



Green Space Perception

A Research Project

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Executive Summary

The reason we decided to commit ourselves to this research project is because landscaping is an important part of every University campus. Historically, the purpose of landscaping has been to make an environment or landscape look more aesthetically pleasing. Green space is an important part of landscaping because it makes an artificial landscape look more natural and a part of nature. For this reason, we decided to focus our research on the perception and utility of green space on the Studley campus of Dalhousie University. We wanted to see if students and faculty think it is an important part of the University landscape. Through analyzing the perception and utility of green space we aimed at determining an overall and common perception of green space by students and faculty on campus. As well, we wanted to determine whether or not students and faculty feel that green space on campus is utilized effectively. In other words, our research question is, how is green space perceived on campus and does its perception affect its use?

We used both qualitative and quantitative methods to answer our research question. For quantitative data we collected cross-sectional surveys from a heterogeneous population sample of Dalhousie students and faculty to categorize opinions about utility and green space perception. For qualitative data we used questionnaires in order to answer more specific questions about green space perception and utility. The questionnaires also served as a substitution for interviews due to our time constraint with regards to collecting data. In the end, through the application of our research methods we were able to determine that the students and faculty have a positive perception of green space and its utility on campus.

Introduction

University life is stressful; students and faculty are under constant pressure from lectures, assignments, research, and exams. It has been found that this relentless pressure can lead to mental stress. Mental stress has harmful effects on a person's psychological well-being, which can cause a number of adverse health concerns. These concerns include, mental health problems, heart attack, stroke, and cancer. To maintain a healthy life style it is important to distress, relax, and get rejuvenated in order to survive the rigorous university life. In a study done by Stephen S. Y Lau and Feng Yang, it was determined that natural spaces are beneficial to

a human's mental and physical health (Lau & Yang, 2009). Natural or green spaces are said to engage one's mind without causing fatigue, they tranquilize the mind, leaving it refreshed and reinvigorated. Effective open spaces on campus can improve and enhance the quality of life and create a healthier environment for students and faculty (Lau & Yang, 2009).

According to a study done by Tawfiq M. Abu-Ghazze, a green space's effectiveness in providing a rejuvenating experience is determined by how one perceives and utilizes it (Abu-Ghazze, 1999). For this reason The Green Space Perception research project will focus on the perception and utilization of green spaces found on Dalhousie's Studley campus.

Project Goals & Objectives

This research project aims to understand the perception of green spaces on campus and its relationship to its utilization in order to determine whether or not the Studley campus' green spaces meet the needs of the current student and faculty populace. Our main objectives for this research project were; to determine the current perception of green spaces on campus held by the student and faculty populace. Second, to determine the current utilization of the green spaces on campus, and third was to determine if there was a correlation between the perception and utilization of green spaces on campus. These main objectives encompass this projects research question:

How is green space perceived on campus and does its perception affect its use?

Another purpose of this research project is to aid the Dalhousie University's facilities management in understanding how the campus green spaces are currently perceived and used, and how they can be better designed to suit the needs of students and faculty. Ultimately we hope our research will be seen as a guide for campus landscaping. Incorporating ideas for campus green spaces that come from the people who directly use them. In doing so, the Dalhousie campus would become unique in the sense that it caters to the individuals who are immersed in Studley campus everyday.

We hypothesized that the perception of green space would correlate with the frequency of its utilization. We also predicted that there would be a positive correlation between the perception of green space and its utilization. This research report will thoroughly detail the procedures and research tools used for this project. It will also explain the results and discussion for future action and research.

Background & Literature Review

A literature review was performed in order to gather current knowledge and understandings about our research question. A large amount of literature was found relating to the study of green spaces and how people use them. However, it was more difficult to find literature specifically relating to the perception of green space and how this perception can affect the use of green spaces. For the purpose of this project we will define perception as the apprehension of cognitive senses to form independent understandings of one's environment. Zube defines perception as a product of transactions between a subject and a landscape they are situated in. This means that different individuals (whom have different experiences) will perceive a landscape differently. These perceptions are mediated by factors such as needs and desires, in addition to social and cultural contexts. Different perceptions lead to different values (Zube, 1987). The following articles discuss the perception of green space on different university campuses and how these perceptions affect the utility of green space.

Himasari Hanan's article, *Open Space as Meaningful Place for Students in ITB Campus*, analyzed the use of a number of open spaces on the Bandung Institute of Technology (ITB) campus in Indonesia. The researchers looked at what features within the chosen open spaces were essential for making the space meaningful to students (Hanan, 2013). They also reviewed the uses of these spaces in hopes of understanding the functions the spaces provide and how they contribute to an effective learning environment. Through observation and interviews, it was determined that the ITB campus essential features that attracted students were: shaded areas, areas that were easy to access, areas with uncontrolled atmosphere, proximity to lectures, sitting facilities, power supply, spaciousness and areas to view people passing by (Hanan, 2013). The uses that were noted in these areas were; students socializing (having a discussion or chatting) in open spaces, waiting for their next lecture, studying, having lunch, and relaxing. The purpose of this research was to encourage the use of student preferences as guidance in the design of open spaces to create meaningful spaces for students (Hanan, 2013).

This article is relevant to our research project, because it studies the preferences of students and relates it back to campus landscape design. The Green Space Perception study through questionnaires also wishes to identify spaces that the campus populace perceive to be meaningful and why. By determining the aspects of campus that students and faculty deem significant, our study can support Hanan's suggestion that student preferences should be used as criteria for planning and designing open spaces on campus (Hanan, 2013). The only drawback of this article is that it does not specifically relate the students of ITB's perceptions of open space to their utilization.

Another article that is relevant to this project is about a study that was done on the two campuses of Sichuan Agricultural University in China. The purpose of this study was to

determine the positive and negative impacts of three aspects of the landscaping on the University campuses (Mu & Zhang, 2011). These three aspects were humanization, communication atmosphere, and visual effect of plant disposition. Humanization refers to how a landscape or in this case University campus has been altered in order to be better used by humans. Communication atmosphere refers to the layout of a landscape and whether or not it allows or encourages social interactions where students can interact and communicate with one another (Mu & Zhang, 2011). Lastly, visual effect of plant disposition refers to the placement of vegetation throughout the campus. The significance of this aspect is that plant disposition can have an incredible impact on how students psychologically relate to their campus (Mu & Zhang, 2011). For example, a campus with only grass on it and no vegetation looks barren and can make students psychologically depressed. Making sure there are plants situated around campus increases moral and psychological behaviour as students are reminded about life through the natural processes of nature (Mu & Zhang, 2011).

Surveys, questionnaires, statistical analyses and charts were created to gather data about the three aspects of the University campuses mentioned above. Quantitative analysis was the primary data collection method (Mu & Zhang, 2011). By analyzing the three aspects mentioned above this study aimed at evaluating the quality of the University campuses' landscapes in order to determine the positive and negative aspects of the campuses (Mu & Zhang, 2011). As a result, this study serves as a reference for University campus landscape design. This type of study would be useful on the Studley campus in order to create an appropriate environment that suits the psychological needs and behavior of University students (Mu & Zhang, 2011).

The only weakness of this article is that the study makes no comment of past or anticipated ecological impacts from landscape design. It seems the study was not concerned about how the University campuses affected their surrounding environments. Despite the lack of concern towards environmental sustainability this article serves as a great template from which to create a questionnaire that aims at determining the positive and negative aspects of green space on the Studley campus.

