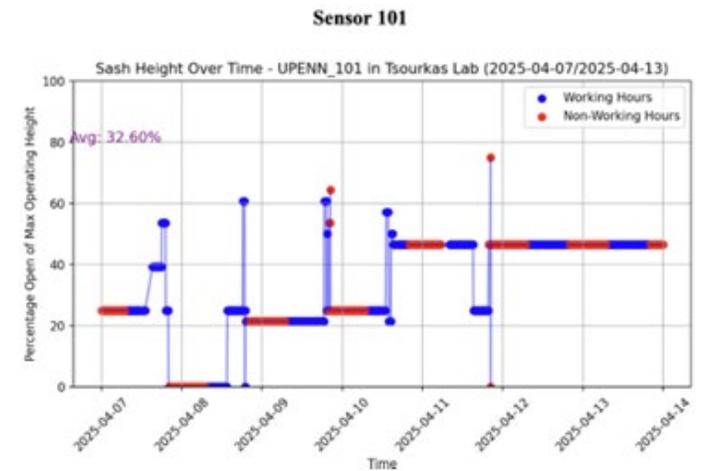


Fume Hood Sash Report 2

Here is the weekly breakdown of sash height being open (% of max safe operating height) from the past two weeks!

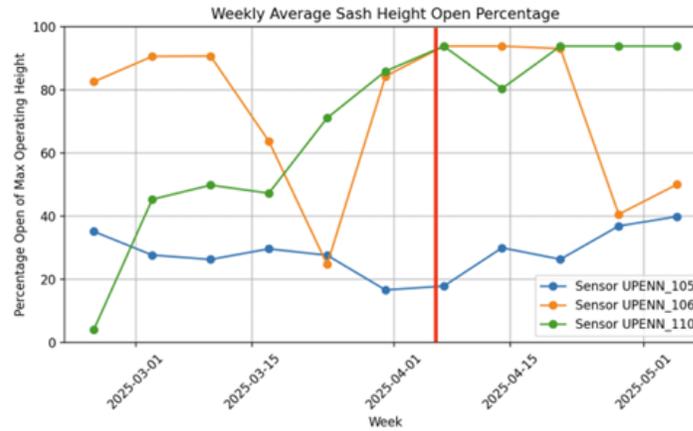
| Week | Average % Sash Open Sensor 101 | Average % Sash Open Sensor 103 | Average % Sash Open Sensor 112 | Average % Sash Open Sensor 115 |
|-------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| 04-07/04-13 | 32.6% (-18% from last week) | 26.3% (-56% from last week) | 32.8% (-21% from last week) | 20.6% (-44% from last week) |
| 04-14/04-20 | 46.4% (+42% from last week) | 0.1% (-100% from last week) | 46.9% (+43% from last week) | 17.9% (-13% from last week) |

Here are some plots for the sensors:

