

**Is the Green Lab program really that Green? An Analysis of Sustainable
Laboratory Programs at Dalhousie University**

ENVS 3502 Research Report

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Date: 2023/04/11

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Executive Summary

Within many university laboratories, waste and inefficient use of resources is garnering greater attention as a part of efforts to create a more sustainable campus. One way universities are taking action is by implementing a Green Lab Program, which helps laboratories reduce their environmental footprint while maintaining high-quality research and safety. Survey studies have investigated the effectiveness of green lab programs, yet none have examined these programs at a Canadian university. In this study, we bridged this gap by analyzing the effectiveness of the Green Lab Program in terms of awareness of energy efficiency, waste diversion, and resource efficiency at Dalhousie University in Halifax, Nova Scotia.

We conducted an online survey directed toward Dalhousie science lab members on the Studley campus. Through the surveys, we determined that many lab members are unaware of the Green Lab Program, with only 7% registered. The participants enrolled in the program found that they saw an improvement in sustainability in their labs. Participants that did not register wanted to participate in the Green Lab Program but felt that the university was not providing them with sufficient awareness and financial incentives. In all, lab members see sustainability as essential, but it is up to the university to push environmentally friendly practices through improving infrastructure, education, and financial support.

Our research can inform the Dalhousie Office of Sustainability of potential modifications that could improve the program's effectiveness and encourage further participation in the development and progression of the program. It also builds awareness of the Green Lab program and evaluates its effectiveness and shortcomings at Dalhousie University on Studley Campus.

Keywords: Sustainable Laboratories, Survey, University Laboratories, Green Initiatives, Waste Management, Energy Efficiency, Resource Use

Introduction

Science laboratories are critical to a sustainable future, from illuminating new understandings of our planet, tackling disease, and developing clean technologies (Greever et al., 2020). Yet, with this advance in knowledge, there is also a substantial environmental cost. Researchers at the University of Exeter in the United Kingdom estimated in 2015 that 5.5 million tons of plastic waste per year are produced by biological, medical, and agricultural research (Gammie et al., 2022). Laboratories are increasingly resource and energy intensive, and the scientific community needs to improve laboratory operations to mitigate climate change.

One way scientists are taking action is by implementing *Green Lab programs*. Over the past few decades, the scientific community has been implementing grass root sustainability efforts at individual institutions. The first green labs program began in 1990 at the University of Colorado Boulder and since then the initiative has rapidly expanded (Ramirez-Aguila et al., 2019). There are many different types of programs, such as the *International Institute for Sustainable Laboratories* and *My Green Lab* (Greever et al., 2020). The programs are initiatives to help laboratories reduce their environmental footprint while still maintaining high-quality research and safety (Gammie et al., 2022). The University of California, and the University of Alabama Birmingham are encouraging their laboratories to participate in a green lab program and allowing them access to recycling opportunities specific to laboratory materials. Clinical laboratories such as AstraZeneca have become the first pharmaceutical company to announce participation with the My Green Lab certification (Gammie et al., 2022). Even with the increase in green lab programs and education, a lot of it is focused on the United States and the United Kingdom, indicating some gaps in green lab education in Canada.

Furthermore, there has been an increase in studies examining the application of green lab initiatives and their impact on improving sustainability in laboratories. One study examined green initiatives in dermatology laboratories, particularly reagent recycling, plastic recycling, and electricity reduction (Chisholm et al., 2022). Through this study, they determined many benefits, including good environmental stewardship, protection against supply chain disruptions, monetary savings through fewer reagent purchases, and less hazardous/biohazardous waste production. The study emphasized the substantial improvement that green initiatives can have in

labs, yet the findings were mostly applicable to dermatology laboratories. Also, the ability to recycle plastic depends on location since some municipalities cannot recycle specific types of plastic. This indicates that many green initiative studies do not consider all disciplines and laboratories.

In addition, surveys have been used in studies to obtain information on sustainability issues found in laboratories. Abou Assi et al. conducted surveys to compare the knowledge of non-laboratory users (professors) and laboratory users (students, lab technicians) in a Malaysian public university regarding water conservation in laboratories (2021). The survey was structured in six sections, “Respondent’s Information”, “Knowledge” (6 items), “Awareness” (5 items), “Practice” (3 items), “Behavior” (5 items), and “Opinion” (4 items), and used a range of question types such as dichotomous questions and a five-point Likert-scale. The occupation “Laboratory assistant” has the highest mean rank for the variable “Knowledge”, whereas “Undergraduate student” obtained the highest mean level for the variable “Practice”. Some issues found in the study included that the age range was generally a younger demographic (20-45), and the sample size for faculty was small, which could have manipulated the results.

The Royal Society of Chemistry also implemented a Sustainable Laboratories Researcher Survey in 2021 (Reid, 2021). Some of their results found that 11% of participants always follow sustainability guidance or frameworks, and 53% of respondents agreed or strongly agreed that they have not received any training regarding green initiatives. These surveys were performed by individuals in the United Kingdom, with 56% of the respondents being academics in chemistry. In all, these survey studies emphasize that surveys are an effective way to obtain information about Green Lab programs. Specifically, surveys could provide insight into determining if these programs make a substantial difference in sustainability in laboratories. These surveys are performed in specific disciplines and countries, so further surveys need to examine the effectiveness of these programs in Canada. Through examination of Green Lab programs from Canadian universities, it could provide information on if these programs are universal to any field and location.

Dalhousie University, a member of the U15 group of Canada’s most research-intensive universities, is deciding to take action by implementing a Green Lab program. Organized by the Office of Sustainability at Dalhousie University, the Green Lab program aims to reduce water and energy consumption, support life cycle costing and related benefits, improve sustainable

purchasing decisions, and increase waste reduction and source separation, raising environmental, health impacts and protection awareness. The program was established in 2022, yet there has been no study examining how the program has improved awareness on sustainable practice in laboratories.