A third article that is applicable to our research project is, *Communicating Behavioral Research to Campus Design: Factors Affecting the Perception and Use of Outdoor Spaces at the University of Jordan*, by Tawfiq M. Abu-Ghazzeah an associate professor of architecture at the University of Jordan in Amman (Abu-Ghazzeah, 1999). Three main questions were explored in this article. The first question was what are the meanings and values associated with preferred outdoor sites? The second question was what qualities of landscape and physical attributes infuse an outdoor setting with a sense of place for the user? The last question was how important are the perceptual characteristics of the outdoor spaces in the context of one's daily experience on campus (Abu-Ghazzeah, 1999)? The researcher used qualitative analyses to answer these questions. The researcher observed participants choices regarding their uses of outdoor spaces and what space they would use (Abu-Ghazzeah, 1999). Interviews were also conducted with participants to determine why they chose to visit and use the spaces as they

did. Additionally, 10 areas that were visited the most by participants were examined to identify any overlapping physical features within the spaces (Abu-Ghazze, 1999).

The results discovered that participants described the places they visited in terms of the activities they did there. Participants were attracted to places that provided space for socializing, sitting, studying, and people watching (Abu-Ghazze, 1999). It was revealed that the participants had a positive perception of their campus and viewed it as a very social setting. Interestingly, many participants noted upon reflection that they took the trees and green space's soothing qualities for granted (Abu-Ghazze, 1999).

The purpose of this research was very similar to the purpose of the Green Space Perception study, which aims to determine whether a correlation exists between the perception and utilization of green spaces (Abu-Ghazze, 1999). Additionally, the Green Space Perception study, like Abu-Ghazze's study, hopes to illuminate the important role perception plays in a spaces utilization; and the role it should be given in campus planning and design (Abu-Ghazze, 1999).

Methods

For this study, we attempted to measure the perception of green spaces on campus. Our study was focused on the various aesthetic and utility preferences of students and faculty. The rank scale and multiple choice methods used throughout the survey questions served as measurements for perception.

Research Tools

For our experiment, we used a mixture of qualitative and quantitative methods to observe and measure perception. Quantitative data can be measured (uses numbers) while qualitative data can only be observed (represented by words). By using both these methods we were able to conduct statistical analysis and determine suggestions for further research.

We decided to use surveys and questionnaires because they were more accessible for our time constraint. Formal interviews would have been ideal to study perception, but they were too time consuming to get enough information from our expected population sample. Surveys and questionnaires can be submitted in an online format, making them a more accessible alternative.

Participant Information

We collected cross-sectional surveys from a heterogeneous population sample of Dalhousie students and faculty. In order to assume normal distribution, we had to sample over 30 subjects. The maximum number of participants we were expecting to participate was 200. The number of student and faculty had to be proportional to the population ratios so we needed roughly 189 students and 11 faculty members. This was necessary to make our research non-probabilistic sampling.

In order to qualify our survey participants had to be either a current student or faculty member of Dalhousie University. They also had to work and/or take classes on Studley campus. They were not required to be affiliated with any specific department. We limited our study to the Studley campus because it has the most green spaces. Studley campus also provides us with a larger variety of students (Sexton has mostly engineering students and Carleton has the health programs). We wanted our data to be representative.

We had a total of 74 participants; 30 were in person, 44 were from online. Of the 74, there were 24 males and 50 females. We had 69 student participants and five faculty participants. We did not have enough faculty participants to make accurate comparisons and assumptions between students and faculty. Our participants provided a total of 59 surveys and 50 questionnaires.

Procedure

After choosing our research question, we decided on project goals. We compiled a literature review from our extensive background research and determined our definition of perception. We then proceeded to develop our survey and questionnaire. Our ethics application was then submitted; we received approval on March 15th, 2014.

We used self-administered surveys to collect our data. These surveys featured several “yes or no” questions followed by a series of “pick and chose” (see Appendix D for all questions). We used a scale to determine overall satisfaction. These questions were chosen because they can be easily evaluated and can be used for data analysis. Surveys are useful because they are a way to gain a large amount of information in a short amount of time and are non-interactive (Kirby et al, 2010). We chose surveys because we do not have enough time to do full interviews and focus groups; this was the most efficient method for our study.

We also used a questionnaire with more specific questions to be used in interview sessions (see Appendix E). These questions tested subjects on their current definition of green spaces in addition to receiving their personal definitions and views from open-ended questions. These were structured questions in order to keep the research conditions the same for each subject (Kirby et al, 2010). We decided to use questionnaires in addition to surveys because we wanted to be able to observe data. This was useful when making further initiatives and suggestions for further research.

We wanted to know:

- Our participants current view on Dalhousie's green spaces
- How often they are used year round
- Preferred green space features
- What people want to see added
- If the perception of green spaces is affecting it's use

The surveys and questionnaires were distributed primarily on Studley campus. They were handed out at the same location on different days to avoid sampling the same subject twice. Surveys were handed out throughout the Killam Library and inside and outside the Student Union Building. They were handed out randomly. Randomizing makes sure that on average the sample will look similar to the rest of the population (De Veaux, Vellemean & Bock, 2008). We offered candy as an incentive and asked for people to return them to us once they were completed. Participants had to fill out the consent form (signed by a researcher) in order for it to be considered complete (see Appendix C). In-person sampling was done from March 21st- March 28th, 2014.

There was also an electronic version done through the survey website Free Online Surveys. The link was sent to several faculties with the request to forward to students; the faculty of Earth Sciences and Statistics forwarded our request. Links were also posted on Dalhousie Facebook groups. The link was given to students whom did not want to complete a paper copy. The online survey was open from March 18th-March 28th, 2014.

After our sampling was completed we compiled all of our research from hard copies and online versions. We calculated the percentages and used them to create comparative graphs for different questions. In some cases, chi-square tests were done to determine if the results were significantly different (used for comparing perceived usage and observed usage). Perception was coded by examining the categories that emerged from responses. This is called *the Grounded a posteriori Context Sensitive Scheme*. The bits were sorted into categories based on their properties; conclusions were derived from the substantive theories (Kirby et al, 2010). We categorized the responses based on a word scheme rather than by entire sentences because we were able to form more categories and gain more information.

Reliability and Viability

In order to ensure the reliability and validity of our survey, we did random sampling on the Studley campus (chosen for its large variety of students). We ensured that all participants signed an informed consent form prior to completing their survey or questionnaire. The online

survey/questionnaire also contained consent information and a summary of the study.

Some problems did arise for our validity; some of our written survey participants did not answer all of the questions. Whether this was simply a miscalculation on the part of the participant or on purpose is unclear. There also seemed to be some confusion over question number seven of the survey, therefore question “7a” was cut to avoid any invalid information.

Limitations and Delimitations

Our study had several limitations and delimitations. We were limited on our sample size, which depended on how many subjects completed a survey or questionnaire within our time limit. A longer period of time dedicated to sampling would have generated greater in-depth responses from participants and statistical results. Our faculty to student ratio was still accurate but was not high enough to make assumptions and comparisons between the two groups. We were also limited on our outdoor distribution because of poor weather; a snowstorm occurred on one of our distribution days. Our distribution was also limited by whom the faculty distributes the tests to and how many faculty members were willing to forward our information. We were limited by how many individuals applied within our criteria; the amount of people that did reply was not the exact number we were expecting for our study. We were delimited by whom we chose to survey; we had chosen to delimit ourselves to the students and faculty of the Dalhousie University Studley campus.

Results

In total we had 74 participants: 69 were students and five were faculty. 24 of them were male, while 50 were female. The participants filled out 59 surveys and 50 questionnaires. These amounts of surveys and questionnaires were not the numbers we aimed at receiving, but they were more than enough to conduct accurate and substantial research. Considering the fact we had only a month to conduct research we have come to realize our expectations for the number of participants we wanted to receive was a little high and that the actual number we received was much more realistic. We originally aimed at receiving at least 30 participants for both questionnaires and surveys. However, the maximum number we wanted to reach was more or less than 100 for both questionnaires and surveys. This means our ultimate goal was to have 100 surveys and 100 questionnaires filled out by our participants. Nevertheless, here are the results for our research. The results have been broken down into two categories: qualitative and quantitative results. All tables for the quantitative data can be found in the tables of Appendix A.

