Student Guided Suggestions for Improving Participation in Dalhousie Office of Sustainability's Used Device Drive

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Abstract

Electronic waste, or e-waste, poses a significant global challenge, driven by escalating technology consumption and declining device lifespans. In Canada, individuals generate an estimated 20kg of e-waste annually, necessitating urgent and effective management strategies. However, only 20% of Canadian e-waste undergoes proper recycling, with the remaining waste leading to severe environmental and health hazards due to toxic leaching. In response to this pressing issue, circular economic models advocating for the reuse and refurbishment of devices have gained prominence, exemplified by initiatives like the Used Device Drive implemented at Dalhousie University. This study delves into the efficacy of the Used Device Drive promotion through a multifaceted approach, incorporating a comprehensive student survey and a thorough literature review. Particularly, findings from the survey highlight a glaring disparity: while a staggering 81% of surveyed students remain unaware of the initiative, an overwhelming 86% express a strong willingness to donate their devices. The survey further identifies effective strategies for heightening awareness, including leveraging platforms such as Brightspace, social media channels, and class presentations. Moreover, barriers to donation, such as lack of awareness and privacy concerns, underscore the imperative for targeted promotional campaigns and educational initiatives. Integrated insights from the literature review point out key components crucial for the success of sustainability initiatives, emphasizing the importance of collaboration with university stakeholders, highlighting sustainability benefits, and providing robust educational resources and incentives. These findings not only inform the strategic promotion and refinement of the Used Device Drive but also offer invaluable insights for shaping future sustainability efforts at Dalhousie University, fostering a more environmentally conscious campus community.

Key words: E-waste, circular economy, awareness campaign, campus sustainability, sustainability communication, student engagement

Introduction

The proper disposal and management of electronic waste (e-waste) has become an increasing concern, as discarded electronics are one of the most rapidly growing sources of global waste (Forti et al., 2018). Defined in the Solving The E-waste Problem (STEP) initiative, e-waste refers to "all types of electrical and electronic equipment (EEE) and its parts that have been discarded by the owner as waste without the intention of re-use," (United Nations University, 2014). An increase in technology users and shortened electronic lifespans have contributed to the increase in e-waste generation, which is predicted to grow at an annual rate of 1-5% in developed nations (Forti et al., 2018). In Canada, a predicted 20kg of e-waste is generated per citizen on a yearly basis, and as of 2016, only 20% of this waste was properly recycled through provincial organizations (Baldé et al., 2017). The remaining e-waste that is not properly recycled is a major concern, as electronics that are improperly disposed of can lead to environmental pollution and negative human health consequences (Baldé et al., 2017). In the 2017 Global E-waste Monitor report released by United Nations organizations, one of the key suggestions for improving e-waste management was to increase circular economic initiatives that promote the re-use and refurbishment of electronic devices (Baldé et al., 2017).

At Dalhousie University, a circular economic model of e-waste management has been developed through the Office of Sustainability's Used Device Drive (Dalhousie University Office of Sustainability, 2024). This device drive is running from January to April 2024, and allows all Dalhousie community members to drop off their old phones, tablets, or computers, which will then be donated to local organizations that provide devices for individuals leaving the justice system (Dalhousie University Office of Sustainability, 2024). In past studies at Dalhousie, it was found that 83.3% of students on Studley campus would use an e-waste disposal site if it was made available to them (Broughton et al., 2023), indicating student support for such initiatives. However, a potential barrier to student participation in the used device drive may come from a lack of student awareness. This awareness barrier was noted in a 2019 study conducted on undergraduate students at Southeastern Texas University, where it was found that over half of the students were not aware of the e-waste recycling program on campus, and that students had a general unawareness for campus sustainability initiatives (Msengi et al., 2019).

Various studies have been performed on university campuses to assess the effectiveness of different communication methods in increasing awareness of sustainability initiatives (Godfrey & Feng, 2017; Nanath & Kumar, 2021; Tlebere et al., 2016). These studies have yielded a diversity of results, allowing for a comparison of different communication methods, and identification of common features present in successful awareness campaigns (Godfrey & Feng, 2017; Nanath & Kumar, 2021; Tlebere et

al., 2016). For example, a 2021 study was conducted at Middlesex University Dubai to compare the effectiveness of text and video methods in changing student attitudes and behaviors towards e-waste recycling (Nanath & Kumar, 2021). It was found that students that read an informational text about e-waste recycling displayed increased behavioral changes when compared to students that watched an informational video, indicating that a text-based method may be a more effective communication strategy (Nanath & Kumar, 2021).

Where Nanath & Kumar (2021) found that a text-based communication method was effective in shifting student attitudes towards e-waste recycling, a 2017 study focused on sustainable food choice displayed contradicting results (Godfrey & Feng, 2017). Godfrey & Feng (2017) found that informative infographics posted in dining halls were an ineffective method for encouraging sustainable food choice, and that students may be less likely to choose sustainable meals after viewing the infographics. In analyzing these results, Godfrey & Feng (2017) noted that the lack of behavior and attitude change might be attributed to the perceived inconvenience of stopping to read the poster, as many interviewed students described time saving as a significant factor in their meal choices. Overall, the comparison of the studies by Nanath & Kumar (2021) and Godfrey & Feng (2017) indicates that similar communication methods may not be effective at promoting sustainable initiatives across all topics and contexts, demonstrating the importance of proper medium choice in awareness campaigns.

With the rapid growth of social media in recent decades, researchers have taken advantage of this growing platform and investigated the effectiveness of social media-based environmental awareness campaigns (Tlebere et al., 2016). Tlebere et al. (2016) studied South African university students' knowledge of environmental sustainability before and after a 4-week social media campaign that posted educational blogs and videos to Twitter, Facebook, and a campaign specific website. Comparisons of pre and post campaign surveys indicated that the campaign was effective in increasing students' knowledge of environmental issues, demonstrating that social media resources can be an effective method of communicating sustainable initiatives (Tlebere et al., 2016). Additionally, similar to the findings of Godfrey & Feng (2017), this study noted time constraints as a major limitation to students' engagement with the campaign material (Tlebere et al., 2016). This common theme among the two studies suggests that for awareness campaigns to garner the highest engagement, the campaigns should focus on providing education in a format with which individuals can engage quickly (Godfrey & Feng, 2017; Tlebere et al., 2016).

Overall, previous studies demonstrated that various communication methods can be effective in raising awareness for sustainable initiatives, and that the optimal method may differ across audiences and

contexts (Godfrey & Feng, 2017; Nanath & Kumar, 2021; Tlebere et al., 2016). This finding highlights the importance of conducting ample research when creating promotional material, to ensure that the chosen communication methods are best suited to your audience and initiative. As such, to best promote Dalhousie Office of Sustainability's Used Device Drive, research is required to guide the creation of a successful awareness campaign. Accordingly, we have designed a research project which aims to answer the following questions; (1) Are students aware of the existence of Dalhousie University's Used Device Drive?, (2) What is the level of willingness among students to participate in the Used Device Drive?, and (3) What advertising methods should the Office of Sustainability employ to increase student awareness about the Used Device Drive initiative?. To effectively answer these questions, this study will employ a combination of student surveys and literature review, allowing us to generate insights that are both specific to the Dalhousie community, and supported by robust literature.

Methods

Surveys

A survey was conducted on the Dalhousie student body to gain insights on students' awareness and interest in the Used Device Drive. Additionally, the survey aimed to gather students' suggestions on optimal advertisement methods, and program modifications that would help to increase student participation. A survey was deemed the most appropriate data collection method, compared to alternative methods such as interviews, as it allowed for the inclusion of many student participants, generating responses that are more representative of the Dalhousie student body.

The survey was offered through an online Microsoft form and included a description of the Used Device Drive, followed by a consent form and 9 survey questions (Appendix 1). The questions included one consent verification, 7 closed-ended questions, and 1 open-ended question. The combination of close and open-ended question types was chosen as the close-ended style better facilitated statistical analysis, while the open-ended question allowed for students to share diverse perspectives and ideas that may not have been covered in the prior questions.

The survey population included any individual currently enrolled in a degree with any faculty at Dalhousie University, who studies on the Studley or Sexton campus. Survey participants were recruited through word of mouth, Brightspace announcements, social media posts on Dalhousie associated accounts, and posters in campus buildings. The variety of recruitment methods allowed for a probabilistic sampling style, as the survey was promoted to the entirety of the student body with no emphasis on a specific degree level, faculty, gender, age, or any other grouping. In total, 58 survey responses were

obtained, 48 from Studley campus, and 10 from Sexton campus. While this does not correspond to the targeted 90% confidence level of n=269, it provides a representation of the Dalhousie student body that was achievable given the 2-week time frame of the study.

Ethics Review

As the survey involved human participants, an ethics review was conducted via Dalhousie University's Department of Earth and Environmental Science internal Research Ethics Board, thereby ensuring that all methodology meets ethical standards.

Survey Statistical Analysis

For survey questions 4, 5, and 6, a chi-square test of homogeneity was conducted to determine if levels of awareness, willingness to participate, and prior donation differ between students on Studley and Sexton campus. This test was conducted to determine if one of the campuses displays either a greater willingness to participate or lower awareness of the drive. Using this information, promotional methods can be prioritized by campus, to obtain maximal benefits from advertising efforts. For questions 7 and 8, the responses were totaled to determine the percentage of students on both campuses, Studley campus, and Sexton campus that selected each awareness method (question 7), and barrier (question 8). For question 9, student responses were coded using a mix of *a priori* and *a posteriori* methods and presented in a coding tree, allowing for the identification of the main themes present in the responses.