The aim of this study is to ask: to what extent does the Green Lab program improve awareness of energy efficiency, waste diversion, and resource efficiency within Dalhousie science laboratories on Studley Campus?

As a recently introduced program, our results may shed light on possible improvements to the Green Lab program and make other practices within labs more sustainable. This project will also help explore how Dalhousie lab members (faculty, lab technicians, students, etc.) on Studley campus utilize the Green Lab program and how knowledgeable they are regarding sustainability in laboratories.

Methods

We conducted a survey directed toward Dalhousie Science lab members on Studley Campus to determine their awareness and perceptions of the Green Lab program, as well as the strengths and weaknesses of lab sustainability on the Studley campus. We chose to conduct a survey due to the scope of our analysis; it was the most effective way to obtain information about lab sustainability and perceptions of the Green Lab program from a large population size in a short amount of time.

We delivered our survey using a snowball sampling technique. We emailed an online anonymous survey to every member of the Dalhousie Faculty of Science on the Studley campus, asking them to fill out the survey and to share it with all members of their lab (Appendix A). This sampling technique allowed us to place more of a focus on professors, who have the most control over practices in their labs, while still gaining the perspectives of students and lab technicians. A limitation to this approach was that we did not have access to the contact information for all of the Dalhousie Faculty of Science professors, lab technicians, and students that worked in labs on campus. Because of this, we were only able to email the faculty that we could find on the Dalhousie Faculty of Science website, and we had to rely on the professors to pass our survey along to their lab members.

The online survey consisted of 22 questions about awareness and perceptions of the Green Lab program and lab sustainability, specifically regarding resource use, energy efficiency, and waste management (Appendix B). The survey was estimated to take participants approximately 5 minutes to complete. We emailed the survey to the faculty in our sample on March 10th and provided them with two weeks to respond, and March 17th we sent the faculty a reminder email (Appendix A).

The qualitative data obtained from the survey helped to assess the overall performance of the Green Lab program at the Studley campus through the eyes of the faculty and lab members. We used a combination of likert scale, rating, dichotomous, single-response, and open-ended questions to assess awareness of the Green Lab program and lab sustainability, specifically regarding resource efficiency, waste diversion, and energy efficiency. The qualitative data obtained from these responses allowed us to identify priorities and areas for improvement within Studley labs, which we used to develop a set of recommendations to propose to the Dalhousie Office of Sustainability. We also compared the results obtained from respondents who are enrolled in the Green Lab program to those who are not, to determine whether the program has increased sustainability practices and improved perceptions. We analyzed this data through qualitative coding and produced visualizations, including charts, graphs, word clouds, and mind maps, to highlight common themes within the data.

Our survey did not contain any sensitive information. It was anonymous and shared only with the research team. We asked each faculty member what department they are in and their position in the lab, which will not be enough information to link the survey responses to an individual. Due to the lack of sensitive information, there are limited ethical concerns regarding our survey. The appropriate Research Ethics Board (REB) application form has been completed (Appendix D). Participation was voluntary, and no incentives were offered to participants. We included an appropriate consent disclaimer at the beginning of the survey that the participants agreed to before they could move on to the survey questions (Appendix B).

Results

The beginning of the survey concentrated on understanding the makeup of our participants. The first question asked respondents to indicate which department they were a part of (Figure 1). This response demonstrated that many participants were from Earth and

Environmental Science. Arts and Social Science, Psychology and Neuroscience, generic Science and Pediatrics had only one respondent per department. We also asked what role they play in the lab and found that most respondents were students, laboratory technicians and Principal Investigators (PI) (Figure 2).

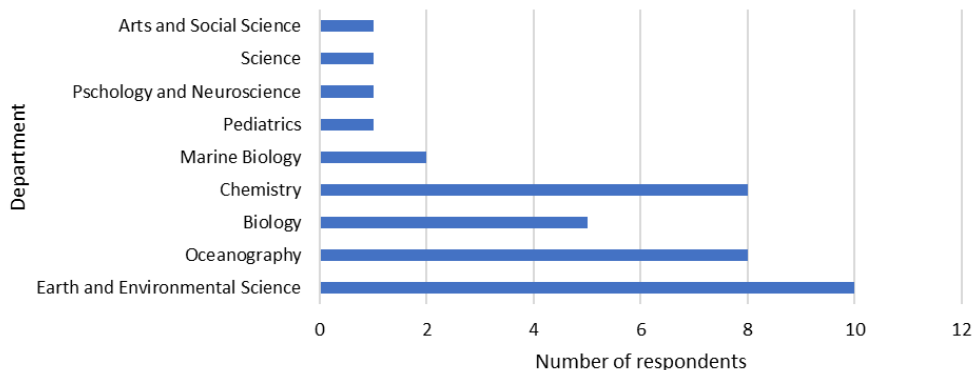


Figure 1. Graph depicting which department each respondent is a part of.

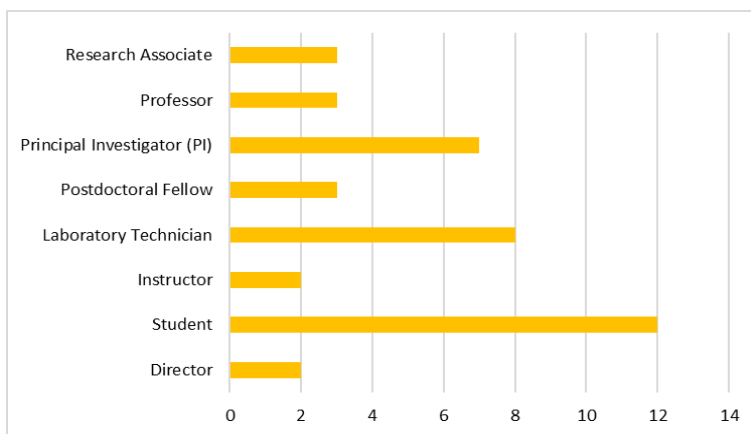


Figure 2. Graph demonstrating the role of each respondent in their lab.