Quantitative Results

The percentage of students and/or faculty that think Dalhousie University is a green campus can be seen in Figure 1. More participants thought that Dalhousie was a green campus. After doing a goodness of fit test, the chi-squared value was $\chi^2 = 1.3729$ and had a p-value greater than 0.10 therefore the two answers (Yes and No) are not significantly different from the mean. They are therefore, not significantly different from each other. The majority of the faculty thought that Dalhousie was a green campus. It was significantly higher than the total number of participants that thought Dalhousie was a green campus.

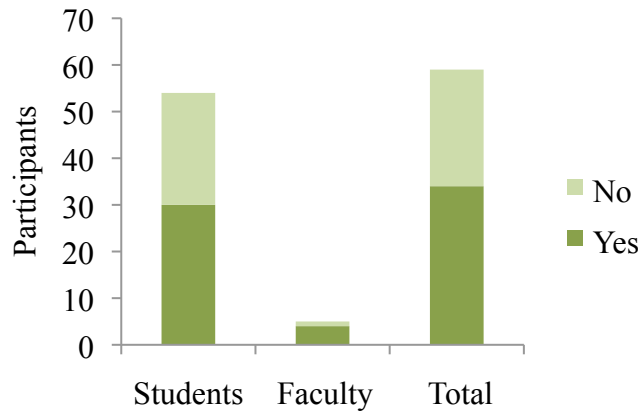


Figure 1. Number of students and/or faculty that think Dalhousie is a green campus.

The current green space satisfaction level of students and/or staff can be seen in Figure 2. No participants were very satisfied with the green spaces on campus. A large portion of the sample population were satisfied, but more felt neutral (the majority picked this answer). The number of participants that were dissatisfied was lower than the satisfied participants; even fewer participants were very dissatisfied (significantly lower).

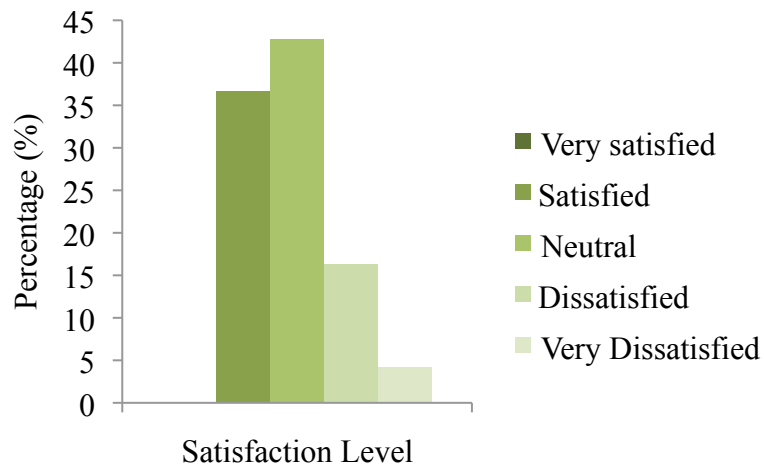


Figure 2. Satisfaction level of students/faculty towards green spaces.

A comparison of perceived use of green spaces versus actual use can be seen in Figure 3. The actual use of green spaces is higher than the amount of perceived usage. After doing a

goodness of fit test: the chi-squared value was $\chi^2 = 28.8$ and the p-value was less than 0.005. Therefore, there is a significant difference between perceived use and actual use of campus green spaces.

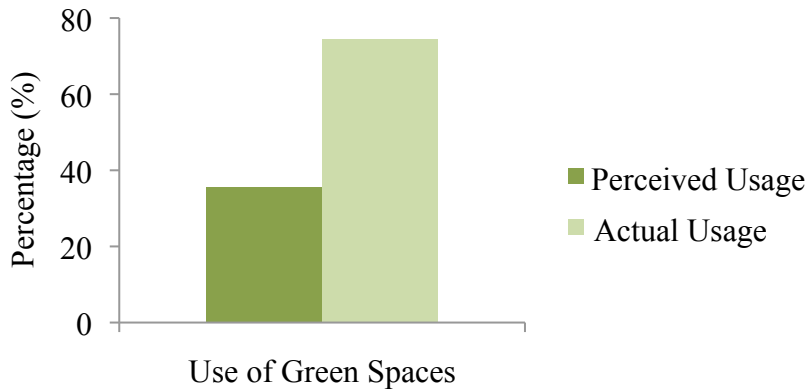


Figure 3. Perceived use of green spaces on campus versus actual use.

The use of green spaces during warmer weather (i.e. spring/summer semester) by students and faculty can be seen in Figure 4. The majority of participants on campus in the spring/summer semester used the green spaces. The majority however, did not think they were being used effectively.

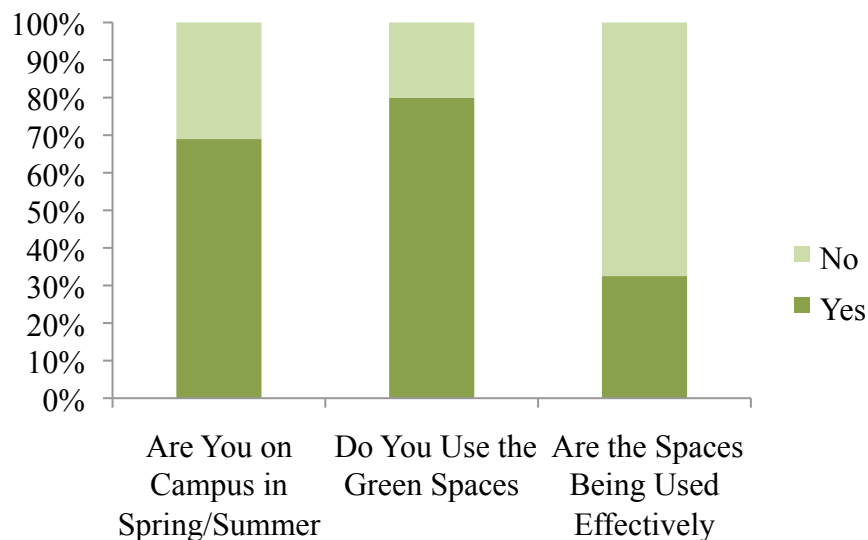


Figure 4. Green space usage in the spring/summer term.

The usage of green spaces in the fall/winter terms can be seen in Figure 5. The majority of students and faculty do not use the green spaces during the colder months (i.e. fall and winter). The majority of participants do not think these spaces are being well utilized.

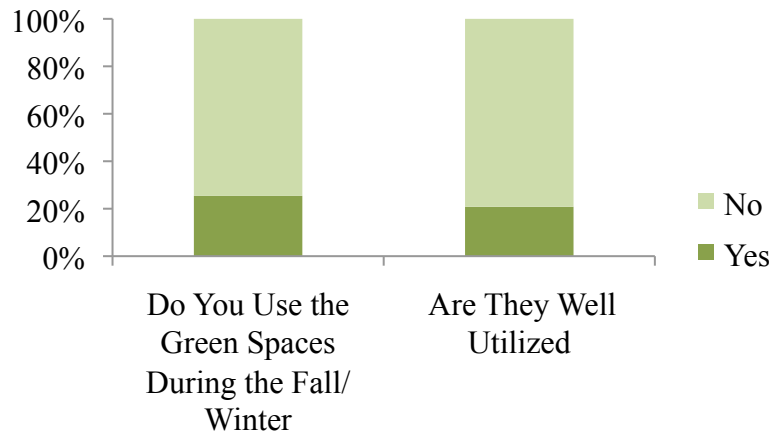


Figure 5. Green space usage in the fall/winter term.