Literature Review

The literature review was completed as a resource to accompany primary data collected from the survey. The literature review provides an understanding of the current academic literature regarding the methods of raising awareness about sustainability initiatives. The common themes identified in the literature have been catalogued and analyzed. The goal of the literature review was to determine the most effective methods of advertising for sustainability initiatives, with a specific focus on Dalhousie's used Device Drive. The literature review was conducted using three databases: Google Scholar, Open Alex, and Scopus. Google Scholar was queried using the search terms {"Awareness campaign" AND "Sustainability" AND "campus"} and {"Sustainable practices" AND "Promotional methods"} and {"Student engagement" AND "Promotional Methods"}. Open Alex was queried using the search terms {"Awareness Campaign" AND "Sustainability"} and {"Green Initiatives" AND "Student Engagement"}. Scopus was queried using the search terms {"Awareness campaign" AND "Sustainability" AND "Campus"} and {"Student engagement" AND "Promotional Methods"}. The Boolean 'AND' operator was used to refine search results, in order to find literature most relevant to the scope of the project.

For each combination of search terms on each database, the five most applicable results from the first page of results were screened for inclusion in the literature review. To be included in the literature review, the research had to meet the following three criteria: 1. Research must include collection of primary data 2. Research must be focused on raising awareness of a sustainability initiative/issue 3. Results must provide insight into the effectiveness of one or more specific communication methods. Once all research articles had been screened, and duplicates were removed, we were left with a final list of five included research articles. Notes were made on the key findings and themes from these articles, and write-ups were put together for the five most applicable studies.

Results

The survey received 58 total responses, with 48 from students on Studley campus and 10 from students on Sexton campus. When looking at both campuses, 81% of student respondents have not heard of the Used Device Drive, 16% have heard of it, and 3% are unsure (Figure 1A). A chi-square test of homogeneity revealed that levels of awareness of the Used Device Drive do not differ significantly between students on Studley and Sexton campus ($P = 0.75$). Across both campuses, 0% of student respondents have donated a device to the Used Device Drive. On Studley and Sexton campus, 86% of student respondents would consider donating a device to the Used Device Drive, 9% would not consider donating a device, and 5% are unsure (Figure 2A). A chi-square test of homogeneity revealed that willingness to participate in the device drive does not differ significantly between students on Studley and Sexton campus ($P = 0.287$).
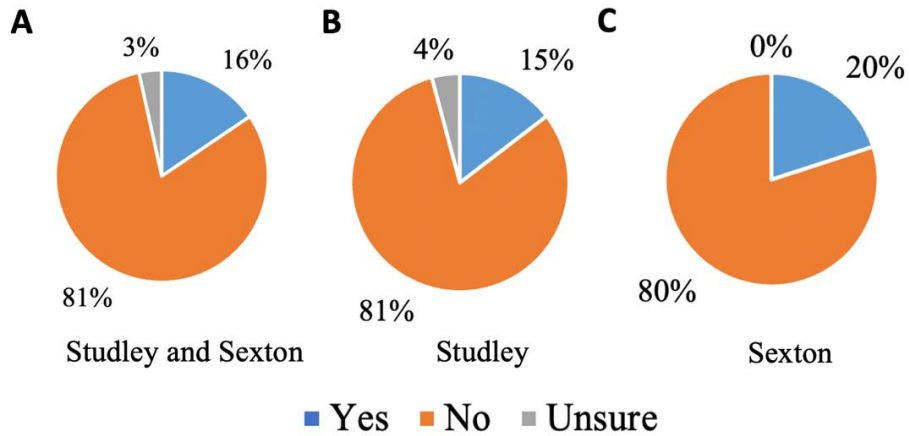
Figure 1. Responses to survey question "Prior to this study, have you ever heard of the Used Device Drive?" from A) students on Studley and Sexton Campus, B) students on Studley Campus, and C) students on Sexton Campus. Survey conducted at Dalhousie University, Halifax, Canada, in March 2024. For Studley campus n=48, for Sexton campus n=10, for Studley and Sexton campuses n=58.

Figure 2. Responses to survey question "Should you seek to discard one of your devices, would you consider donating to the used device drive?" from A) students on Studley and Sexton Campus, B) students on Studley Campus, and C) students on Sexton Campus. Survey conducted at Dalhousie University, Halifax, Canada, in March 2024. For Studley campus n=48, for Sexton campus n=10, for Studley and Sexton campuses n=58.
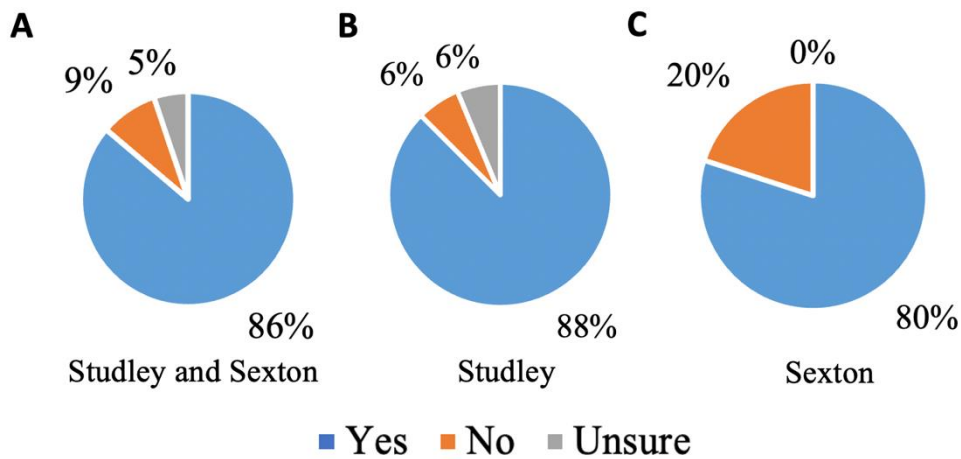
Students on Studley and Sexton campus consider Brightspace posts, social media posts, and class presentations as the top three most effective methods for raising awareness of the Used Device Drive,

with 86%, 81%, and 60% of students selecting these methods, respectively (Figure 3A). On Studley campus, Brightspace posts (88%), social media posts (83%), class presentations (56%), and posters (56%) were considered the most effective (Figure 3B). On Sexton campus, class presentations (80%), Brightspace posts (80%), and social media posts (70%) were considered most effective (Figure 3C).
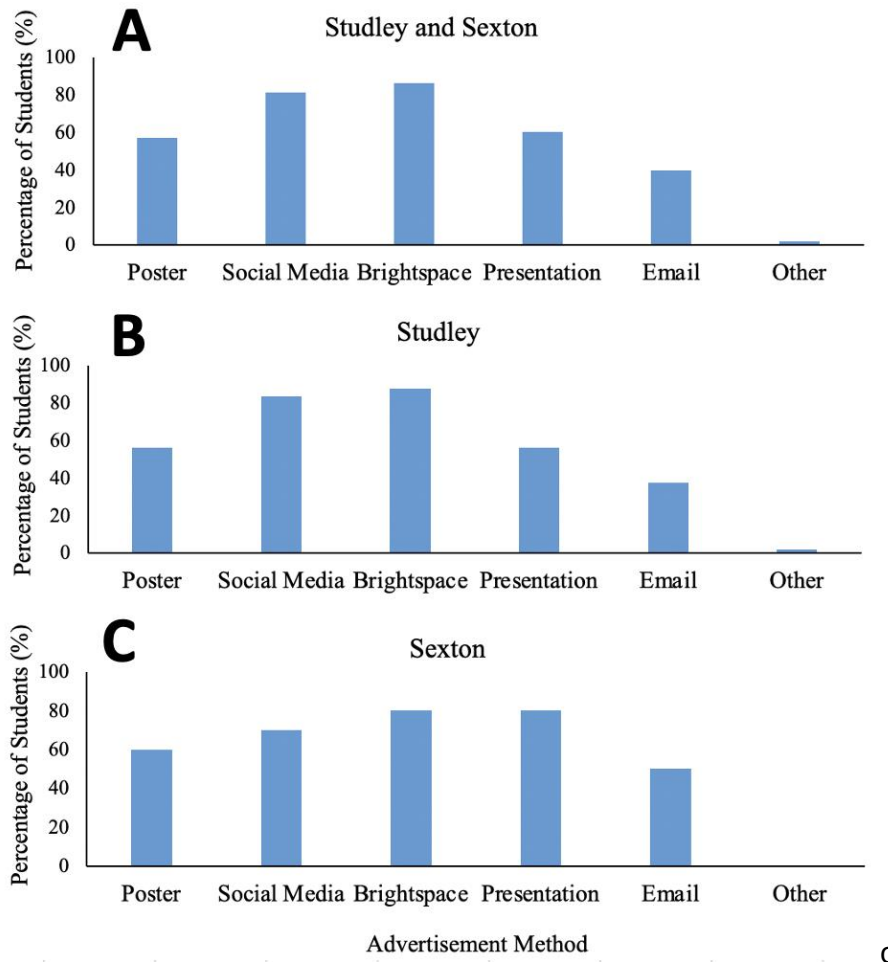

Figure 3. Responses to survey question "Which of the following methods do you think are the most effective in spreading awareness of Dalhousie's Used Device Drive? (Select all that apply)" from A) students on Studley and Sexton Campus, B) students on Studley Campus, and C) students on Sexton Campus. Survey conducted at Dalhousie University, Halifax, Canada, in March 2024. For Studley campus n=48, for Sexton campus n=10, for Studley and Sexton campuses n=58.