The survey then progressed, with single response and multiple choice questions focusing on awareness of the Green Lab program. Approximately 74% of respondents indicated that they were not aware of the program's existence, and only 7.1% said that their lab was enrolled in the Green Lab program, two from the biology department and one from the oceanography department (Appendix C). With only three individuals enrolled in the Green Lab program, for most of the survey questions that asked how the program has improved energy efficiency, waste

diversion, and resource efficiency, around 90% of the responses stated that it did not apply (Appendix C). Yet, all the individuals enrolled in the Green Lab program agreed or were neutral that the program has improved their lab's energy efficiency, waste diversion, and resource efficiency.

Participants were also asked, “How satisfied are you with your laboratory in terms of sustainability?”. The majority selected neutral, while 26% were satisfied and another 26% were dissatisfied (Figure 3). The individuals who indicated that they were enrolled in the Green Lab program all selected that they were satisfied with their lab sustainability.

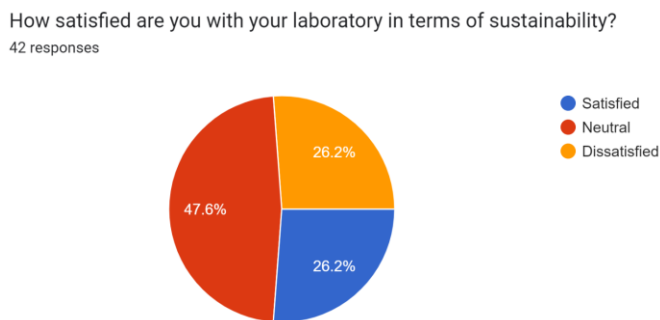


Figure 3. Pie chart visualizing the satisfaction of respondents towards sustainability in their labs.

The survey then shifted to actions that labs can take to increase sustainability. These questions started with whether or not the respondent’s labs had conducted waste audits, to which 55% said never (Appendix C). The running of waste audits can be compared between departments, with Earth and Environmental Science Department being the least likely to conduct a waste audit (Figure 4). When examining the three respondents participating in the Green Lab program, two said never, while one answered frequently. When asked if participants of the survey select suppliers with more eco-friendly products, 74% declared never, I don’t know, and does not apply, while only 26% said frequently and sometimes (Appendix C). Additionally, 69% of respondents answered always, frequently, and sometimes when asked about minimizing their chemical waste (Appendix C). Furthermore, when questioned if the lab has spoken about which equipment can be turned off, 59% said this was discussed always, frequently and sometimes (Appendix C). Throughout these questions it is important to note that most of the answers were I don’t know or does not apply.

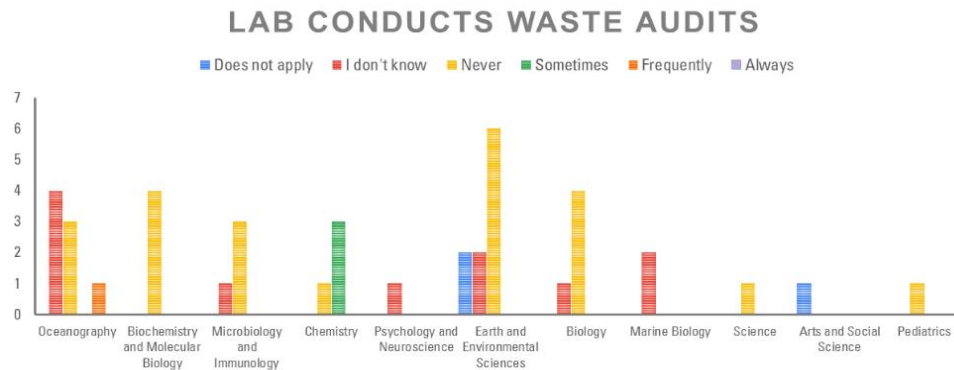


Figure 4. Bar graph showing the respondents answers from each department.

At the end of the survey, participants were asked if they knew about the energy rebates that the Sustainability office provides to laboratories enrolled in the green lab's program, and 98% had never heard of it (Appendix C). Additionally, the last short answer question was whether they would be interested in learning more about the Green Lab Program, and 61% indicated they would be curious about knowing more about the program (Appendix C).

Following the short answer, a series of three open-ended questions were asked. The first of these three questions asked survey participants, “Is it important to improve sustainability in Dalhousie University labs? Why or why not?” (Figure 5). This question received 33 responses. All respondents said it was essential to increase sustainability in labs. The answers revealed a variety of areas that respondents emphasized as important to increasing sustainability. These include reducing waste, improving efficiency, improving technology, and offering lab benefits for transitions to more sustainable practices. Respondents also identified several challenges with implementing improvements to sustainability at Dalhousie University, including time constraints, funding, and prioritizing safety over sustainability.