A comparison between amount of visits to campus green spaces in the fall/winter and spring/summer are shown in Figure 6. These results are complimentary to Figures 4 and 5. The majority of participants put that they do not use green spaces in the winter; the most common number of visits was one. The majority of participants put that they use the green spaces in the spring/summer term between 2-3 times weekly.

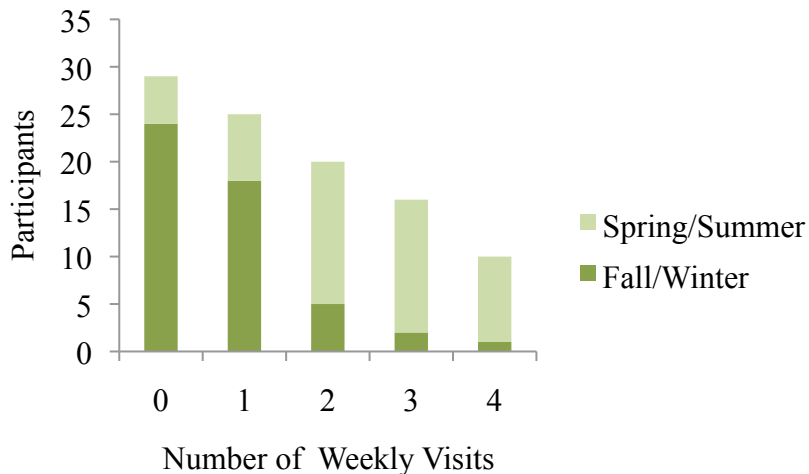


Figure 6. Comparison of green space usage in the fall/winter terms and the spring/summer term.

The perception of green space maintenance can be seen in Figure 7. The majority of participants (but not by a large percentage) thought the green spaces on campus are well maintained. The sample population was split almost 50/50 when asked if they would change the maintenance of green spaces on campus (no significant difference).

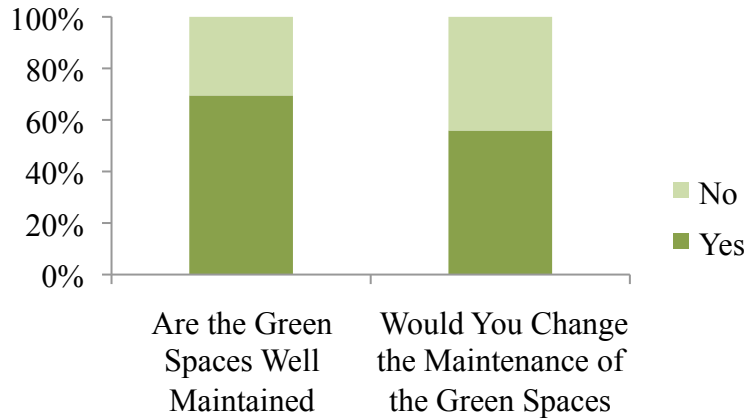


Figure 7. Perception of green space maintenance on campus.

The percentage of students and/or faculty that would change the amount of green spaces on campus can be seen in Figure 8. The majority of the sample population would increase the green spaces, no participants chose to decrease them, and a small number would keep the amount the same. The number of participants that would increase the amount of campus green spaces was significantly larger than the number that would keep them the same.

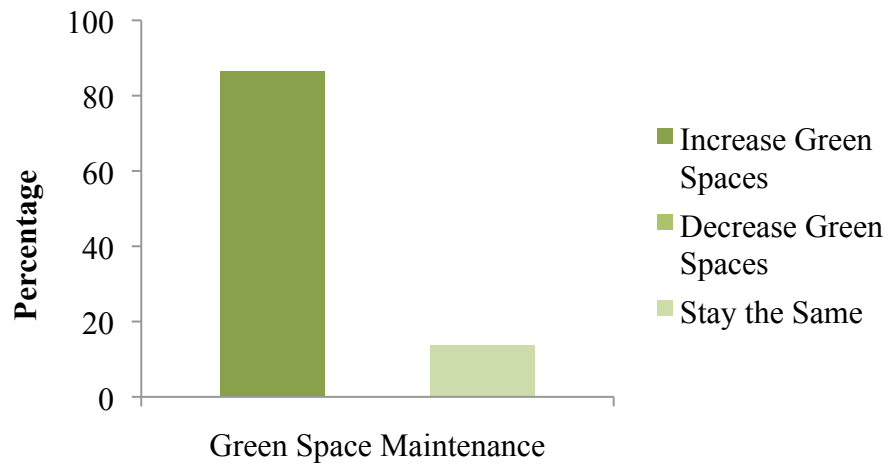


Figure 8. Number of students and/or faculty that would increase, decrease or keep the amount of green spaces the same.

The preferences for open spaces or secluded spaces can be seen in Figure 9. Figure 9 also shows the preference for either neat & tidy or wild & natural spaces. Overall, there was a preference for open spaces that are neat & tidy. The majority of participants picked open spaces over secluded spaces. There was not a significant difference between neat & tidy and wild & natural; the results were very close, almost 50/50.

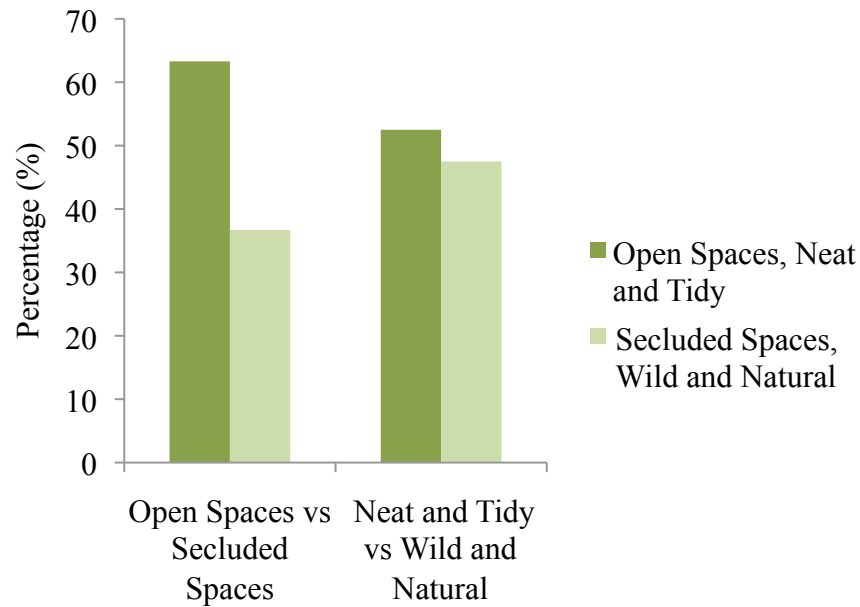


Figure 9. Preference of open spaces versus secluded spaces, and neat & tidy versus wild & natural spaces on campus.

Qualitative Results

We organized the data (via coding of bits) and sorted them into categories based on their properties; conclusions were derived from the substantive theories that were explained in our literature review (Kirby et al, 2010). The bits from the questionnaires were determined to be qualitative data because their questions have properties that lead to long, detailed and specified answers that cannot be explained through graphs or tables. They require elaborate and descriptive analysis in order to determine their significance.

Green Space Definitions

One of the questions from the questionnaire that we feel is important to mention is one where we asked participants to give their own definition of green spaces. The purpose of this question was to determine a common definition of green spaces that is shared by the majority of participants; and through association the majority of students and faculty on the Studley campus. Since many of the participants gave long and descriptive definitions of what green space means to them; we decided to take all the most common definitions of green space and shortening them to four or five words. In doing so, we came up with four common definitions and perceptions of green space on Studley campus. These definitions are natural spaces, areas with lots of plant species, open areas for socializing, and well maintained areas for resting.

These definitions are significant because they highlight what sort of purposes participants believe green spaces should serve on campus.