Students on Studley and Sexton campus consider a lack of awareness, lack of devices to donate, and privacy concerns as the top three barriers to student participation in the Used Device Drive, with

90%, 59%, and 48% of students selecting these barriers, respectively (Figure 4A). On Studley campus, a lack of awareness (89%), lack of devices to donate (58%), and privacy concerns (48%) were considered the top barriers (Figure 4B). On Sexton campus, a lack of awareness (90%), lack of devices (60%), privacy concerns (50%), and inconvenient locations (50%), were considered the top barriers (Figure 4C).
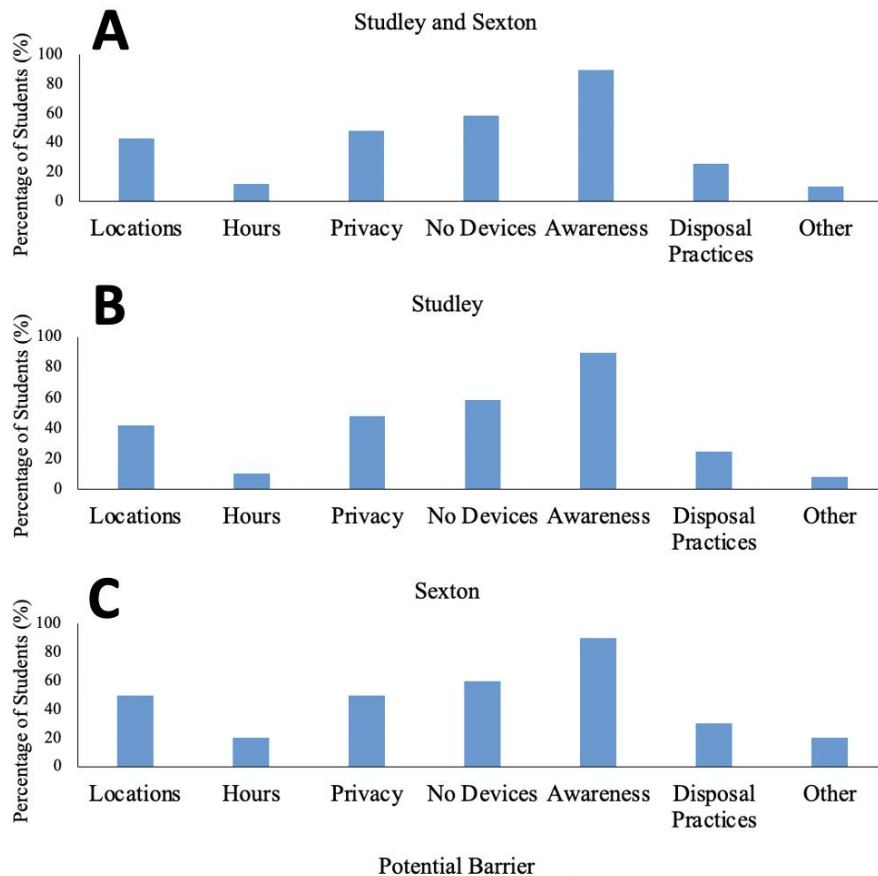

Figure 4. Responses to survey question "Which of the following methods do you think are the most effective in spreading awareness of Dalhousie's Used Device Drive? (Select all that apply)" from A) students on Studley and Sexton Campus, B) students on Studley Campus, and C) students on Sexton Campus. Survey conducted at Dalhousie University, Halifax, Canada, in March 2024. For Studley campus n=48, for Sexton campus n=10, for Studley and Sexton campuses n=58.

Of the 21 respondents that shared their perceptions of the drive through an open-ended response, 38% left positive feedback about the Used Device Drive, 43% provided suggestions for improving the program, 5% had questions, 5% had concerns, and 43% cited their lack of awareness about the program (Figure 5). The suggestions were to provide incentives for donation, include a self-serve drop-off

location, provide device clearing instructions, and raise awareness through info booths and educational resources. The questions were about how the charity was chosen, and how the program was designed. The concerns were about the possibility of non-functional devices being donated, and the possibility of students not participating and instead opting to sell their devices.
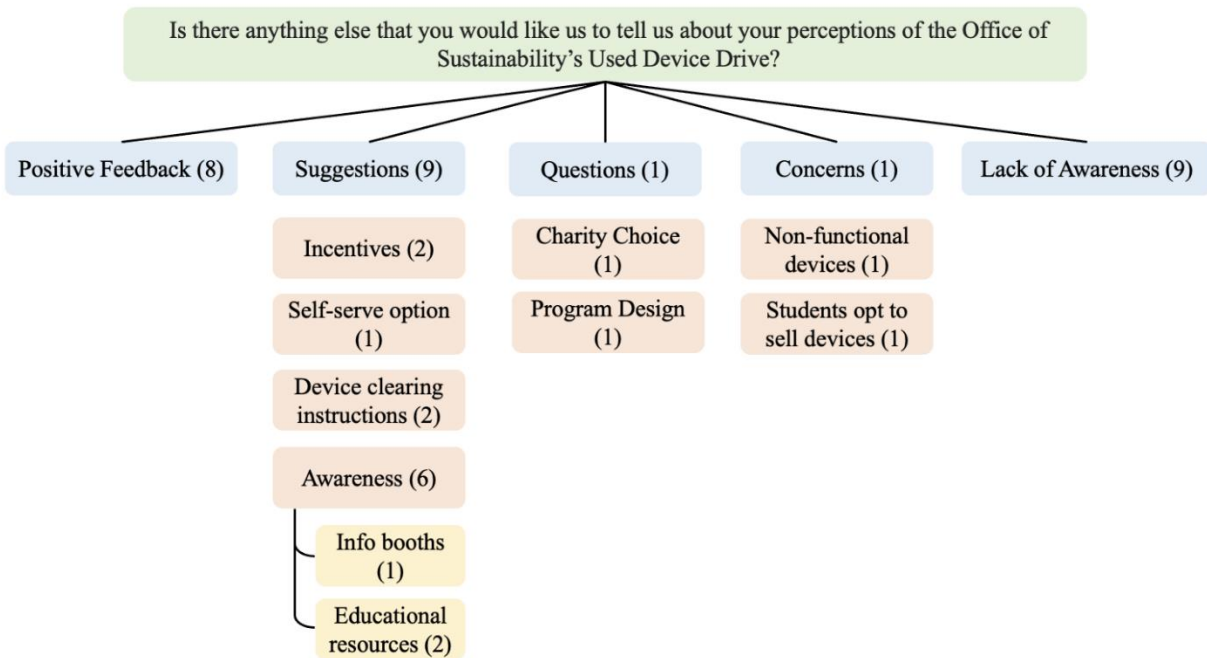

Figure 5. Responses to survey question "Is there anything else that you would like us to tell us about your perceptions of the Office of Sustainability's Used Device Drive?". Responses coded using *a priori* and *a posteriori* methods. Survey conducted at Dalhousie University, Halifax, Canada, in March 2024, n=58.

Literature Review

We present the major findings and themes of five core studies whose findings provide the most relevant connections to the Used Device Drive.

Study 1: "Sustainable Water Consumption", Cheong et al. (2013)

Cheong et al. (2013) performed a study at the University of British Columbia to research and design a social marketing campaign to promote the use of sustainable water sources on campus and facilitate a campus wide transition towards environmentally mindful water consumption. The developed

marketing plan includes three steps, designed to optimize campus awareness (Cheong et al. 2013). The first step of the marketing campaign is to raise awareness of the environmental issues surrounding water consumption. This step is followed by collaboration with university administrators, staff members, and student organizations, to plan campus events designed to promote sustainable water use. The final step of the social marketing campaign is to launch targeted events such as "Sustainability week" which educate students on how they can adopt more sustainable water drinking habits. Altogether, this social marketing process is designed to facilitate optimal awareness and participation on campus, leading to increased environmental benefit (Cheong et al. 2013).

Major Findings:

This study found that students should be educated on the environmental issues driving the initiative, awareness campaigns should be designed in collaboration with university administrators, staff and organizations, and targeted campus events should be utilized to promote sustainability initiatives (Cheong et al. 2013).

Study 2: "Towards a campus culture of environmental sustainability: Recommendations for a large university", Levy and Marans (2011)

Levy and Marans (2011) performed a study to provide guidance on how to best encourage pro-environmental behaviours on campus. The authors led an interdisciplinary team that developed recommendations for creating a "culture of environmental sustainability" at the University of Michigan (UM) (Levy and Marans, 2011). This study found that people's pro-environmental behaviours are influenced by five factors: social incentives, material incentives, awareness of procedures, awareness of issues, and prompts/reminders (Levy and Marans, 2011). In light of these considerations, universities should focus on three different kinds of initiatives to encourage the growth of environmentally friendly behaviours: engagement, education, and assessment (Levy and Marans, 2011). The educational and engagement recommendations aim to assist members of the campus community in developing knowledge and behaviours that are in line with environmental sustainability. While the goal of the assessment initiatives is to assess the short- and long-term success of educational and engagement efforts (Levy and Marans, 2011).

Major Findings:

This piece of literature found that pro-environmental behaviors are influenced by social incentives, material incentives, awareness of procedures, awareness of the issue, and prompt/reminders

(Levy and Marans, 2011). Additionally, they found that engagement, education, and assessment initiatives encourage the growth of environmentally friendly behaviours (Levy and Marans, 2011).