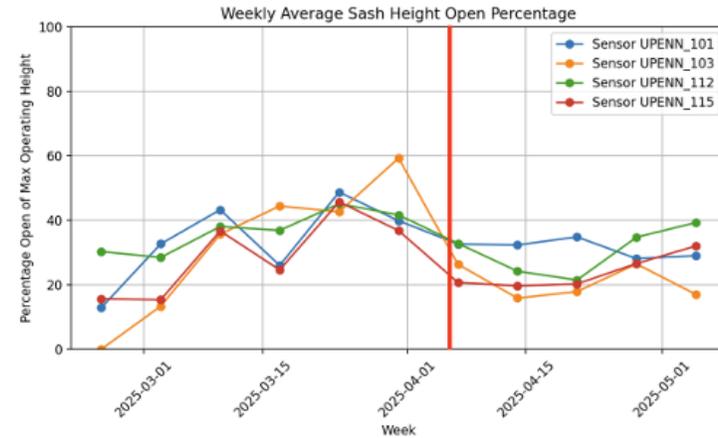


Data Collected

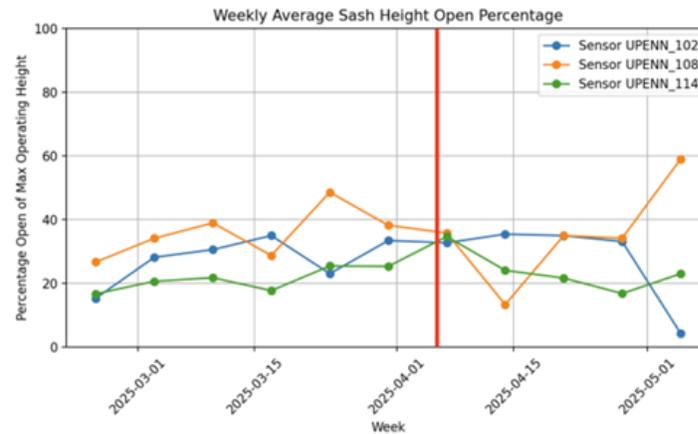
Lab A



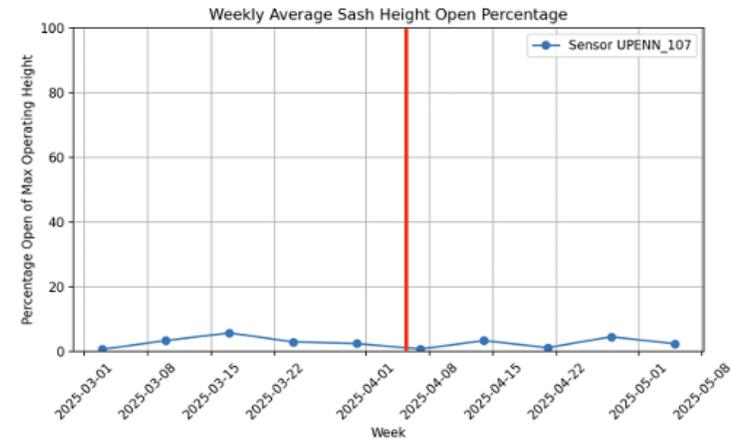
Lab B



Lab C



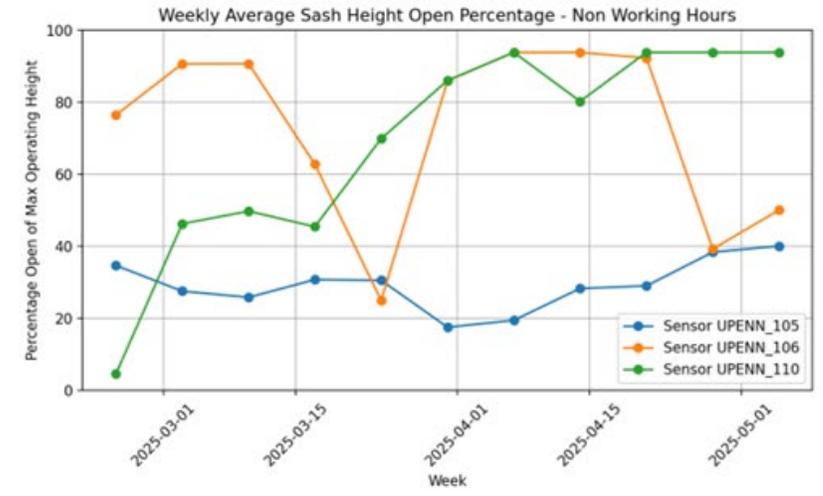
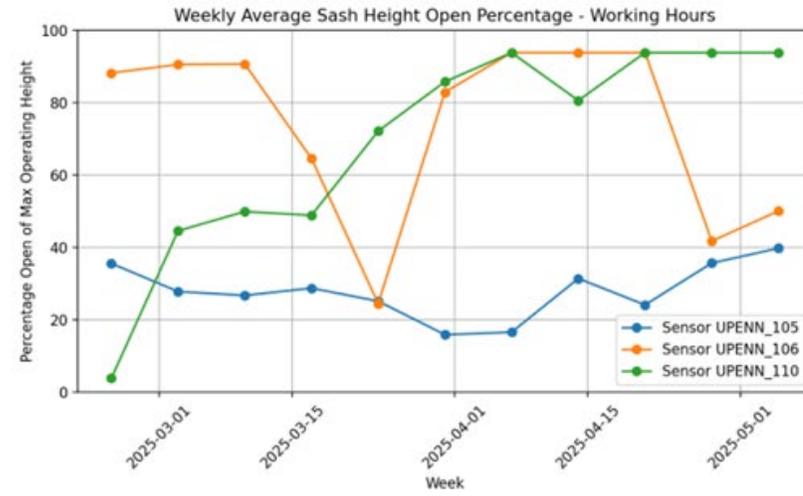
Lab D