For this reason we also asked participants what purposes they believe green spaces serve on campus. Similarly to the question mentioned above answers were quite descriptive and long, so we categorized the bits into four categories with short answers that generalize the most common perception of what purposes green spaces serve. The four most common answers were a place to socialize, study or relax, connect to nature, and to make the university more aesthetically pleasing. Consequently, it seems the most common purposes that people believe green space on campus serves is for leisure and connecting with nature.

Visual and Aesthetic Features on Campus

Once we established a common perception and purpose of green space on campus the next step was to determine how green space is identified on campus. For this reason, in the questionnaire we asked participants what visual and aesthetic features stand out to them on campus. The most common answers to this question were buildings, the quad, vines on buildings, trees and shrubbery, area behind the library and flowers. The last answer that was frequently said is nothing, which was quite surprising, because it either means that nothing stands out to people on campus: or that people just could not think of anything significant to write down. We also asked people what visual features would they prefer to see the most. The most common answers to this question were trees, gardens with lots of flowers, open grass areas and wild areas like the ocean pond. The significance of these answers is that all the features that are mentioned are aspects of green spaces incorporated into landscaping. These answers illustrate that the student body and faculty want to see these elements incorporated into the green spaces on the Studley campus.

Incentives to Use Green Space

Since it became apparent that both students and faculty want more green space on campus we asked the participants what features they wanted to see added to the greens spaces on the Studley campus. The most common answers were more native species, higher frequency of maintenance (grooming of grasslands and trimming of vegetation), more recreational spaces, more benches and chairs, gardens, and outdoor gazebos or canopies for shelter. The significance of these answers is that there are many ways in which people feel that green spaces on campus be better utilized.

After we identified ways in which ways green space could be improved we asked participants how people can be incentivized to use green space. The most common incentives that people came up with were outdoor school events, chairs, benches, outdoor study space and warm weather. Nothing was also a common answer, but we did not really pay attention to

it because you cannot incentivize someone into using green space by doing nothing. However, it is an important answer to analyze because it illustrates that there are people at Dalhousie University who may feel there is no need to incentivize people into using green spaces, because green space itself is an incentive. Nonetheless, the other common answers are extremely helpful, because they illustrate what aspects of green space the school should focus on in order to create better incentives for using green spaces. Once incentives were identified the final step was to determine whether or not people would use green spaces with the added incentives: and if so, how. The majority of answers were yes for whether or not they would use it. Some answers were weather dependent or dependent on personal factors like homework and choice of recreational activities. For how participants would use the new green spaces the most common answers were relaxing, socializing and recreational.

Overall, these qualitative answers from the questionnaire are significant because they provide context for our quantitative data. Through these answers we were able to determine that green space is perceived as a natural part of a landscape and that its utility affects how it is perceived. It is also perceived as something good that improves the aesthetic appeal of a landscape, so it is important that Dalhousie continues to maintain and develop its green spaces on the Studley campus.

Discussion

Summary and Purpose of Research

By focusing specifically on the Studley campus, the study was able to identify distinctions of green space perception among male and female students and faculty. As well, whether or not there is a correlation between the perception of green spaces and how they are used among the university population. Essentially, this research was intended to discern how green space is perceived on campus and whether a correlation exists or not between the utilization of these spaces. Earlier it was mentioned that perception is determined to be the apprehension of cognitive senses to create an independent understanding of one's environment. This study sampled a proportionate group, representing the overall campus population, as well, have developed a greater understanding of the perceptions of green spaces which exist on campus. In terms of the use of green spaces, the study focused on how the spaces function in daily campus activities; do they provoke socialization, relaxation, and recreation? In general, the survey and questionnaire focus on the components of Studley green spaces, which are currently appreciated/unappreciated, and what future components people would like to see implemented.

The results gathered provide an understanding of how current green spaces are being perceived, consequently allowing for the development of recommendations for Dalhousie University to make the green spaces of Studley campus more effective and appealing to the overall population. Ultimately, the significance of this study was providing an analysis of the

perceived use of green spaces, its utilization, or lack there of, and its role with regard to campus lifestyles. The results found provide Dalhousie with useful information on the management of the Studley campus green spaces, and the found differences between perceptions and the current utilization of the spaces.

Overview of Significant Findings

This Study had many significant findings in relation to Dalhousie University's Studley campus. Among the answers received from participants (varying total depending on the question – refer to figures), it was found that the majority (almost a 50/50 split) regard Dalhousie as a green campus; that the vast majority of participants state that they utilize the green spaces found on campus; that the majority of participants (again almost 50/50) regard the campus to be visually/aesthetically pleasing. This gives insight into the minds of the Dalhousie community and their perspective towards the green spaces on campus. It was found that just over half of participants view the campus to be both aesthetically pleasing and green. This is in light of the greater majority of the community sampled, having identified themselves as individuals who do in fact utilize the available green space around the Studley campus. This study had also found that more than half of the total participants did not regard the campus green spaces as being used; that a greater number of participants regard the campus green spaces to be well maintained consequently with just over half participants stating that they would change the maintenance of the Studley campus green spaces.

The common answers on how participants 'defined' or referred to campus green spaces were: as natural spaces; open areas for socializing and being a well maintained area for resting and recreational purposes. The purpose of the green spaces, gathered from participants, was that they are places for interpersonal interactions, study, relaxation, and a way to connect with nature. Consequently the aesthetically pleasing features of the Studley campus were identified as the quad, the buildings (referring to the lack of green space) and the various trees and shrubbery that are found all over the campus. Regarding these features, participants indicated that they would like to see more native (to Nova Scotia) plant species, greater/expanded recreational space, as well as an outdoor sheltered area (gazebo). Lastly, participants identified incentives to utilize the campus green space, these incentives being: more outdoor events, available chairs and benches, and designated outdoor study spaces.

In light of existing research studies, which had determined that individuals are supportive of land use changes when they are consistent or congruent with their own perception (personal utility functions and value orientations); an individual's perception of a landscape will have an effect on what they do with that landscape (Zube, 1987). Based on the findings of this study involving Dalhousie's green space and its perception among the community, the results found to be consistent with and reflect that which was found in existing studies.

Implications for Theory/Practice

The University of Jordan did a study similar to ours on perception and land use. They determined that planners should be aware of how users will perceive the outdoor spaces as perception is closely tied to outdoor activities (Abu-Ghazze, 1999). These views are what we looked at as we did our study. Dalhousie University should also take perception into account while planning the campus landscape. Planning with perception in mind will ensure the green spaces are designed appropriately for the campus populace. In Indonesia, The Bandung Institute of Technology (ITB) campus, the researchers looked at what features within the chosen open spaces were essential to making the space meaningful for the students (Hanan, 2013). They also reviewed the uses of these spaces in hopes of understanding the functions the spaces provide and how they contribute to an effective learning environment. They determined that students were attracted to: shaded areas, areas that were easy access, areas with uncontrolled atmosphere, proximity to lectures, sitting facilities, power supply, spaciousness and areas to view people passing by (Hanan, 2013). These views relate to our research project because it studies the preferences of students and relates it back to campus landscape design. Dalhousie should take the perception on the meaningfulness of features in an open space into account. Appropriate landscaping will establish and entrench meaningful features of the campus into the campus populace.

Lastly, a study that was done on the two campuses of Sichuan Agricultural University in China with the purpose of determining the positive and negative impacts of three aspects of the landscaping on the University campuses (Mu & Zhang, 2011). These three aspects were: humanization (how a landscape has been altered in order to be better used by humans), communication atmosphere (layout of a landscape and whether or not it allows/encourages socialization and interaction among students), and visual effect of plant disposition (placement of vegetation throughout the landscape). This relates to our research project because of the aspect that plant disposition [in a landscape] can have an incredible impact on how students psychologically relate to their campus (Mu & Zhang, 2011). Dalhousie should take into account the positive and negative impacts of these three aspects (humanization, communication atmosphere, and visual effect of plant disposition) in order to better relate to the campus populace.