Study 3: "Marketing Strategies to Motivate Participation in Municipal Recycling Programs", Spear (2012)

The study performed by Spear (2012) explored different ways to encourage participation in a municipal recycling program in New Hampshire. This study provided many insights into marketing strategies designed to promote sustainability goals. One important takeaway from the study was that recycling facilities should be kept neat, clean, organized, and designed for user convenience in order to convince people that the materials dropped off will be properly handled and recycled when possible (Spear, 2012). The study also found that people react more favorably to advertisements which focus on the positive effects of sustainable actions, rather than the negative consequences of inaction, so it would be more useful to promote the benefits of properly recycling e-waste rather than trying to guilt or shame people into doing so (Spear, 2012). The study sought to compare word-of-mouth marketing, physical signage, and educational communications. The conclusion was that all three should be used in conjunction to promote sustainable practices, however, they each have their own strengths and weaknesses (Spear, 2012). Signage can have positive impacts on environmental awareness and sustainability, however, when there are a large number of signs posted somewhere their impact is greatly reduced due to "advertising noise" (Spear, 2012). According to the study, the best signage is generally simple, compelling, and uncluttered (Spear, 2012). Word-of-mouth communication has been shown to be very effective in promoting sustainability initiatives, especially if the promoter is perceived to be an expert in a relevant field, although the scalability of this approach is limited (Spear, 2012). Programs designed to educate the public on the positive impacts of proper recycling were also found to be very effective, however the positive effects of these campaigns appeared to be temporary and should be supported with continual reinforcement (Spear, 2012).

Major Findings:

The most important takeaways from this study include the suggestion that recycling center drop-off locations should be kept clean and organized to encourage use (Spear, 2012). This is very applicable to our project and would suggest that the e-waste drop-off locations should be kept very tidy. Another key takeaway is the finding that advertising the benefits of sustainable action is more effective than advertising the consequences of inaction (Spear, 2012). This piece of information can be helpful in generating buzz around the Dalhousie Used Device Drive. Also, the study found that simple and uncluttered signage, placed in locations without a lot of other advertising, is very effective (Spear, 2012).

Finally, a combination of word-of-mouth marketing, physical signage, and educational communications has been shown to be the best way to advertise sustainability initiatives, according to this study (Spear, 2012).

Study 4: "The Role of Public Awareness Campaigns in Sustainable Development", (Borawska, 2017)

A study conducted at the University of Poland focused on the role of public awareness campaigns and the impacts they have on the perceptions of sustainability initiatives. The article focuses on six broad sustainability issues including climate change, biodiversity, animals, diet/ nutrition, consumption of goods, and waste reduction (Borawska, 2017). The article found that the marketing of any sustainable initiative surveys played an important role when drawing the public's attention to the issue (Borawska, 2017). It was also found that questionnaires and focus groups are the most common and effective promotional methods in the field of sustainability (Borawska, 2017). The authors created a methodological framework which measures campaign effectiveness and create different measures that will increase the productivity and social impact of individual campaigns (Borawska, 2017). This framework was tested by measuring people's heart rates, EEG, and GSR to determine which technique showed the most neurological responses (Borawska, 2017). Overall, this study demonstrated that effective awareness strategies are critical in shaping public attitude toward sustainability issues (Borawska, 2017).

Major findings:

The key takeaway from this study was the importance of including the public to successfully implement a sustainability campaign (Borawska, 2017). Proper involvement ensures that campaigns are perceived correctly, which aids in shaping public attitude about the initiatives. The paper highlighted that implementing an effective marketing campaign is critical in the implementation of sustainability initiatives, to ensure maximum involvement and success (Borawska, 2017).

Study 5: " Pro-Environmental Campaigns via Social Media: Analysing Awareness and Behaviour Patterns", Fernandez et al. (2017)

The study performed by Fernandez et al. (2017) was an investigation into the nuances and effectiveness of various forms of social media campaigns promoting environmental awareness. This study suggested that awareness campaigns can have a significant impact on resource use and carbon footprints (Fernandez et al., 2017). The study also indicated that Facebook is the most effective of the major social

media platforms in promoting sustainability initiatives, and Twitter is the least effective, likely due to character limits on posts and an interface less conducive to embedding media (Fernandez et al., 2017).

Major Findings:

The key takeaways from this study include the broad, sweeping assertion that awareness campaigns are important and effective, especially for sustainability initiatives (Fernandez et al., 2017). This is important, as this project has adopted the assumption that an awareness campaign could make the Used Device Drive more successful. Also, the study found that Facebook is the most effective social media platform for advertising sustainability initiatives, while Twitter is the least effective (Fernandez et al., 2017). This suggests that the Used Device Drive should create a large presence on Facebook, while not wasting resources on advertising through Twitter.

Discussion

Summary of Research Purpose

The core objective of this research was to evaluate Dalhousie University students' awareness and willingness to participate in the Office of Sustainability's Used Device Drive, identify effective communication strategies to enhance student engagement, and uncover barriers hindering student participation. By combining a comprehensive student survey with a thorough literature review, this study aimed to provide actionable suggestions to elevate participation rates, crucial for the effective management and recycling of e-waste within the Dalhousie campus community.

Overview of Significant Findings

Our findings reveal a striking lack of awareness among students regarding the Used Device Drive, with 81% of respondents unaware of the initiative. Despite this, a substantial majority (86%) expressed willingness to donate, contingent upon adequate awareness. The preferred methods for the circulation of information were identified as Brightspace posts, social media engagement, and in-class presentations. Additionally, the primary barriers to participation were pinpointed as a lack of awareness, insufficient devices for donation, and privacy concerns related to device donation. An additional significant finding was that the levels of awareness in the Used Device Drive and willingness to participate did not differ significantly between Studley and Sexton campus.

Interpretation of Findings and Program Recommendations

        The noticeable unawareness yet high willingness to donate emphasizes the critical gap in communication strategies currently employed by the Used Device Drive initiative. The lack of effectiveness of current awareness methods aligns with the findings of Nanath & Kumar (2021), where they noted that certain awareness methods can be ineffective in promoting sustainability initiatives. To improve upon their promotional methods, Dalhousie should utilize the advertisement methods suggested by students, which include Brightspace posts, social media posts, and in-class presentations. The preference for students to receive program promotion through social media channels over traditional posters or email reflects a broader trend towards the effectiveness of digital platforms in engaging university students in sustainability initiatives (Tlebere et al, 2016). This trend supports the findings of Tlebere et al. (2016) who noted the effectiveness of social media in promoting campus sustainability. In creating these promotional materials, Dalhousie's Office of Sustainability should incorporate the suggestions of Spear (2012) by emphasizing the benefits of donation, and ensuring that promotional tools are simple and easy to understand.

        Moreover, the concern over device privacy indicates a need for additional educational resources that address these specific barriers. The worry about personal data privacy reflects the need for clear, accessible information on how to properly prepare devices for donation, including data wiping and device reset procedures. This importance of addressing this concern aligns with findings from Spear (2012) and Fernandez et al. (2017) who emphasized the effectiveness of addressing specific concerns and barriers to encourage engagement with sustainability initiatives and programs. Providing detailed instructions, possibly through workshops, online tutorials, or step-by-step guides, could alleviate these privacy concerns and empower potential donors to participate more confidently.

        An additional method that could be employed by the Office of Sustainability to promote device donation could be the use of incentives. The use of incentives was suggested by a survey respondent, and supported by the findings (Levy and Marans, 2011) who found that material incentives are one of the five factors that influence pro-environmental behavior. Following these suggestions, a simple incentive such a prize draw for device donors could be very effective at increasing program participation.

        As the level of awareness of the Used Device Drive and willingness to participate did not differ significantly between Studley and Sexton campus, this indicates that the same degree of advertising should be applied at both campuses. Students from both campuses are equally likely to participate and share the same level of knowledge about the drive, so one campus should not be prioritized when designing and implementing the awareness campaign.

Implications for Theory and Practice

Theoretically, this study contributes to the growing literature on the role of communication strategies in fostering sustainable behaviors within academic institutions such as Dalhousie University. It underscores the critical role of targeted, audience-specific communication in encouraging environmental stewardship among students. Practically, this study offers the Dalhousie Office of Sustainability a roadmap to refine its communication strategies, specifically by leveraging digital platforms and addressing privacy concerns directly to boost and enhance participation.

Limitations to the Study

This study's primary limitation was the relatively small sample size (58 respondents), which may not fully represent the diverse student body at Dalhousie University. This limitation is particularly relevant when considering the varied ways in which students may engage with sustainability initiatives, influenced by their respective faculties, levels of study, and even their personal schedules and commitments. The small sample size also raises questions about the statistical power of the analysis. With more respondents, the study could have potentially identified subtler trends or differences among various student groups, such as between those in different faculties or year levels, which could significantly inform targeted communication strategies.

Although this study was not designed to monitor changes over time, its cross-sectional approach limits insights into how student engagement with the sustainability initiative might evolve. The nature of sustainability initiatives, which depend on shifts in awareness, attitudes, and participation, means that understanding these dynamics over time is crucial. Without longitudinal data, it's difficult to measure the long-term impact of the initiative or the ongoing effectiveness of communication strategies.

Suggestions for Future Research

To address these limitations, future research could aim to engage a larger and more diverse sample of the student population. Stratified sampling methods could ensure that the sample accurately reflects the composition of the entire student body, including representation across different faculties, levels of study, and demographic backgrounds. This approach would enhance the generalizability of the findings and provide a more nuanced understanding of the student body's engagement with sustainability initiatives.

Moreover, adopting a longitudinal design in future studies would offer insights into the temporal dynamics of student engagement with the Used Device Drive. By tracking awareness, attitudes, and behaviors over time, researchers could identify the most effective moments and methods for communication, as well as understand the long-term impact of the initiative on student behavior.

Incorporating considerations around privacy concerns into future studies is essential, given the significant impact these concerns have on participation willingness. Research could explore effective communication strategies that transparently address how personal data and device privacy are safeguarded, including the steps participants can take to securely erase their data before donation. Evaluating the effectiveness of these communication strategies could clarify ways to mitigate privacy concerns, potentially increasing participation rates.