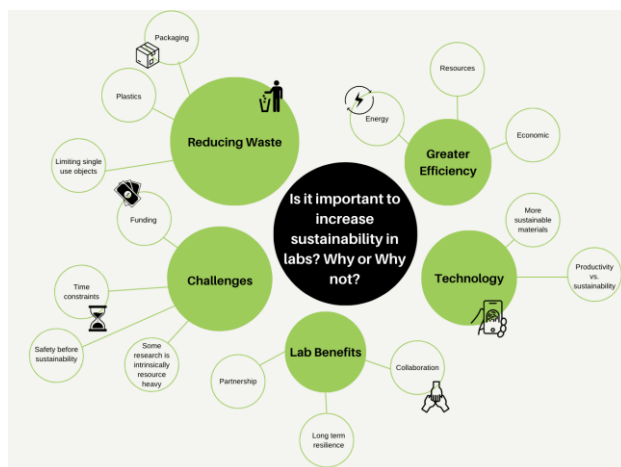


Figure 5. Mind map used to visualize the responses of recipients to the long answer question. The larger the green bubble the more respondents addressed this topic when answering the question.

The second of the three long answer questions attempted to gather insight into what those that frequent Dalhousie labs would do to improve sustainability in these spaces (Figure 6). Survey participants were asked, “What sustainability changes would you like to see made in your lab?” Responses highlighted improvements, such as energy efficiency, reducing single-use materials, upgrading old equipment, and investing in new infrastructure. Two respondents said their lab space, composed of computers, was already optimized.



Figure 6. Word cloud used to visualize the answer for the question “What sustainability changes would you like to see made in your lab?” The larger the word the more it was discussed by respondents.

The final long answer question asked, “How could the university better support your transition to a more sustainable lab?” (Figure 7). Respondents identified four main areas where

Dalhousie could better support transitions to sustainable labs. These include investing in building improvements, providing financial incentives for investments into improving sustainability, improving waste programs (chemical disposal, recycling), and improving the communication of information to raise awareness of current programs used to promote sustainability.

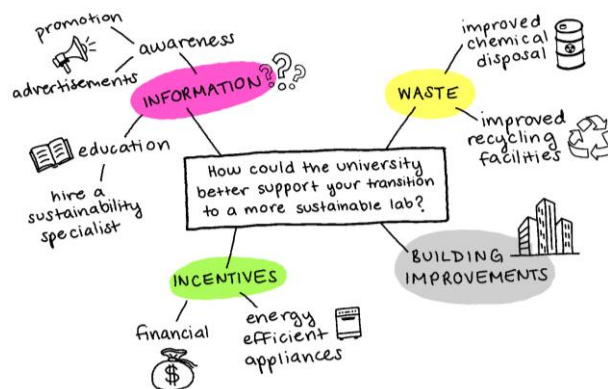


Figure 7. Mind map to visualize the respondents answers to an open-ended question. All of the respondents' answers were grouped into themes to draw conclusions.

Discussion

The goal of this study is to determine the extent to which the Green Lab program has improved awareness of energy efficiency, waste diversion, and resource efficiency within Dalhousie science laboratories on the Studley Campus.

Our results revealed that the majority of respondents were unaware of the Green Lab program. This shows a significant lack of awareness of the program within the Faculty of Science. Advertisement and education surrounding the Green Lab program at Dalhousie are needed to increase the program's enrollment.

Our surveys also showed that lab sustainability is not a main priority for most lab members at Dalhousie. Although many agreed with the importance of sustainability in general, the majority of respondents reported that they do not discuss sustainability at their lab meetings, and nearly half of the respondents were neutral towards their satisfaction with sustainability in their lab (Figure 3). This indicates a lack of prioritization regarding lab sustainability.

Similar results were found in a UK study assessing sustainability in bioscience laboratories (Wright et al., 2008). Like our study, the researchers conducted a questionnaire to determine the current state of lab sustainability. They found that although most of the respondents were in favor of sustainability, the majority of respondents also stated that their lab

practices were not as sustainable as they could be. Lack of information was indicated as a key barrier in the implementation of more sustainable practices. Another study focused on medical laboratories also reported that lack of information and awareness of sustainable lab practices was one of the largest hurdles facing the healthcare sector (Ozben & Fragão-Marques, 2022). Both of these studies support our finding that education is essential to the implementation of a successful green lab program.

It is clear from our results that Dalhousie labs are not currently operating sustainably and would benefit from the Green Lab program. The results show that most labs seek ways to minimize chemical or reagent use at least sometimes. However, the other lab practices we asked about did not show positive results. Many participants responded that they never conduct waste audits (Figure 4), and “I don’t know” made up over a quarter of the responses regarding eco-friendly products, energy-efficient equipment, and greener tools and guides (Appendix C). This could be due to the large portion of responses we received from students, research assistants, lab technicians, and other types of lab members that do not have as much authority or access to knowledge regarding lab practices as faculty or lab managers (Figure 2). This also suggests a lack of prioritization of sustainability in labs by those that do have authority.

The surveys also revealed that the Green Lab program can have a positive impact on lab sustainability. All of the participants that are currently enrolled in the program indicated that they are satisfied with sustainability within their lab, and the majority of those participants agreed that the program has improved their lab in terms of waste diversion, energy efficiency, and resource use (Appendix C). This shows positive perceptions of the Green Lab program from lab members that are enrolled. This was expected, due to the positive impacts green lab programs have had at other universities and research facilities. However, we did not expect that only three respondents would be enrolled in the program. This is another indicator that the Green Lab program is not being implemented at a large enough scale and will require significant advertisement and promotion before we can fully assess its implications for lab sustainability.

When analyzing the open ended questions, there was a theme of lack of awareness, need for funding, and desire for change. The first and second open ended questions discussed whether sustainability is significant and what modifications should be made in labs. Many lab members acknowledged that sustainability is essential in laboratories and that improvements are needed in

their labs. This highlights that respondents have sustainability knowledge, but something is preventing them from executing these changes.