In light of existing research studies, which had determined that individuals are supportive of land use changes when they are consistent or congruent with their own perception (personal utility functions and value orientations); an individual's perception of landscape will have an effect on what we do with them (Zube, 1987). Based on the findings of this study involving Dalhousie's green space and its perception among the community, the results found to be consistent with and reflect that which was found in the existing studies.

Findings Failing to Support our Hypothesis

Due to the essence of the study focusing on perception, being a subjective topic, there are instances where findings had failed to support the Study's given hypothesis. Participants potentially indicated that they use the green spaces found on campus more than in actuality, and vice versa; that the greater populace potentially uses the green space on campus more than had been indicated, as well as vice versa. Part of the questionnaire was term specific (Fall and Winter), gaining the perspective of the participant, based off of the individual school term. The results gathered were of a biased nature based on the weather found in each term and its role on the use and perceived use of green space found on Dalhousie Studley campus. Lastly, it must be noted that there may be a positive correlation, but this does not mean that there is causation.

Conclusion

Recommendation for Action

Based on the information gathered by the participants from the Green Space Perception Study, recommendations can be made and submitted to Dalhousie University on how to better utilize, in its entirety, the greens space found on the Studley campus. These recommendations include a desire to increase the amount of native Nova Scotia plant and tree species whether adding species that are not currently found on the campus or increasing the population of those that are already found on the campus; better maintained and groomed green spaces opposed to more wild and free-growing campus green spaces; greater/expanded space to be available and utilized for recreational activities (directed towards the quad); adding garden spaces to the campus (whether in the open or as a rooftop garden) that are available and accessible to the Dalhousie community; greater wild green spaces specific to its location (such as the ocean pond); increase of the amount of benches and chairs available to the community in proximity to green spaces or otherwise places found to be relaxing and better for studying; an addition of a covered space (gazebo or canopy) dedicated to shade, relaxation and studying on or around campus green spaces. Participants directly link all the above recommendations with indicated incentives – relaxing, studying, socializing, and recreational use – to use the campus green space.

Recommendation for Further Research

Further research into the topic of green space perception – by Dalhousie University, or future research projects – should incorporate a larger sample size that is capable of directly representing the majority of the Dalhousie population, whether it is staff/faculty, students and or the general Dalhousie community. This will gain more appropriate and in-depth results and

statistics based on the more proportional sample population of the study/research. There could potentially be smaller studies to gather specific and related data to aid and influence the results and statistics gathered. These studies could be dedicated to areas of preferred study outside; specific events to be held on campus (the quad); specific changes that participants would make to the Dalhousie Studley campus green space. These recommendations have the potential to improve and aid a greater study based on green space perception on the Dalhousie campus.

Acknowledgements

We would like to thank our course instructor Hendricus A. Van Wilgenburg, and our mentor Ais Baskaran for all of their guidance throughout this study. Our research would not have been possible without their help and dedication. We would also like to thank all of our participants for their time and efforts.

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Appendix

Appendix A: Data Tables

Table 1. Participant information regarding whether or not Dalhousie is a green campus.

	Yes	No
Males	9	11
Females	25	14
Students	30	24
Faculty	4	1
Total	34 (57.6%)	25 (42.4%)

Table 2. Amount of students and/or faculty that use green spaces on campus.

	Yes	No
Males	11	9
Females	33	6
Students	40	14
Faculty	4	1
Total	44 (74.6%)	15 (25.4%)

Table 3. Number of students and/or faculty that find the landscaping on campus visually pleasing.

	Yes	No
Males	12	8
Females	22	17
Students	30	24
Faculty	4	1
Total	34 (57.6%)	25 (42.4%)

Table 4. Number of students and/or faculty that have previously heard of the ocean pond.

	Yes	No
Males	11	9
Females	18	21
Students	25	29
Faculty	4	1
Total	29 (49.2%)	30 (50.8%)

Table 5. Amount of students and/or faculty that think campus green spaces are used.

	Yes	No
Males	3	17
Females	17	21
Students	18	35
Faculty	2	3
Total	20 (34.5%)	38 (65.5%)

Table 6. Amount of students and/or faculty on campus during the spring/summer semester.

	Yes	No
Males	15	5
Females	25	13
Students	36	17
Faculty	4	1
Total	40 (68.9%)	18 (31 %)

Table 7. Amount of students and/or faculty that use campus green spaces during the spring/summer semester.

	Yes	No
Males	13	3
Females	19	5
Students	30	6
Faculty	2	2
Total	32 (80%)	8 (20%)

Table 8. Amount of students and/or faculty on campus during the spring/summer semester that think the campus green spaces are being used effectively.

	Yes	No
Males	4	12
Females	9	15
Students	11	25
Faculty	2	2
Total	13 (32.5%)	27 (67.5%)

Table 9. Amount of students and/or faculty on campus during the fall/winter semesters that use the campus green spaces.

	Yes	No
Males	1	19
Females	14	25
Students	14	40
Faculty	1	4
Total	15 (25.4%)	44 (74.6%)

Table 10. Amount of students and/or faculty that think the green spaces are well utilized in the fall/winter semesters.

	Yes	No
Males	0	4
Females	5	15
Students	4	19
Faculty	1	0
Total	5 (20.8%)	19 (79.2%)

Table 11. Amount of students and/or faculty that think Dalhousie's green spaces are well maintained.

	Yes	No
Males	14	6
Females	27	12
Students	37	17
Faculty	4	1
Total	41 (69.5%)	18 (30.5%)

Table 12. Amount of students and/or faculty that would change the maintenance of campus green spaces.

	Yes	No
Males	11	9
Females	22	17
Students	31	23
Faculty	2	3
Total	33 (55.9%)	26 (44.1%)

Table 13. Preferred outdoor seating areas for students and/or faculty.

	Open Outdoor Spaces	Secluded Spaces
Males	13	6
Females	25	16
Students	33	22
Faculty	5	0
Total	38 (63.3%)	22 (36.7%)

Table 14. Amount of students and/or faculty that would increase, decrease or keep the amount of green spaces the same.

	Increase	Keep same	Decrease
Males	19	0	0
Females	32	8	0
Students	47	7	0
Faculty	4	1	0
Total	51 (86.4%)	8 (13.6%)	0

Table 15. Student and/or faculty preference of either neat & tidy or wild & natural green spaces.

	Neat & Tidy	Wild
Males	8	11
Females	23	17
Students	27	27
Faculty	4	1
Total	31(52.5%)	28 (47.5%)

Table 16. Current perception of green spaces on campus.

	Very satisfied	satisfied	Neutral	Dissatisfied	Very dissatisfied
Total	0	18	21	8	2

Table 17. Amount of green space usage per week during the fall/winter and spring/summer semesters.

	0 Times	1 Time	2 Times	3 Times	4 or More
Fall/Winter	24	18	5	2	1
Spring/Summer	5	7	15	14	9

Appendix B: Ethics Review

UNDERGRADUATE STUDENT SUBMISSION
RESEARCH ETHICS BOARDS
DALHOUSIE UNIVERSITY

This form should be completed using the guidance document http://researchservices.dal.ca/research_7776.html

SECTION 1. ADMINISTRATIVE INFORMATION

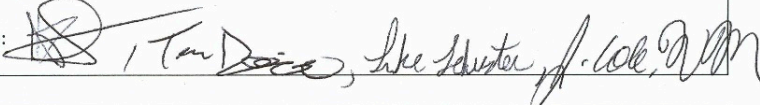
[File No: _____]
Office Use

Indicate the Research Ethics Board to review this research:
 Health Sciences OR Social Sciences and Humanities

Project Title: The Green Space Perception Study

1.1 Student researchers: Kieran Stepan, Thomas Davison, Luke Weinbaum Schuster, Jillian Cole, and Winfield McKay.			
Department	College of Sustainability		
Degree program	Environmental Sustainability and Society		
Email	Kr806780@dal.ca	Phone	(902) 877-4924

I agree to conduct this research following the principles of the Tri-Council Policy Statement *Ethical Conduct for Research Involving Humans* and consistent with the University Policy on the Ethical Conduct of Research Involving Humans.