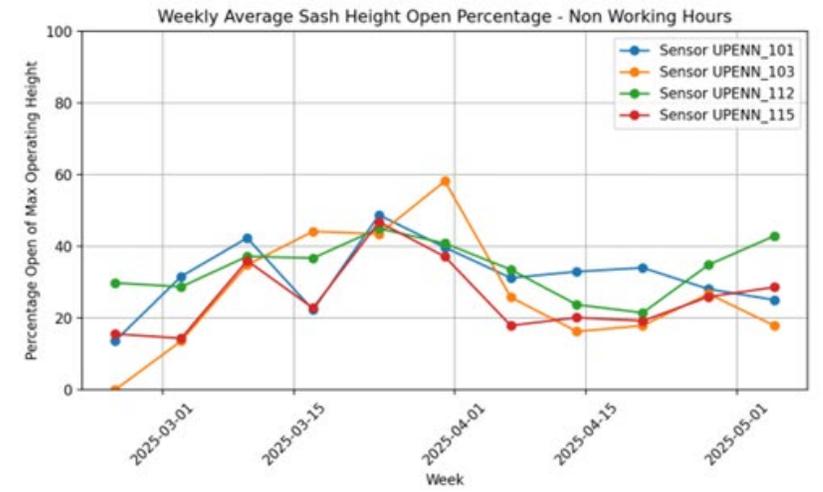
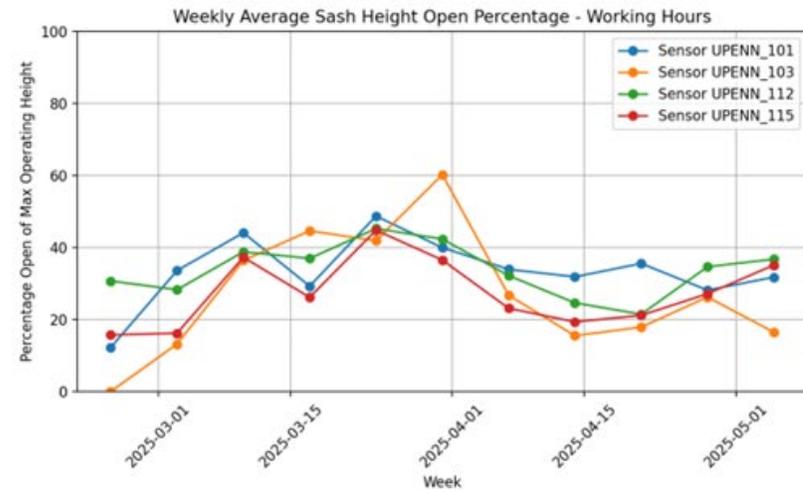
Weekly average sash height across labs. Intervention represented by red line.

Data

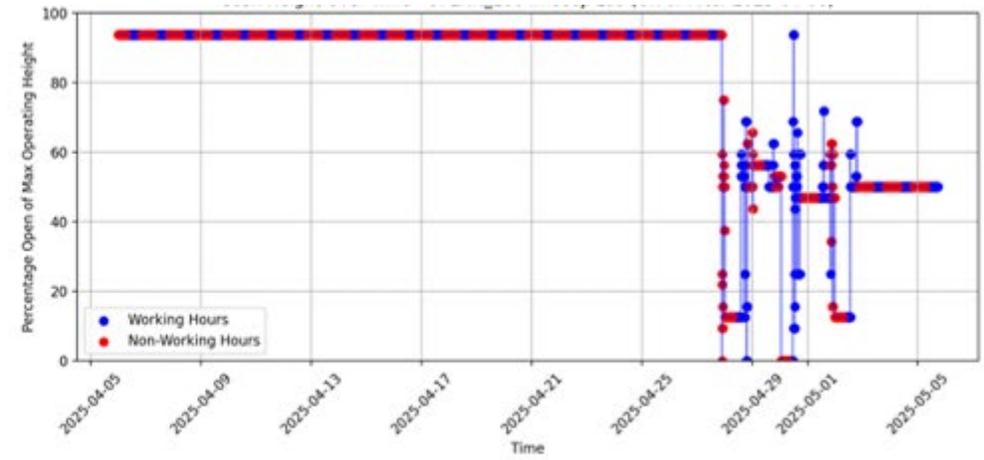
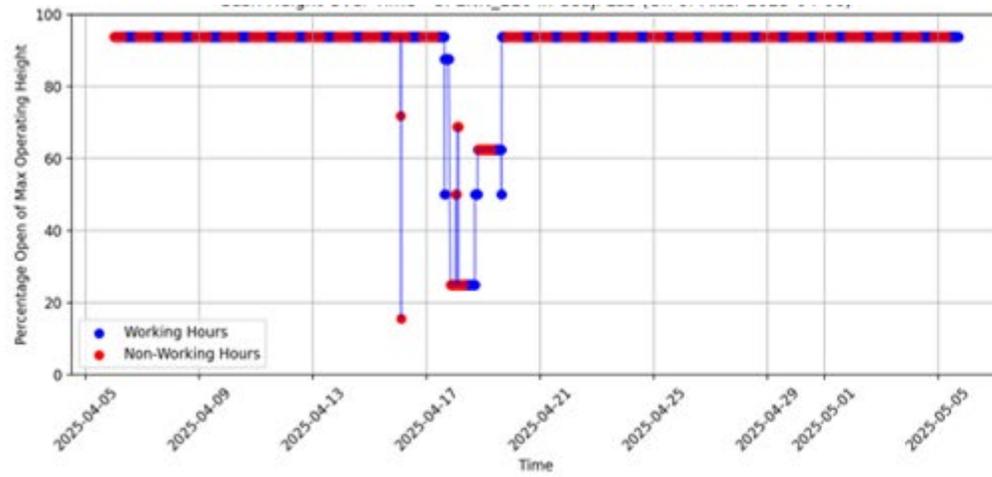
Lab A