Finally, emphasizing the role of digital communication in these efforts is critical. Future research should assess the specific impact of digital advertising and social media engagement on raising awareness and driving participation, considering the growing importance of digital platforms in reaching and engaging the student demographic effectively (Tlebere et al, 2016).

Conclusion

Discarded electronics are an immense contributor to global waste (Forti et al., 2018). For this reason, it is of paramount importance that effective methods of re-using and refurbishing electronics become commonplace (Baldé et al., 2017). With re-use initiatives such as the Used Device Drive, it is essential that these programs are effectively promoted to increase participation, and in turn benefit the environment. Our study identified the most effective ways of promoting a Used Device Drive at Dalhousie University. The results of our survey indicated that students at Dalhousie University prefer to be informed about device drive through Brightspace posts, social media, and classroom presentations. Our literature review found that effective device drives are organized, neat, and clean, and can be promoted through awareness campaigns (Spear 2012). Using these findings, we hope to collaborate with Office of Sustainability to foster a more successful Used Device Drive, and inform awareness campaigns for future sustainability initiatives on campus.

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Appendix 1: Survey Questions and Consent form

CONSENT FORM

Student Guided Suggestions for Improving Awareness and Participation in Dalhousie's Office of Sustainability Used Device Drive

You are invited to take part in a research study being conducted by Kate Pennyfather, Eric Burchert, Braden White, Jacqueline Theal, and Mariam Knakriah, undergraduate students in the Department of Earth and Environmental Sciences at Dalhousie University. The purpose of this research is to understand students' perceptions of Dalhousie Office of Sustainability's Used Device Drive. All students studying on Sexton or Studley campuses are eligible to participate.

Your participation in this research is entirely your choice. You do not have to answer questions that you do not want to answer (by selecting prefer not to answer), and you are welcome to stop completing the survey at any time. All you need to do is close your browser. We will not include any incomplete surveys in our analyses. 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.

If you choose to participate in this research, you will be asked to answer 7-8 questions in an anonymous online survey. You will be asked questions about the Office of Sustainability's Used Device Drive, your willingness to participate in the device drive, and any suggestions for modifying the design of the device drive. The survey should take approximately 5 minutes. The risks associated with this study are no greater than those you encounter in your everyday life.

Your responses to the survey will be anonymous. This means that no questions in the survey will ask you to provide your name or email address. All responses will be saved in a secure Dalhousie University repository. Only Kate Pennyfather, Jacqueline Theal, Eric Burchert, Mariam Knakriah, and Braden White will have access to the survey results.

We will describe and share general findings of this research in a final research report that will be published online and accessible through DalSpace, the official Dalhousie University repository for student works. We will destroy collected and analyzed data at the end of the winter term (April 30th 2024).

There will be no direct benefit to you in participating in this research. The results of this research, however, may contribute to the generation of new knowledge to inform sustainability initiatives at

Dalhousie University. Please do not hesitate to reach out to Kate Pennyfather at kt853542@dal.ca should you have any questions.

This study was reviewed and approved by the Department of Earth and Environmental Sciences at Dalhousie University.

[ ] I consent to complete this survey (required to proceed to survey).
[ ] I consent to have my data stored in a data repository for future research (optional).

Description of the Office of Sustainability's Used Device Drive: The Used Device Drive is running from January to April 2024 and taking donations for functional cellphones, tablets, and laptops with chargers. The collected devices will be donated to the John Howard Society and Elizabeth Fry Society to be used by individuals leaving the justice system. For the Studley Campus, devices can be dropped off at the front desk of the following buildings: Student Union Building Sustainability Office (DSUSO), College of Sustainability (Mona Campbell Building), Howe Hall, Risley Hall. For the Sexton Campus, devices can be dropped off at the front desk of the following buildings: Gerard Hall, Civil and Resource Engineering Department (A.L MacDonald Building Room D215). All devices should be unlocked and cleared of personal data before being dropped off.

Survey Questions:

1. Are you currently a Dalhousie University student enrolled in a program delivered on the Studley or Sexton campuses? (Yes / No)
   If you answered No to question 1, you are not eligible to participate in this survey. Please exit the survey and do not submit a response.
2. What is your primary campus of study? (Studley Campus / Sexton Campus)
3. Prior to this survey, have you ever heard of Dalhousie's Used Device Drive? (Yes / Unsure / No)
4. Have you already donated a device to Dalhousie's Used Device Drive? (Yes / Unsure / No)
5. *Question 5 only presented to participants that answered 'Unsure' or 'No' to question 4*
   Should you seek to discard one of your electronic devices, would you consider donating your device to Dalhousie's Used Device Drive? (Yes / Unsure / No)
6. Which of the following methods do you think are the most effective in spreading awareness of Dalhousie's Used Device Drive?
   A. Posters in campus buildings
   B. Social media posts on Dalhousie associated accounts (Office of Sustainability, societies etc.)
   C. Brightspace posts

D. Short in-class presentations

F. Email from the Office of Sustainability

E. Other (Please explain)

7. Based on the description of the Used Device Drive, what are the potential barriers to student engagement in the program? (Select all that apply)

A. Inconvenient drop-off locations

B. Inconvenient drop-off hours

C. Privacy worries associated with re-use of devices

D. Students don't have devices to donate

E. Lack of student awareness about the Used Device Drive

F. Concerns about the disposal procedure if the donated devices are not able to be re-used

G. Other (Please explain)

8. Is there anything else that you would like us to tell us about your perceptions of the Office of Sustainability's Used Device Drive?

RESEARCH ETHICS BOARDS APPLICATION FORM

Prospective Research

This form should only be used if new data will be collected. For research involving only secondary use of existing information (such as health records, student records, survey data) or previously collected biological materials, use the *REB Application Form – Secondary Use of Information for Research.*

Instructions to complete this form are provided in the *Guidance for Submitting an Application for Research Ethics Review*.

This form makes reference to the TCPS2. It is linked here for convenience.

SECTION 1. ADMINISTRATIVE INFORMATION   [File No: office only | **v 2023**]

Suggest the preferred Research Ethics Board to review this research:

☐ Health Sciences OR   ☒ Social Sciences and Humanities

Project Title: Student and Literature Guided Suggestions for Improving Awareness and Participation in Dalhousie Office of Sustainability's Used Device Drive

1.1 Research team information				
Lead researcher (at Dalhousie):	Name:	**Kate Pennyfather**		
	Email (@dal.ca):	**Kt853542@dal.ca**	Phone:	

	Banner #:			Department:	**Biology**

Lead researcher's primary affiliation with Dalhousie:

☐ Faculty	☐ Postdoctoral Fellow
☐ PhD Student	☐ Medical Resident
☐ Master's student	☐ Staff
☒ Undergraduate student	☐ Medical Staff
☐ Medical student	☐ External to Dalhousie

Co-investigator names, affiliations, and email addresses	Eric Burchert, Environmental Science, er206199@dal.ca Mariam Knakriah, Environmental Science, mr362648@dal.ca Jacqueline Theal, Environmental Science, jc868509@dal.ca Braden White, Environmental Science, br963338@dal.ca
Contact person for this submission (if not lead researcher)	Name: Kate Pennyfather

	Email:	Kt853542@dal.ca		Phone:	9058084158
	Banner # if applicable:				

Study start date:	February 26th, 2024	Study end date:		April 8th, 2024	

1.2 **For student/learner submissions** (including medical residents and postdoctoral fellows)			
Degree program	Undergraduate Degree – BSc in Earth and Environmental Science		
Supervisor name and department	Dr. Caroline Franklin, Department of Earth and Environmental Science		
Supervisor Email (@dal)	caroline.franklin@dal.ca	Phone	
Code for the course in which credit will be received as a result of this research (e.g., REGN 9999): ☐ Not Applicable			SUST/ENVS 3502
Department/unit ethics review (if applicable). **Undergraduate minimal risk research only**			
Attestation: ☐ I am responsible for the unit-level research ethics review of this project and it has been approved. Authorizing name: Date:			

1.3 **Other reviews**			
Other ethics review (if any) for this research	Where?	na	
	Status?	na	
Scholarly/scientific peer review (if any)	na		
Is this a variation on, or extension of, a previously approved Dal REB submission?		☒ No ☐ Yes Dal REB file #_____	
If yes, describe which components of the current submission are the same as the previously approved submission (list section numbers), and which components are different from the previously approved submission (list section numbers). You may also use highlighting to clearly indicate revised text.			

<table>
<tr><td colspan="3">1.4 Funding   ☒ Not Applicable</td></tr>
<tr><td>Funding (list on consent form)</td><td align="right">Funder</td><td>na</td></tr>
<tr><td></td><td align="right">Award Number</td><td>na</td></tr>
<tr><td></td><td align="right">Institution where funds are/will be held</td><td>☐ Dalhousie University
☐ Other:
_____</td></tr>
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<tr><td>1.5 Attestation(s). The appropriate boxes must be checked for the submission to be accepted by the REB</td></tr>
<tr><td>

☒ I am the **lead researcher** (at Dalhousie) named in section 1.1. I agree to conduct this research following the principles of the Tri-Council Policy Statement *Ethical Conduct for Research Involving Humans* (TCPS2) and consistent with the University *Policy on the Ethical Conduct of Research Involving Humans*.

I have completed the TCPS2 Course on Research Ethics (CORE) online tutorial.

☒ Yes   ☐ No

For Supervisors (of student, postdoc, resident research projects):

☐ I am the **supervisor** named in section 1.2. I have reviewed this submission, including the scholarly merit of the research, and believe it is sound and appropriate. I take responsibility for ensuring this research is conducted following the principles of the TCPS2 and University Policy.