Student signature: 

1.2 Supervisor Name: Dr. Hendricus Van Wilgenburg			
Department	College of Sustainability		
Email	hwilgenb@dal.ca.	Phone	

I have reviewed the attached ethics application prior to its submission for ethics review, including the scientific/scholarly methods of the research project which is described in the ethics application, and believe it is sound and appropriate. I will ensure this research will be conducted following the principles of the Tri-Council Policy Statement *Ethical Conduct for Research Involving Humans* and consistent with the University Policy on the Ethical Conduct of Research Involving Humans.

Supervisor signature:  March 15, 14

1.3 Department/unit ethics review (if applicable). Minimal risk research only.

This submission has been reviewed and approved by the research ethics committee.

Authorizing name and signature:
 Date of approval:

Appendix C: Written and Online Consent Forms

Written Survey Consent Form



SURVEY CONSENT FORM

Project Title: The Green Space Perception Study

We invite you to take part in a research study being conducted by Kieran Stepan who is a student at Dalhousie University, as part of her Environmental Sustainability and Society degree program. Taking part in the research is up to you and you can leave the study at any time. There will be no impact on your studies/your employment/your performance evaluation/the services you receive at Dalhousie University if you decide to withdraw from this study. The information below tells you about what you will be asked to do and about any benefit, risk, or discomfort that you might experience. You should discuss any questions you have about this study with Dr. Hendricus Van Wilgenburg.

Who Is Conducting the Research Study

The researchers conducting this study are Kieran Stepan, Thomas Davison, Luke Weinbaum Schuster, Jillian Cole, and Winfield McKay. The Supervisor of this study is Dr. Hendricus Van Wilgenburg.

Purpose and Outline of the Research Study

This research looks at how green space on campus is perceived and if its perception affects its use? We hope to achieve a better understanding of the relationship between perception and use of green space on campus.

Who Can Participate in the Research Study

You may participate in this study if you are a student or faculty member at Dalhousie University.

What You Will Be Asked to Do

You will be asked to help us understand how green space on campus is perceived and if its perception affects its use we will ask you to complete a short survey. The survey will be completed only once in the Killam library, the Student Union Building or outdoors near the quad and will only take 5 to 10 minutes to complete.

Possible Benefits, Risks and Discomforts

There are no anticipated direct personal benefits to participants. Indirect benefits of the study could include the contribution of new knowledge on the relationship between perception and use of green spaces on campus, which could help inform future campus green space design. There are no major risks or discomforts, apart from maybe finding participation boring. To mitigate this participants can take breaks at any time.

Compensation / Reimbursement

Participants will be given a treat as compensation for taking the time to complete the survey; this will be given to the participant after the completion of the survey or at the time of withdrawal.

Privacy and Confidentiality

The information that you provide to us will be kept private. Only the research team at Dalhousie University will have access to this information. We will describe and share our findings in a public presentation held at the Grawwood in the Student Union Building at the end of the current term. We will be very careful to only talk about group results so that you cannot be identified in our reports or presentation. The people who work with your information have an obligation to keep all research information confidential. The information given in your survey will be kept in a locked box and all electronic records will be kept on a secure USB. Following the completion of the study (approximately 2 months) the data will be destroyed.

If You Decide to Stop Participating

You are free to withdraw from the study at any time. If you decide to stop participating at any point in the study, you can demand any of the information that you have contributed up to that point to be removed from the study.

How to Obtain Results

A public presentation of results will be held at the Grawwood in the Student Union Building at the end of the current term. No individual results will be shared in the presentation. If you wish to obtain the results of the study, feel free to contact the research team (contact information can be found at the end of this form).

Questions

We would be happy to answer any questions or concerns you may have about your participation in this research study. Please contact Kieran Stepan (at 902 877-4924, kr806780@dal.ca) or Dr. Hendricus Van Wilgenburg (at hwilgenb@dal.ca.) at any time with questions, comments, or concerns about the research study (if you are calling long distance, please call collect). We will also tell you if any new information comes up that could affect your decision to participate.

If you have any ethical concerns about your participation in this research, you may also contact Catherine Connors, Director, Research Ethics, Dalhousie University at (902) 494-1462, or email: ethics@dal.ca

Signatures

Project Title: The Green Space Perception Study

“I have read the explanation about this study. I have been given the opportunity to discuss it and my questions have been answered to my satisfaction. I agree to take part in this study. However I realize that my participation is voluntary and that I am free to withdraw from the study at any time.”

Legal Rights and Signatures:

I _____(participants name), consent to participate in The Green Space Perception Study conducted by Kieran Stepan, Thomas Davison, Luke Weinbaum Schuster, Jillian Cole, and Winfield McKay. I have understood the nature of this project and wish to participate. I am not waiving any of my legal rights by signing this form. My signature below indicates my consent.

Signature _____
Participant

Date _____

Signature _____
Principal Investigator

Date _____

Written Questionnaire Consent Form



QUESTIONNAIRE CONSENT FORM

Project Title: The Green Space Perception Study

We invite you to take part in a research study being conducted by Kieran Stepan who is a student at Dalhousie University, as part of her Environmental Sustainability and Society degree program. Taking part in the research is up to you and you can leave the study at any time. There will be no impact on [your studies/your employment/your performance evaluation/the services you receive] if you decide not to participate in the research. The information below tells you about what you will be asked to do and about any benefit, risk, or discomfort that you might experience. You should discuss any questions you have about this study with Dr. Hendricus Van Wilgenburg.

Who Is Conducting the Research Study

The researchers conducting this study are Kieran Stepan, Thomas Davison, Luke Weinbaum Schuster, Jillian Cole, and Winfield McKay. The Supervisor of this study is Dr. Hendricus Van Wilgenburg.

Purpose and Outline of the Research Study

This research looks at how green space on campus is perceived and if its perception affects its use? We hope to achieve a better understanding of the relationship between perception and use of green space on campus.

Who Can Participate in the Research Study

You may participate in this study if you are a student or faculty member at Dalhousie University.

What You Will Be Asked to Do

To help us understand how green space on campus is perceived and if its perception affects its use we will ask you to complete a short questionnaire. The questionnaire will be completed only once in the Killam library, the Student Union Building or outdoors near the quad and will only take 5 to 10 minutes.

Possible Benefits, Risks and Discomforts

There are no anticipated direct personal benefits to you. There may be indirect benefits from the study such as could include the contribution of new knowledge on the relationship between perception and use of green spaces on campus, which could help inform future campus green space design. There are no major risks or discomforts, apart from you may find participation boring. To mitigate this possible feeling of boredom participants can take breaks at any time.

Compensation / Reimbursement

Participants will be given a treat as compensation for taking the time to complete the questionnaire; this will be given to the participant after the completion of the questionnaire or at the time of withdrawal.

Privacy and Confidentiality

Information that you provide to us will be kept private. Only the research team at Dalhousie University will have access to this information. We will describe and share our findings in a public presentation held at the Grawwood in the Student Union Building at the end of the current term. We will be very careful to only talk about group results so that you will not be identified in our reports or the Pecha Kucha presentation. The people who work with your information have an obligation to keep all research information private. The information given in your questionnaire will be kept in a locked box. All electronic records will be kept on a secure USB.

If You Decide to Stop Participating

You are free to leave the study at any time. If you decide to stop participating at any point in the study, you can also decide whether you want any of the information that you have contributed up to that point to be removed or if you will allow us to use that information.