The third open ended question discussed what the university could do to support the implementation of a sustainable lab. This question was the most helpful in understanding the challenges lab members face when implementing sustainability, such as lack of incentives, lack of information on the Green lab program, and the need for building improvements (specifically the chemistry building). Most respondents were motivated, but Dalhousie does not provide the resources to make their ideas a reality. The Dalhousie Sustainability Office should better promote the Green Lab Program, allowing lab members to examine different opportunities and solutions to making labs environmentally friendly. It also highlights that respondents are not motivated solely by the goodness of making their lab sustainable; instead, they need financial support, and the Dalhousie sustainability office should be educating them about the rebates and energy savings they could receive by making the transition.

Our survey results were similar to previous studies, such as the sustainable lab survey by the Royal Society of Chemistry (2021). In this survey, they asked researchers (academics, companies, and government) about their carbon footprint in laboratories. They found that 84% of researchers agreed that they would like to do more to reduce the impact of their day-to-day scientific work on the environment, yet, only 11% of their employers required environmental sustainability in laboratories. Furthermore, a study by Abou Assi et al. (2021) regarding water conservation in Malaysian public university laboratories found that more than 97% of the respondents supported the effort to recycle wastewater from the distillation process. Also, higher management at the university was ignoring the problem and not playing a role in improving water conservation. These findings correlate with our survey suggesting that many lab members want to do more to reduce their impact, yet, the lack of support from the institution adds barriers to sustainable change.

A significant limitation of our research was our sample size. Our target population size was 450, making our target sample size 208, with a 95% confidence level and a 5% margin of error. However, we only received 42 responses to our survey, which puts into question the significance of our results. Our sampling technique was also limited due to its potential to create sampling bias towards certain departments. The number of responses from each department was not equal, with Earth and Environmental Science having the greatest number of participants

(Figure 1). This could have skewed the results due to the different mindsets lab members from different departments may hold. We were also limited by the lack of data provided by the Dalhousie Office of Sustainability, which is currently running the Green Lab program. We attempted to reach out to the office multiple times to obtain data and information about the program, such as enrollment statistics, advertisement strategies, and faculty response to the program; however, we did not receive a response. This information would be useful for further research into the Green Lab program at Dalhousie.

A limited number of participants were registered in the Green Lab Program during this study, so once that quantity increases, future research should conduct more surveys to validate our findings that the Green Lab program improves energy efficiency, waste diversion and resource efficiency on campus. It would also be interesting to ask individuals to provide feedback about the program every year to see its progression and determine the effectiveness of the program over a substantial time period. Other research could be done comparing Dalhousie University to other Canadian university's laboratory sustainability, to determine what approaches other institutions are taking that could also be implemented at Dalhousie.

Conclusion

Our study reveals that the Green Lab program improves laboratories in terms of energy efficiency, waste diversion, and resource efficiency. Furthermore, this study demonstrated that there is currently minimal awareness about the Green Lab Program, and many lab members want to enhance sustainability in their labs but are not motivated due to a lack of support from Dalhousie University.

Laboratory sustainability is a transition that takes time and can be challenging for researchers if they are unaware of the benefits for the planet, reducing costs, and enhancing safety. The Green Lab program can be an effective step towards shifting mindsets and behaviors in labs. However, it is up to the Sustainability Office at Dalhousie University to promote awareness about the program to lab members. Furthermore, Dalhousie University could improve sustainability in labs through financial incentives and by implementing more efficient buildings. In all, a community of sustainable labs on the Studley campus could help shift ideologies and allow for other parts of the university to improve its sustainability.

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Appendix A

Email Script:

Hello,

You are invited to take part in a research study being conducted by Catherine Brennan, Elena Milito, Andrew Martell, and Quinn Taaffe, undergraduate students in the Department of Earth and Environmental Science at Dalhousie University, as part of our research project for ENVS 3502. The purpose of this research is to have Dalhousie Science lab members complete a survey on awareness of the Green Labs program and lab sustainability.

If you choose to participate in this research, you will be asked to answer 21 questions in an anonymous survey on the Green Labs program and sustainable lab practices. The survey should take approximately 5 minutes.

We hope that this research will contribute to new knowledge on lab sustainability and the effectiveness of the Green Labs Program at Dalhousie.

We would greatly appreciate it if you could share our survey with all members of your lab (lab technicians, students, etc.). If you are interested in completing the survey, click on the link below. Please don't hesitate to contact us if you have any questions.

<https://forms.gle/r77x6CKv38dzX5JM6>

Thank you,

Catherine Brennan
Elena Milito
Andrew Martell
Quinn Taaffe

Hello,

Thank you so much to everyone who has filled out the survey! We just wanted to send a friendly reminder to those who have not filled out the survey that we will be closing it on **March 21st at 5 pm**. We would really appreciate it if you could send the survey to anyone who works in your lab.

<https://forms.gle/r77x6CKv38dzX5JM6>

All the best,

Catherine, Andrew, Elena and Quinn

Appendix B

Green Labs Program Survey (<https://forms.gle/u5aKFJ8ZR4x7K9cQ7>)

If you choose to participate in this research you will be asked to complete a 5 minute anonymous survey on the Green Labs program and sustainable lab practices. Your participation in this research is entirely your choice. You do not have to answer questions that you do not want to answer, and you are welcome to stop the survey at any time if you no longer want to participate. All you need to do is close your browser. If you do complete your survey and you change your mind later, we will not be able to remove the information you provided as we will not know which response is yours. Your responses to the survey will be anonymous. This means that there are no questions in the survey that ask for identifying details such as your name or email address. All responses will be saved on a secure Dalhousie server. Only the researchers mentioned above will have access to the survey results. We will describe and share general findings of this research in a final report as well as a class presentation. We will destroy all information 1 month after reporting the results. You should discuss any questions you have about this study with the researchers mentioned above, as well as our supervisor Caroline Franklin. Please ask as many questions as you like before or after participating, feel free to contact us at el761621@dal.ca.

Do you consent to the survey?