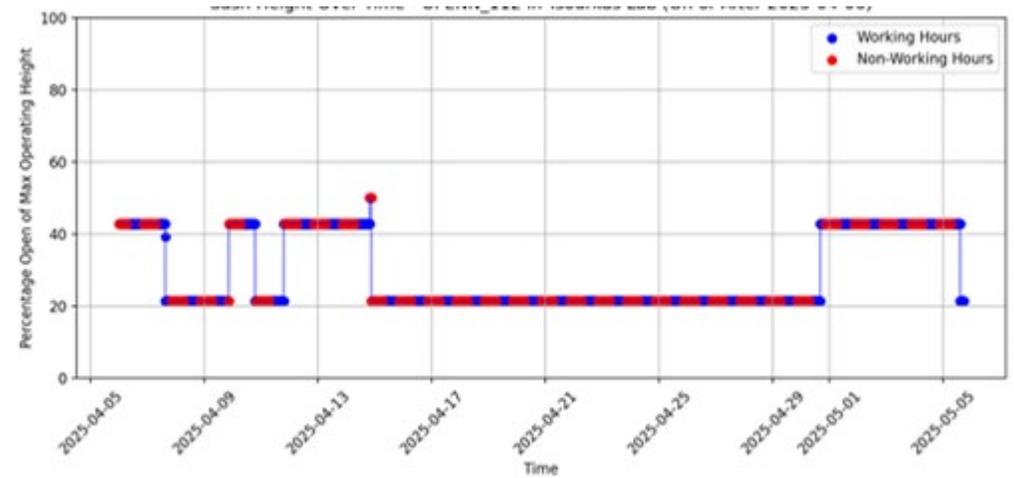
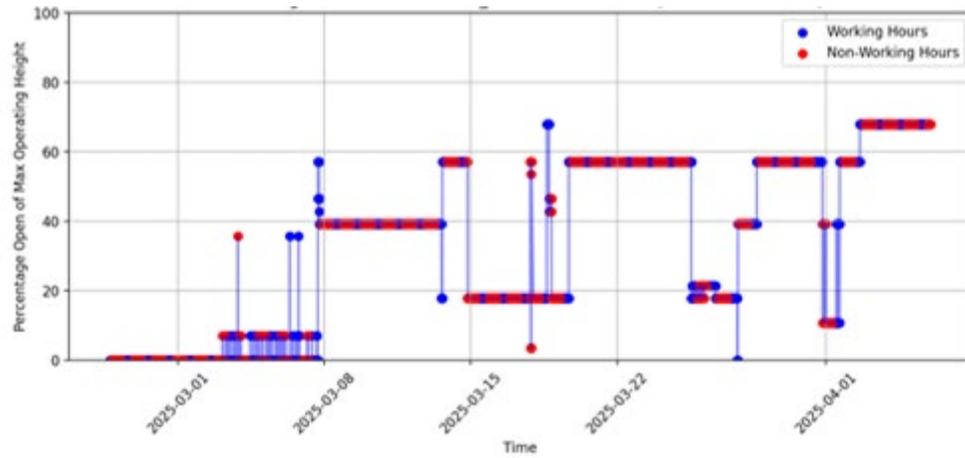
Lab B



Lab A (Pre- vs. Post- Intervention)



Lab B (Pre- vs. Post- Intervention)



Discussion

The data showed overall behaviors and responses to intervention (or lack thereof)

Daily data versus weekly averages showed periods of improvement and behaviors that can be a focus for improvement (leaving hoods open)

Students gained experience with stakeholders, equipment troubleshooting, data analysis

Intervention methods- stickers were a hit, but emails may have been overlooked

How can we encourage more involvement/communication with lab staff?

Challenges

- New technology
- Limiting my input (while I was there for support and check-ins, it was important for the students to do the problem-solving)
- Project limited to one semester (not a lot of time for data collection)

Benefits

- Identified a variety of lab behaviors, including leaving the sash open
- Foundation for future students
- Students learn about lab sustainability and the challenges of influencing behavior
- Collaboration
- More informed approach to sash competitions that I would not have had the time to explore without their help
- A new sticker design!



Next Steps

- A new student group will pick up on this project in Spring 2026
- Consider focus on different departments
- Focus on more interactive interventions
 - EHS lab inspections
 - Lab visits, conversations



Thanks!

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I2SL University Alliance Group

Questions?