I have completed the TCPS2 Course on Research Ethics (CORE) online tutorial.

☐ Yes   ☐ No

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SECTION 2. PROJECT DESCRIPTION

2.1 Lay summary
2.1.1 In **plain language**, describe the rationale, purpose, study population and methods to be used. Include a summary of background information or literature to contextualize the study. What new knowledge, or public or scientific benefit is anticipated? Is this a pilot study or a fully developed study? [maximum 500 words] The proper disposal of e-waste, which refers to discarded electronic devices, is a major societal concern as e-waste is one of the most rapidly growing sources of global waste (Forti et al., 2018). At Dalhousie University, a circular economic model of e-waste management has been developed through the Office of Sustainability's Used Device Drive (Dalhousie University Office of Sustainability, 2024). This device drive began in January 2024, and allows all Dalhousie community members to drop off their old phones, tablets, or computers, which will then be donated to local organizations that provide devices for individuals leaving the justice system (Dalhousie University Office of Sustainability, 2024). Past studies at Dalhousie (Broughton et al., 2023) found strong support (83.3%) for e-waste disposal sites. However, a 2019 study at Southeastern Texas University (Msengi et al., 2019) highlighted significant unawareness among students about campus sustainability programs. Various studies indicate diverse communication methods' effectiveness in promoting sustainability initiatives (Godfrey & Feng, 2017; Nanath & Kumar, 2021; Tlebere et al., 2016). Given this, research is needed to inform an effective awareness campaign for Dalhousie's Used Device Drive. This study represents a fully developed research endeavor, aiming to provide actionable insights for designing effective awareness campaigns. The research anticipates valuable insights into student awareness and attitudes towards e-waste management and sustainability initiatives, informing targeted strategies for improvement. By identifying barriers and opportunities, the study aims to enhance participation in initiatives like the Used Device Drive, fostering a culture of sustainability within the Dalhousie community. Through effective communication strategies, the

research promotes broader environmental stewardship goals, contributing to a more sustainable future both within the Dalhousie setting and beyond.

The literature review will analyze reports published on previous awareness campaigns in the field of sustainability, in order to gain an understanding of successful communication techniques and themes. This review will follow systematic methods, including database searches and citation tracking, to gather relevant studies on sustainability awareness campaigns. On the other hand, the student surveys will help gauge current student awareness of the initiative and willingness to participate. The structures questionnaire will consist of closed and open-ended questions, administered as an online form. It will start with a brief description of the Used Device Drive and a consent form outlining data usage. The questions will cover awareness, willingness to participate, and suggestions for improvement.

The survey population includes all Dalhousie University students studying at Studley or Sexton Campus. Promotion will utilize social media, word of mouth, and campus posters, ensuring a diverse representation. With a 90% confidence level, 269 responses are needed to represent the approximately 21,000 students.

All together, the goal of the research is to create and communicate a framework for designing successful awareness campaigns that will lead to increased participation in the Used Device Drive, as well as future sustainability initiatives on Dalhousie campus.

2.1.2 Phased review. If a phased review is being requested, describe why this is appropriate for this study, and which phase(s) are included for approval in this application. Refer to the guidance document before requesting a phased review.

☒ Not applicable

2.2 Research question

2.2 State the research question(s) or research objective(s).

1. Are students aware of the existence of Dalhousie University's Used Device Drive?

2. What is the level of willingness among students to participate in the Used Device Drive?

3. What advertising methods should the Office of Sustainability employ to increase student awareness about the Used Device Drive initiative?

2.3 Study Population

2.3.1 Identify the study population(s) and describe and justify the inclusion and exclusion criteria for participants.

The survey population will be any individual currently enrolled in a degree with any faculty at Dalhousie University, who studies on the Studley or Sexton campus. The conduction of the survey will include a probabilistic sampling style, as the survey will be promoted to the entirety of the student body with no emphasis on a specific degree level, faculty, gender, age, or any other grouping. The decision to include all Sexton and Studley students was made as all students can participate in the Used Device Drive. The exclusion criteria extend to respondents who are not Dalhousie students at either the Studley or Sexton campus. We have decided to exclude Dalhousie faculty and staff, as there are other e-waste recycling systems in place for Dalhousie employees, but these systems do not extent to the students. As the Used Device Drive is the only student e-waste disposal service at Dalhousie, we believe that we should prioritize the student body in any awareness campaigns or program modifications. Through a screening question on the survey, we will be able to filter out any responses that do not come from Dalhousie students on the Studley and Sexton campuses.

2.3.2 How many participants are needed to answer the research question or achieve the research objectives? Provide a target range that includes the maximum number of participants for each participant category and data collection method (*e.g.: Interviews with nurses: 10-15. Surveys with farmers: 90-100*). Provide a scholarly rationale (e.g. sample size calculation) for how these numbers were determined.

Student Surveys: We will need 269 participants in order to represent the Dalhousie student body of approximately 21,000 students at the 90% confidence level.

2.4 Recruitment

2.4.1 Will you require the cooperation, assistance, or approval of a third party to recruit or access potential participants?

☒ No, I can do all recruitment without cooperation, assistance or approval from anyone outside the research team.

☐ Yes, in order to inform potential participants about the study, I will need to work with a third-party to assist with recruitment or approve the study. If yes, describe the required cooperation, assistance, approvals or agreements needed and append written confirmation of their agreement to assist with recruitment and/or their approval of the research (required) and label the corresponding appendices here. **These must be secured and appended before your project will be considered for ethical review**.

2.4.2 What methods will be used to recruit participants? Check all that apply. Append final versions of all materials that will be used during recruitment.

☒ Posters

☒ Social Media

☐ Email or listserv

☐ Online advertising

☐ Subject pool (e.g. SONA)

☒ Word of mouth / in person

☐ Syllabus or online learning platform

☐ Phone

☐ Presentation

☐ Letter

☐ Other. Describe:

2.4.3 Who will conduct recruitment? Please specify by name or position (e.g. research assistant). What will they do?

All group members conducting recruitment are undergraduate students at Dalhousie University. Group members include Kate Pennyfather (Biology Major), Jacqueline Theal (Environmental Science Major), Eric Burchert (Environmental Science Major), Mariam Knakriah (environmental science and sustainability major), Braden White (Environmental Science Major) who will conduct interviews on the Dalhousie Studley Campus. All members will be involved with hanging posters in Dalhousie Buildings,

posting information to their social media accounts, and speaking wi th classmates and peers about participating in the survey.

2.4.5 Describe how participants will be screened to determine eligibility for the study. Append any materials that will be used in screening. If participants will self-screen, state that here.

The first question on the survey is a self-screening question that asks if the respondent is a Dalhousie Student studying on the Studley or Sexton campus. If respondents respond no, they are encouraged to exit the survey and not submit responses. However, if a respondent replies "No" and still fills out the survey we will be able to filter out these results to ensure that only Dalhousie students information is recorded and used for the analysis.

2.5 Informed consent process

2.5.1 Describe the informed consent process by completing each of the following sections. Append copies of all consent information/forms that will be used (e.g. written consent document, oral consent script, assent document/script, etc.) and identify the corresponding appendices.

A) How, when and by whom will the study information be conveyed to prospective participants? How will the researcher ensure prospective participants are fully informed?

The beginning of the survey will include a consent form (attached as appendix) that provides information about the research objectives and how the results from the survey will be used. This consent form will follow Dalhousie's approved consent form template for surveys that do not require signature.

B) Describe how consent will be documented (e.g. written signature, audio-recorded, etc.).

Consent will be documented electronically using the consent form on the survey. Participants will have to check off that they consent before gaining access to the rest of the survey questions.

C) If third-party consent will be used, describe who will provide consent for the participant. Describe the process for obtaining assent from the participant.

☒ *Not applicable. Participants will consent for themselves.*

D) For longitudinal studies, describe how ongoing consent will be confirmed. Address the possibility that a participant's capacity to consent may develop, diminish, or fluctuate and how this will be handled (see TCPS2 Articles 3.9 and 3.10).

☒ *Not applicable, participants only participate at a single time point.*

2.5.2 If the data/materials collected from this research will be kept by the researcher or in a data repository/biobank for potential re-use in future research, describe how participants will be given the opportunity to consent or not consent to potential future use of their data/materials (see TCPS2 Article 3.13) separately from their consent to participate in the research. (Note: participants must be allowed to participate in this research even if they do not want their data/materials stored for future research purposes).

☒ *Not applicable. Data/biological materials collected from participants will not be used in future research.*

2.5.3 Discuss how participants will be given the opportunity to withdraw their participation and/or their data and/or their biological materials and any limitations on this (such as time, identifiability of data, progress through stages of research, etc.). If participants will not have opportunity to withdraw their participation and/or their data and/or their biological materials, explain why.

During the survey completion, participants will be able to withdraw participation by not completing the survey and/ or not submitting their results. After the survey results have been submitted, participants will not be able to withdraw, as all the responses are anonymous and there is no way for us to determine what response is theirs.

2.5.4 If an alteration/exception to the requirement to seek prior informed consent is sought, address the criteria in TCPS2 Article 3.7A. If the alteration involves deception or nondisclosure, also complete section 2.5.5.

☒ Not applicable.

2.5.5 Describe and justify any use of deception or nondisclosure. Explain how participants will be debriefed (TCPS2 Article 3.7B).

☒ Not applicable.

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2.6 Methods, data collection and analysis

2.6.1 This section is about the research methods and the tasks participants will be asked to complete.

A) Where will participants be located during their participation? (If the study takes place online, specify that it is an online study.)

Online study

B) What tasks will participants be asked to do and what research instruments will be used to collect the data? Append all instruments and identify the corresponding appendices here.