- Yes

Overview

Welcome to our ENVS 3502 research project survey. We will be investigating the extent that the Green Lab program has improved awareness of energy efficiency, waste diversion, and material efficiency within Dalhousie science laboratories on Studley Campus. Organized by the Office of Sustainability at Dalhousie University, the Green Lab Program aims to; reduce water and energy consumption, support life cycle costing and related benefits, improve sustainable purchasing decisions, increase waste reduction and source separation. The program was established in 2022, yet there has been no study examining how the program has improved awareness on sustainable practices in laboratories. Our study hopes to fill this knowledge gap.

1. Department
2. Please specify your role in the lab (Ex. Lab tech, instructor, student).
3. How long have you worked in this lab?
 - <2 years
 - 2-5 years
 - 5-8 years
 - More than 8 years
4. During lab discussions, have you talked about sustainability within your lab?
 - Yes
 - No
5. Have you heard of the Green Labs Program?
 - Yes

- No
6. Is your lab enrolled for the Green Labs Program?
- Yes
 - No
 - Do not have authority
 - Never heard of it
7. How satisfied are you with your laboratory in terms of sustainability?
- Satisfied
 - Neutral
 - Dissatisfied
8. Please rate the following aspects of lab sustainability in terms of need for improvement in your lab.
- Material Use
 - Energy Efficiency
 - Waste Management

As part of the Green Labs Program, Labs can conduct the following to work towards being more sustainable. To your knowledge, has your lab ever done any of the following 6 practices?

9. We have conducted a waste audit to identify our biggest source of waste
- Does not apply
 - I don't know
 - Never
 - Sometimes
 - Frequently
 - Always
10. We select suppliers who offer more eco-friendly products
- Does not apply
 - I don't know
 - Never
 - Sometimes
 - Frequently
 - Always
11. We seek ways to minimize chemical or reagent use
- Does not apply
 - I don't know
 - Never
 - Sometimes
 - Frequently
 - Always
12. We use greener alternative tools or guides when possible
- Does not apply
 - I don't know
 - Never
 - Sometimes
 - Frequently
 - Always
13. We replace equipment with more energy efficient options
- Does not apply
 - I don't know

- Never
- Sometimes
- Frequently
- Always

14. We have discussed in the lab what equipment can be turned off

- Does not apply
- I don't know
- Never
- Sometimes
- Frequently
- Always

15. Please indicate your level of agreement with the following statement: The Green Labs Program has improved waste diversion in our lab. If you do not participate in the program select "does not apply".

- Does not apply
- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

16. Please indicate your level of agreement with the following statement: The Green Labs Program has improved material use efficiency in our lab. If you do not participate in the program select "does not apply".

- Does not apply
- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

17. Please indicate your level of agreement with the following statement: The Green Labs Program has improved energy efficiency in our lab. If you do not participate in the program select "does not apply".

- Does not apply
- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

18. Are you aware of the potential rebates for energy and water efficient equipment from the Office of Sustainability?

19. Is it important to increase sustainability in labs? Why or why not?

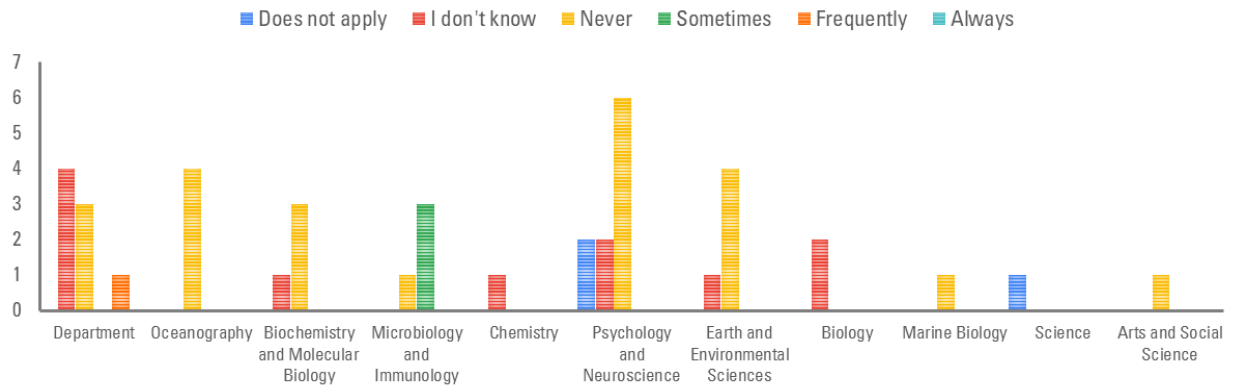
20. What sustainability changes would you like to see made in your lab?

21. How could the university better support your transition to a more sustainable lab?

22. Upon completing this survey, do you want to learn more about the Green Labs Program?

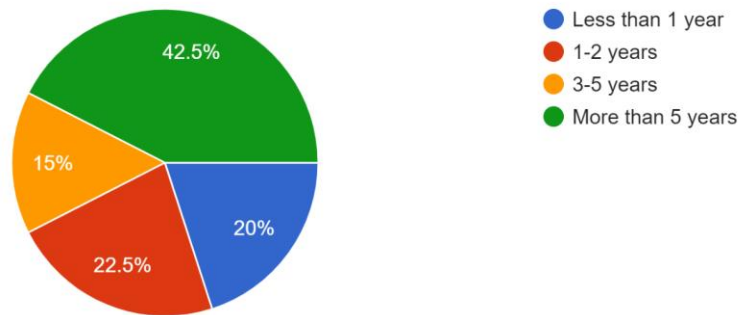
Appendix C

LAB SELECTS SUPPLIERS WITH ECO-FRIENDLY PRODUCTS



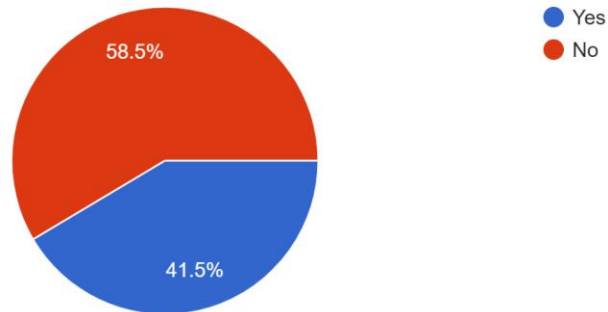
How long have you worked in this lab?