How to Obtain Results

A public presentation of results will be held at the Grawwood in the Student Union Building at the end of the current term. No individual results will be provided. If you wish to obtain the results of the study feel free to contact the research team (contact information can be found at the end of this form).

Questions

We are happy to talk with you about any questions or concerns you may have about your participation in this research study. Please contact Kieran Stepan (at 902 877-4924, kr806780@dal.ca) or Dr. Hendricus Van Wilgenburg, the course instructor, (hwilgenb@dal.ca) at any time with questions, comments, or concerns about the research study (if you are calling long distance, please call collect). We will also tell you if any new information comes up that could affect your decision to participate.

If you have any ethical concerns about your participation in this research, you may also contact Catherine Connors, Director, Research Ethics, Dalhousie University at (902) 494-1462, or email: ethics@dal.ca

Signatures

Project Title: The Green Space Perception Study

“I have read the explanation about this study. I have been given the opportunity to discuss it and my questions have been answered to my satisfaction. I agree to take part in this study. However I realize that my participation is voluntary and that I am free to withdraw from the study at any time.”

I agree that the researcher may use direct quotes from my Questionnaire as long as my identity remains anonymous.

Yes

No

Legal Rights and Signatures:

I _____(participants name), consent to participate in The Green Space Perception Study conducted by Kieran Stepan, Thomas Davison, Luke Weinbaum Schuster, Jillian Cole, and Winfield McKay. I have understood the nature of this project and wish to participate. I am not waiving any of my legal rights by signing this form. My signature below indicates my consent.

Signature _____
Participant

Date _____

Signature _____

Date _____

Online Consent Form

1* I consent to participate in The Green Space Perception Study conducted by Kieran Stepan, Thomas Davison, Luke Weinbaum Schuster, Jillian Cole, and Winfield McKay. I have understood the nature of this project and wish to participate. I am not waiving any of my legal rights by signing this form. By checking this box I understand that it represents my signature.

If you do not consent then you will be unable to complete the survey/questionnaire.

I Consent

2 I agree that the researcher may use direct quotes from my questionnaire as long as my identity remains anonymous.

Yes
 No

Next Page

Report Abuse | Free Online Surveys

Figure 10: Combined online survey and questionnaire consent form

Appendix D: Written and Online Survey

Written Survey

Green Space Perception Survey

General Information

1. Are you a student or a faculty member of Dalhousie University?
2. Do you work and/or take classes on Studley campus?
3. Are you male or female?

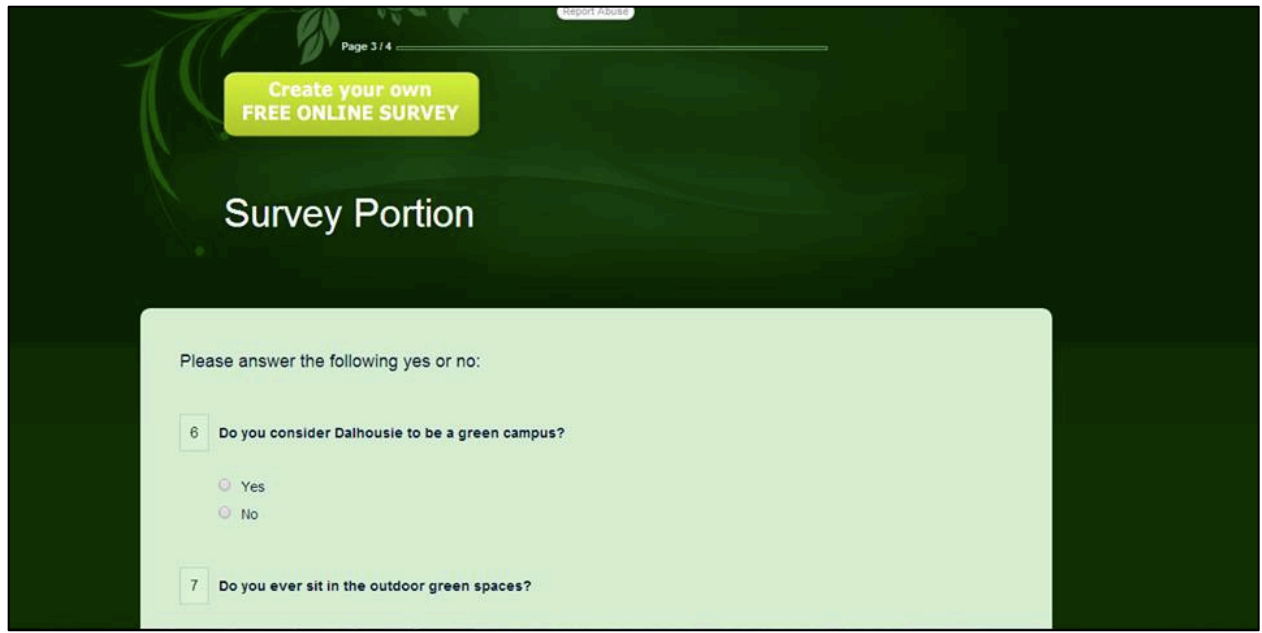
Please answer the following questions yes or no:

1. Do you consider Dalhousie to be a green campus?
2. Do you ever sit in the outdoor green spaces?
3. Do you find the landscaping on campus visually pleasing?
4. Have you ever noticed the ocean pond before?
5. Do you think the green spaces on campus are often used?
6. Are you on campus in warmer months (spring/summer)?
 - a) If so, do you use the campus green spaces?
 - b) Do you think the green spaces are used effectively?
7. Do you use the green spaces in the colder months (fall/winter)?
 - a) If so, do you use the campus green spaces?
 - b) Do you think the green spaces are used effectively?
8. Are Dalhousie's green spaces well maintained?
9. Would you change the maintenance of campus green spaces?

Please circle an option for each of the following questions:

1. Where do you prefer to sit?
 - a) Open outdoor spaces
 - b) Secluded outdoor areas
2. If you could, would you:
 - a) Increase the amount of campus green spaces
 - b) Decrease the amount of campus green spaces
 - c) Maintain the current amount of campus green spaces
3. What do you prefer?
 - a) Neat and tidy green spaces
 - b) Wild and natural green spaces

Online Survey



Page 3 / 4

Create your own
FREE ONLINE SURVEY

Survey Portion

Please answer the following yes or no:

6 Do you consider Dalhousie to be a green campus?

Yes

No

7 Do you ever sit in the outdoor green spaces?

Figure 11: Example of the online survey.

Appendix E: Written and Online Questionnaire

Written Questionnaire

Green Space Perception Questionnaire

1. How do you define green spaces?

2. How do you perceive the green spaces on campus (please tick one only)?

Very Satisfied	Satisfied	Neither Satisfied Nor Dissatisfied	Dissatisfied	Very Dissatisfied
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3. How many times a week do you use the green spaces in the warmer months (spring/summer)?

0 Times	1 Time	2 Times	3 Times	4 or More
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4. How many times a week do you use the green spaces in the colder months (fall/winter)?

0 Times	1 Time	2 Times	3 Times	4 or More
---------	--------	---------	---------	-----------

5. What purpose(s) do you think green spaces serve on campus?

6. What visual/aesthetic features stand out to you on campus?

7. Of those features, what do you prefer to see?

8. What would you like to see added (eg. more native species, wilderness or groomed, more space)?

Online Questionnaire

Questionnaire Portion

22 How do you define green spaces?

23 How do you perceive the green spaces on campus?

Very Satisfied Satisfied Neutral Dissatisfied Very Dissatisfied

Please choose one

24 How many times a week do you use the green spaces in the warmer months (i.e. spring/summer)?

None One Two Three Four or more

Amount of visits

Figure 12: Example of online questionnaire.