Participants will be asked to respond to a short online survey, and the survey will be conducted using Microsoft Forms.

C) How much of the participant's time will participation in the study require (including consent and screening processes, debriefing, member-checking, etc.)?

2-5 minutes

D) If biological samples will be provided by participants, please describe what samples will be provided, how much/many, and the associated process(es) for collecting them.

☒ *Not applicable. No biological samples will be taken as part of this research.*

2.6.2 Will the participants be audio- or video-recorded during data collection?

☒ No

☐ Yes. If yes:

- State if the recordings are audio only, video only, or a combination.
- Explain why recordings are necessary for the research.
- Identify the tool or software that will be used.
- Explain if participants can opt-out of recording and if they can, what modifications to the data collection process will be needed.

2.6.3 If recordings will be transcribed, state who will do the transcribing and/or if transcription will be done by a computerized program or software (name the program/software). Specify if transcription programs or software are used in the cloud or on a local device only. If a transcriptionist will be hired, append the confidentiality agreement they will be asked to sign and identify the corresponding appendix here.

☒ *N/A. Transcription is not required for this study.*

2.6.4 Briefly describe the data analysis plan. Indicate how the proposed data analyses address the study's primary objectives or research questions. Describe and justify the use of all information collected from participants (for example, demographic variables) in the analysis plan.

Survey Question 1: Are you currently a Dalhousie University student enrolled in a program delivered on the Studley or Sexton campuses? (Yes / No)

If you answered No to question 1, you are not eligible to participate in this survey. Please exit the survey and do not submit a response.

This question acts as a screening tool, to ensure that all respondents are from our target population, Dalhousie students studying on the Studley or Sexton campuses.

Survey Question 2: What is your primary campus of Study? (Studley Campus / Sexton Campus)

The data from this survey question will be applied to the results from the following questions in order to make comparisons of awareness / willingness between the two campuses. This information is necessary as it will guide us as to where we should be directing awareness campaign efforts (E.g. if students on the Studley campus are more aware of the initiative than students on the Sexton Campus, there should be increased effort put towards raising awareness on the Sexton Campus).

Survey Question 3: Prior to this survey, have you ever heard of Dalhousie's Used Device Drive? (Yes / Unsure / No)

The data from this survey question will be used to estimate the percentage of Dalhousie students that are aware of the device drive. This information is necessary as it will help inform us whether an awareness campaign is required, or if current awareness levels are sufficient.

Survey Question 4: Have you already donated a device to Dalhousie's Used Device Drive? (Yes / Unsure / No)

The data from this survey question will be used to estimate the percentage of Dalhousie students that have already participated in the device drive. This information is necessary as it will help us estimate current participation levels in the device drive.

Survey Question 5: *Question 5 only presented to participants that answered 'Unsure' or 'No' to question 4* Should you seek to discard one of your electronic devices, would you consider donating your device to Dalhousie's Used Device Drive? (Yes / Unsure / No)

This survey question is necessary as it helps us determine student willingness to participate in the device drive, which will help guide awareness campaigns and/or program modifications. For example, if a large percentage of students would not consider donating a device, this may indicate a need for a modification of the used device drive in order to increase student interest.

Survey Question 6: Which of the following methods do you think are the most effective in spreading awareness of Dalhousie's Used Device Drive?

A. Posters in campus buildings

B. Social media posts on Dalhousie associated accounts (Office of Sustainability, societies etc.)

C. Brightspace posts

D. Short in-class presentations

F. Email from the Office of Sustainability

E. Other (Please explain)

The data from this survey question will be analyzed by identifying the most common suggestions provided by students. This information is necessary as it will help us to create suggestions for awareness campaigns that are specific to Dalhousie's student body. By incorporating student suggestions in awareness campaign design, this will help ensure that the awareness tools reach the students.

Survey Question 7: Based on the description of the Used Device Drive, what are the potential barriers to student engagement in the program? (Select all that apply)

A. Inconvenient drop-off locations

B. Inconvenient drop-off hours

C. Privacy worries associated with re-use of devices

D. Students don't have devices to donate

E. Lack of student awareness about the Used Device Drive

F. Concerns about the disposal procedure if the donated devices are not able to be re-used

G. Other (Please explain)

The data from this survey question will be analyzed by identifying the most common barriers identified by students. This information is necessary as it will help us identify if there is need for program modification, in order to limit the barriers described.

Survey Question 8: Is there anything else that you would like us to tell us about your perceptions of the Office of Sustainability's Used Device Drive?

This open-ended question allows respondents the opportunity to make any comments of interest to them relating to the Used Device Drive. It is crucial for gathering comprehensive feedback on the program. The question also enables students to share additional insights, suggestions, and concerns, helping to identify areas for improvement to enhance the effectiveness of the Used Device Drive. This will inform decision-making, encourage student engagement, and demonstrate the Office of Sustainability's commitment to listening to student voices in shaping sustainability initiatives on campus.

2.6.5 Describe any incentives that will be offered to participants and how this will be handled for participants who do not complete the study (see TCPS2 Article 3.1 for guidance on incentives). Discuss any expenses participants are likely to incur and whether/how these will be reimbursed.

There will be no incentives, and there are no expenses that the participants will incur.

2.7 Privacy and confidentiality

2.7.1 This section is about how participants' data and information will be managed, and how identifiable participants and their data will be during and after this research.

A) Describe who will have knowledge of participants' identities at any point in the research process.

No one will know participants' identities, the survey is completely anonymous. In using Microsoft Forms participants emails are not recorded and saved.

B) Describe the level of identifiability of the study documents (including screening and consent forms and other administrative documents) and data (anonymous, anonymized, de-identified/coded, identifying) (see TCPS2 Chapter 5A – types of information for definitions) at the following timepoints:
- during recruitment, screening, and consent
- during collection
- during analysis and preparation of results

• during long-term storage The study documents will be anonymous throughout the entirety of the research process and beyond.
C) Specify which members of the research team (or others) will have access to participants' data and/or biological materials and for what purpose. All members (Kate Pennyfather, Jacqueline Theal, Eric Burchert, Mariam Knakriah, Braden White) of the research team will have access to participants data. This is to allow for collaboration of all group members during the data analysis process.
D) Describe measures to ensure privacy and confidentiality of study documents, participant data and biological materials during the pre-study (e.g. recruitment, screening, consent), data collection and analysis phases. *[Note that plans for long term storage will be covered in 2.7.2*]. Specifically address the following: • Where data/recordings/documents will be stored and the security of such storage. • How study data/recordings/documents will be securely shared and/or transported between team members. • If data collection software is used, describe the security measures of that software and if others outside the research team (e.g. a survey company) will have access to the data. • If a key-code will be maintained, describe how it will be kept secure and separate from study data. • Confirm that any identifiable data will be encrypted. • For hard copy documents and biological materials, describe physical security measures and specify storage location. Microsoft forms will be used to obtain the data, and the data will be automatically stored in an excel file. All information collected and stored through Microsoft forms and excel is encrypted. There will be no identifiable information collected or stored for this study. Only the 5 group members (Kate Pennyfather, Jacqueline Theal, Eric Burchert, Mariam Knakriah, Braden White) will have access to the excel sheet. There will be no hard copy documents used in this study.
1.a.2 This section is about plans for retention and long-term storage of study documents (signed consent forms, screening documents, key-codes, etc.), data, and/or biological materials.   Will all documents/data/biological materials eventually be destroyed?

☐ No, not all documents/data/biological materials will not be destroyed (if 'no', complete section 2.8).

☒ Yes. If yes:

    A) State when they will be destroyed and provide a rationale for the proposed retention period:

The data will be destroyed approximately three weeks after the submission of the final report (April 30th). This three week grace period is to ensure that the data can be accessed if any changes to the final report are required shortly after the initial submission.

    B) Where will they be stored when the study is over (after analysis and dissemination of findings) but before they are destroyed?

The data will be stored on an Excel file (created automatically through the Microsoft Forms results) that can be accessed by all group members.

    C) How will they eventually be destroyed (i.e., method of destruction) and by whom?

The excel sheet will be deleted from all group members' Microsoft storage and computer desktops (as well as from Microsoft "trash bin").

2.7.3 Describe if/how participant confidentiality will be protected when research results are reported by answering the following:

A) For quantitative results - In what form will study data be disseminated?

☐ Only aggregate data will be presented.

☒ Individual de-identified, anonymized, or anonymous data will be presented.

☐ Other. If "other", briefly describe dissemination plans with regard to identifiability of data:

☐ *Not applicable, only qualitative data will be presented (complete part B).*

B) For qualitative results - Will identifiable data be used in research presentations/publications? If participants will be quoted, address consent for this and indicate whether quotes will be identifiable or attributed.

☐ *Not applicable, only quantitative data will be presented (complete part A).*

Any qualitative results will be completely anonymous with no identifiable information, ensuring participant confidentiality.

2.7.4 Address any limits on confidentiality, such as a legal duty to report abuse or neglect of a child or adult in need of protection, and how these will be handled. Ensure these are clear in the consent documents. (See the guidance document for more information on legal duties and professional codes of ethics).

☒ *Not applicable.*

2.7.5 Will any information that may reasonably be expected to identify an individual (alone or in combination with other available information) be *accessible* outside Canada? And/or, will you be using any electronic tool (e.g. survey company, software, data repository) to help you collect, manage, store, share, or analyze personally identifiable data that makes the data accessible from outside Canada?

☒ No.

☐ Yes. If yes, refer to the University *Policy for the Protection of Personal Information from Access Outside Canada*, and describe how you comply with the policy (such as securing participant consent and/or securing approval from the Vice President Research and Innovation).