40 responses



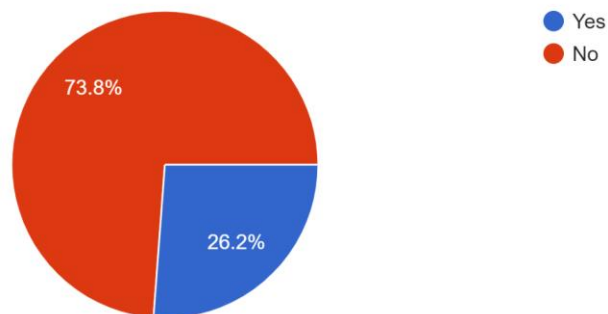
During lab discussions (e.g. lab meetings), have you talked about sustainability within your lab?

41 responses



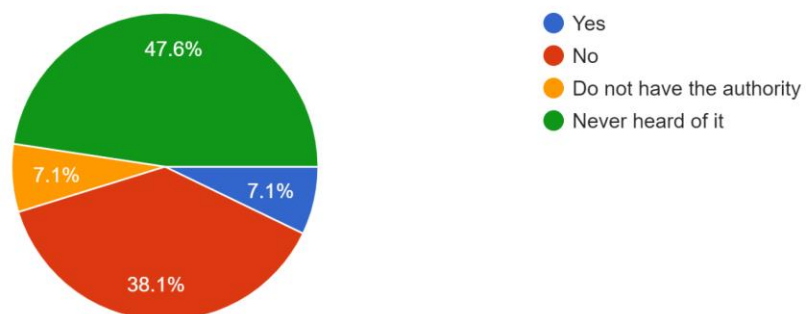
Have you heard of the Green Labs Program?

42 responses



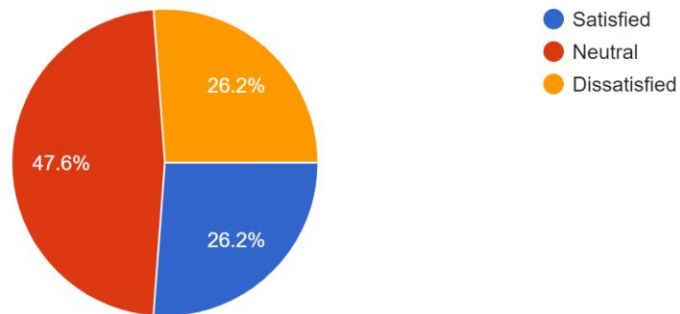
Is your lab enrolled in the Green Labs program?

42 responses



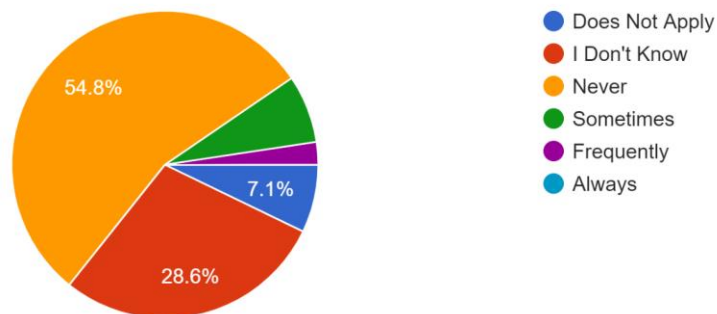
How satisfied are you with your laboratory in terms of sustainability?

42 responses



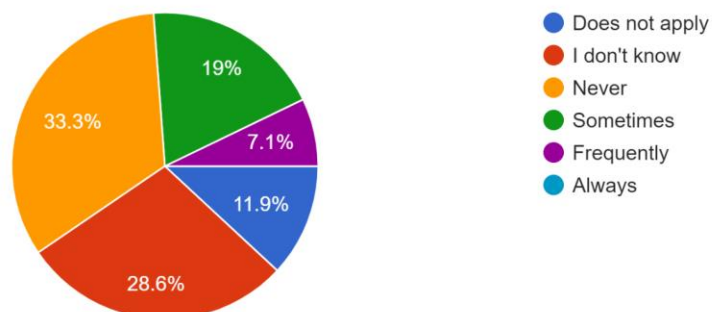
We conduct a waste audit to identify our biggest source of waste.

42 responses



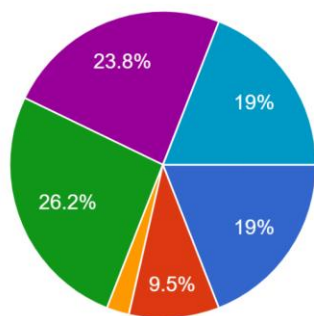
We select suppliers who offer more eco-friendly products.

42 responses



We seek ways to minimize chemical or reagent use.

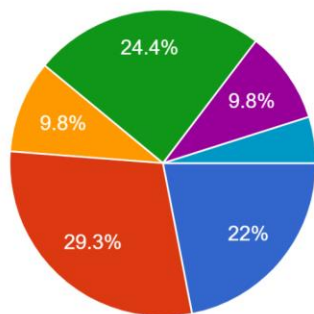
42 responses



- Does not apply
- I don't know
- Never
- Sometimes
- Frequently
- Always

We use greener alternative tools or guides when possible.

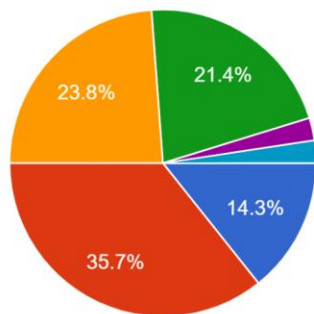
41 responses



- Does not apply
- I don't know
- Never
- Sometimes
- Frequently
- Always

We replace equipment with more energy efficient options.

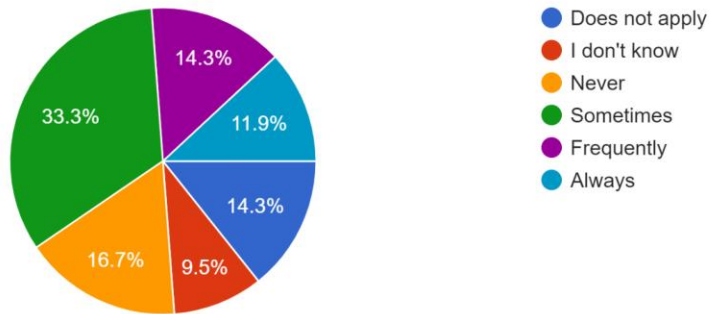
42 responses



- Does not apply
- I don't know
- Never
- Sometimes
- Frequently
- Always

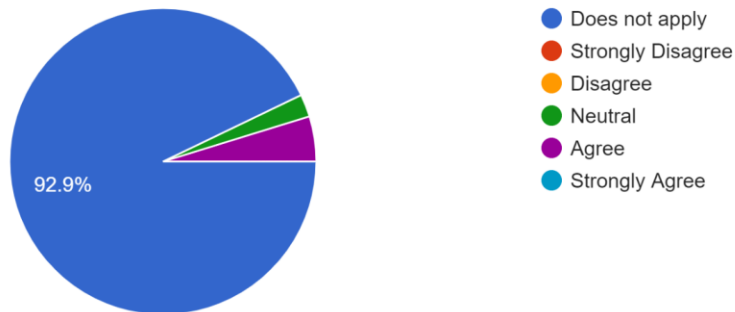
We discuss in the lab what equipment can be turned off.

42 responses



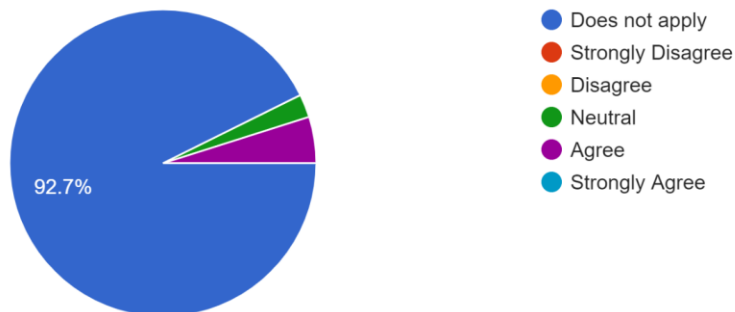
Please indicate your level of agreement with the following statement: The Green Labs Program has improved waste diversion in our lab. If you do not participate in the program select "does not apply".

42 responses



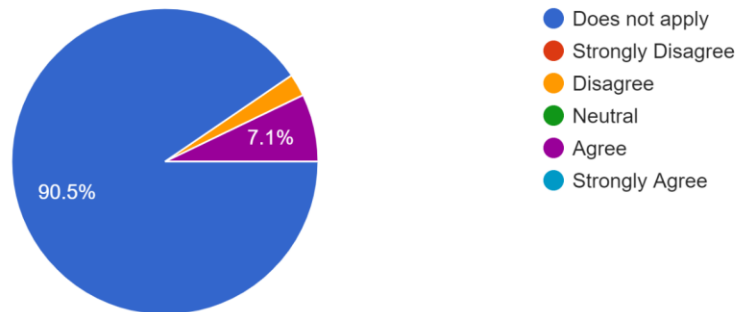
Please indicate your level of agreement with the following statement: The Green Labs Program has improved material use efficiency in our lab. If you do not participate in the program select "does not apply".

41 responses



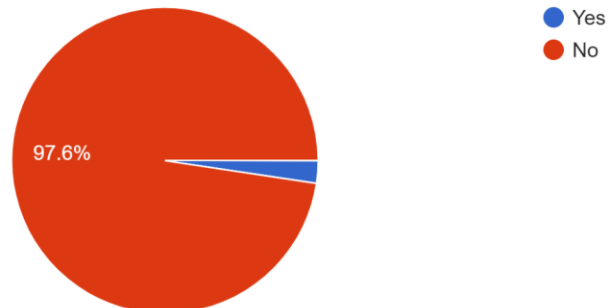
Please indicate your level of agreement with the following statement: The Green Labs Program has improved energy efficiency in our lab. If you do not participate in the program select "does not apply".

42 responses



Are you aware of the potential rebates for energy and water efficient equipment from the Office of Sustainability.

42 responses



Appendix D

Link to REB Application Form:

<https://drive.google.com/file/d/1zX2y5TLq575ht6BGExNPF5HdoAGa78IJ/view?usp=sharing>

Appendix E

Survey Data:

<https://docs.google.com/spreadsheets/d/1ebsz5c5f9eKorMCCHlcJ3vSHCY6tYXAEhG3G2G84udQ/edit?usp=sharing>

Acknowledgements

We would like to thank Caroline Franklin and our TA Jessica Needham for their generous support and feedback throughout the course of this project.