2.8 Indefinite retention of research data/biological materials

If study documents/data/biological materials will not be destroyed **and/or** there are possible plans for re-use of the data, complete this section (and ensure section 2.5.2 is complete):

☒ *Not applicable. The documents/data/materials generated from this study will only be used for this specific research and will be destroyed after this research is complete.*

2.8.1 Discuss the risks and potential benefits of storing documents/data and/or human biological materials long-term for future unspecified research.

1.a.2 Who will be the keeper of the documents/data/biological materials?
☐ The lead researcher on this project.

☐ A data repository (identify the repository):

☐ Other (describe):

2.8.3 If the custodian/steward becomes unaffiliated with Dalhousie (retires, leaves their position, dies, graduates, etc.), what will happen to the documents/data/materials?

☐ *N/A, the data/materials are **only** being stored in a repository/biobank.*

2.8.4 Describe the repository/biobank where the data/materials will be deposited. Indicate the protective measures in place to ensure participants' data are securely managed.

☐ *Not Applicable – the researcher will manage all data indefinitely.*

2.8.5 Who will be able to access the data/materials for future use and under what circumstances?

2.8.6 Describe the type, identifiability, and amount of data and/or human biological materials being stored for potential re-use in the repository. Identify all fields and materials that will be included in the final data set (include as an appendix).

2.9 Risk and benefit analysis

2.9.1 Discuss what risks or discomforts are anticipated for individual participants, how likely risks are and how risks will be mitigated. Risks to privacy from the collection/use of identifying information should be addressed.

Risks are no greater than those encountered in daily activities. Participation in the survey is completely voluntary, has very short time requirements, and will not produce any identifiable results. As such, there are no financial, physical, privacy, or other risks associated with this research.

2.9.2 What people, groups, or communities other than participants in this study might be negatively impacted by the conduct of the research and/or dissemination of research results? How will the researcher mitigate these potential negative impacts? Describe any community engagement that may occur as part of a mitigation strategy.

There are no groups that might be negatively impacted by this research and / or the dissemination of research results.

☐ *This research involves Indigenous communities (complete section 2.13).*

2.9.3 Identify any direct benefits of participation to participants (other than compensation), and any indirect benefits of the study (e.g. contribution to new knowledge).

Participation in this study will provide the indirect benefit of contribution to new knowledge about how to best promote sustainable initiatives on campus, with a specific focus on the Used Device Drive. This has the potential to lead to increased success of sustainable initiatives on Dalhousie campuses, which may benefit Dalhousie community members and / or the surrounding environment.

2.10 Provision of results to participants and dissemination plans

2.10.1 The TCPS2 encourages researchers to share study results with participants in appropriate formats. Describe your plans to share study results with participants and discuss the process and format.

The final report of our study findings will be published online through Dalspace, Dalspace is Dalhousie University's online library that is available for everyone on the web.

2.10.2 Will individual results be returned to participants?

☐ *Not applicable.*

☒ No.

☐ Yes. If yes, explain the format in which results will be given (and append a template for communicating results to participants). Describe how individual results will be shared in a secure and confidential manner. Explain how/if the research team will ensure the individual results are understandable to participants. Discuss any risks to participants of receiving individual results, and how these will be mitigated.

2.10.3 If applicable, describe how participants will be informed of any material incidental findings – a discovery about a participant made in the course of research (screening, data collection, or analysis) that is outside the objectives of the study, that has implications for participant welfare (health, psychological or social). (See TCPS2 Article 3.4 for more information.)

☒ *Not applicable.*

2.10.4 If providing genetic results/information to participants, communities, or groups, discuss the plans for providing genetic counselling (TCPS2 13.4)

⊠ *Not applicable.*

2.10.5 Describe plans for dissemination of the research findings (e.g. conference presentations, journal articles, public lectures etc.).

Research findings will be disseminated through a formal research report that will published online through the Dalhousie Library website. Additionally, the key suggestions generated from the results will be synthesized into a 1-page report that will be given to the Office of Sustainability to guide future awareness campaigns and / or modifications to the Used Device Drive.

2.11 Research Team

2.11.1 Describe the role and duties of each research team member (including students, RAs and supervisors) in relation to the overall study.

Research Team Members:

Eric Burchert, Role: Conducting literature review and data analysis of literature review data

Braden White, Role: Conducting literature review and data analysis of literature review data

Mariam Knakriah, Role: Creating survey and data analysis of survey data

Jacqueline Theal, Role: Conducting literature review and data analysis of literature review data

Kate Pennyfather, Role: Creating survey and data analysis of survey data

Role of all above members: recruiting participants for survey, writing research report, writing 1-page report for Office of Sustainability

Supervisors:

Dr. Caroline Franklin, role: Professor of SUST/ENVS 3502

Alex Legault, role: Tracks progress of research through submitted assignments and provides suggests and improvements

2.11.2 Briefly identify any previous experience or special qualifications represented on the team relevant to the proposed study (e.g. professional or clinical expertise, research methods, experience with the study population, statistics expertise, etc.).

All members of group are taking ENVS3502 course, where they have learned about the research process, different research methods, and data analysis procedures.

2.12 Conflict of interest

2.12   Describe whether any dual role or conflict of interest exists for any member of the research team in relation to potential study participants (e.g. TA, fellow student, teaching or clinical relationship), and/or study sponsors, and how this will be handled. Please provide copies of contracts between researchers, institutions and industry sponsors and relevant budgetary information related to this research (TCPS2 12.20).

☒ *Not applicable.*

2.13 Research involving Indigenous peoples

Consult TCPS2 Articles 9.1 and 9.2 in determining whether this section is applicable to your research.

☒ *Not applicable – go to 2.14.*

2.13.1 If the proposed research is expected to affect the welfare of an Indigenous community, or communities, to which prospective participants belong, describe the plan for community engagement (per TCPS2 Articles 9.1 and 9.2). If community engagement is not sought, explain why the research does not require it, referencing TCPS2 articles 9.1 and 9.2. Append applicable finalized research agreements.

2.13.2 State whether ethical approval has been or will be sought from Mi'kmaw Ethics Watch and if not, why the research does not fall under their purview. If the research falls under the purview of other Indigenous ethics groups, state whether ethical approval has been or will be sought.

2.13.3 Describe plans for returning results to the community and any intellectual property rights agreements negotiated with the community with regard to data ownership (see also 2.11.4 if applicable).

2.13.4 Does this research incorporate OCAP (Ownership, Control, Access, and Possession) principles as described in TCPS2 Article 9.8?

    ☐ Yes. Explain how:

    ☐ No. Explain why not:

2.14 Clinical trials

  ☒ *Not applicable – go to 2.15.*

2.14.1 Will the proposed clinical trial be registered?

    ☐ No. Explain why not:

    ☐ Yes. Indicate where it was/will be registered and provide the registration number:

2.14.2 If a novel intervention or treatment is being examined, describe standard treatment or intervention, to indicate a situation of clinical equipoise exists (TCPS2 Chapter 11). If placebo is used with a control group rather than standard treatment, please justify.

2.14.3 Clearly identify the known effects of any product or device under investigation, approved uses, safety information and possible contraindications. Indicate how the proposed study use differs from approved uses.

    ☐ *Not applicable.*

2.14.4 Discuss any plans for blinding/randomization.

2.14.5 What plans are in place for safety monitoring and reporting of new information to participants, the REB, other team members, sponsors, and the clinical trial registry (refer to TCPS2 Articles 11.6, 11.7, 11.8)? These should address plans for removing participants for safety reasons, and early stopping/unblinding/amendment of the trial. What risks may arise for participants through early trial closure, and how will these be addressed? Are there any options for continued access to interventions shown to be beneficial?

2.15 Use of personal health information

☒ *Not applicable.*

2.15.1 Research using health information may be subject to Nova Scotia's *Personal Health Information Act* or a similar piece of legislation in the jurisdiction where the participants reside. Describe the personal health information (definition explained in the guidance document) required and the information sources, and explain why the research cannot reasonably be accomplished without the use of that information. Describe how the personal health information will be used, and in the most de-identified form possible.

2.15.2 Will there be any linking of separate health data sets as part of this research?

    ☐ No

    ☐ Yes. If yes:

      A) Why is the linkage necessary?

      B) Describe how the linkage will be conducted (it may be helpful to append a flow diagram).

      C) Does that linkage increase the identifiability of the participants?

2.15.3 Describe reasonably foreseeable risks to privacy due to the use of personal health information and how these will be mitigated.

SECTION 3. APPENDICES

Appendices Checklist. Please label and append all relevant material to this application in the order they will be used. This may include:

☒ Reference list

☐ Permission or support/cooperation letters (e.g. from anyone whose cooperation you need to recruit participants or conduct research)

☐ Research agreements (required for research involving Indigenous communities)

☒ Recruitment documents (posters, oral scripts, online postings, invitations to participate, etc.)

☐ Screening documents

☒ Consent/assent documents or scripts

☒ Research instruments (questionnaires, interview or focus group questions, etc.)

☐ Contracts, data transfer agreements, material transfer agreements (finalized versions)

☐ Debriefing and/or study results templates

☐ List of data fields included in data repository

☐ Confidentiality agreements

Consent Form Templates

Sample consent forms are provided on the Research Ethics website and may be used in conjunction with the information in the *Application Instructions* document to help you develop your consent form.

Appendices:

1. Reference List

Broughton, A., Korthals, M., Robinson, G., Xin, Y. (2023). *Exploring the Opportunities and Challenges of Implementing Electronic Waste Disposal Sites on Dalhousie's Studley and Sexton Campuses.* [Research Report, Dalhousie University]. https://dalspace.library.dal.ca/handle/10222/82588?show=full

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Appendix 3: Recruitment poster