



Walkability on University Avenue

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This report will focus on the walkability of University Avenue and the findings made in the research phase, both qualitative and quantitative. The results were achieved through the use of an initial walkability assessment performed by the researchers. This was followed by a survey, completed by the users of the street to determine existing perception. Using both sets of findings, a thorough understanding of the walkability needs on University Avenue was achieved. After studying the surveys, it was deduced that many users of the street would benefit from less traffic on the street as well as more places to sit. After conducting this research study, it is recommended that University Avenue, between Robie Street and the Dalhousie Accessibility Centre, be closed off to vehicle traffic during high pedestrian hours and that more art features and seating be implemented along the street to improve safety, accessibility, enjoyment, and overall walkability of University Avenue.

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INTRODUCTION AND PROJECT DEFINITION

One of the most utilized spaces on the Dalhousie University Studley campus is University Avenue, specifically between the Mark Hill Accessibility Centre and Robie Street, and thus it was selected as the street of focus for a case study focusing on walkability. This was done in order to determine the pedestrian experience throughout said area, in addition to the variables affecting its current perception by the Dalhousie student body, personnel, and other users of the campus' street. This section of the campus was selected above others as there is space available to make adjustments if deemed necessary, and through direct observation it was determined to be one of the more utilized areas on campus.

Walkability is defined as a measure that identifies the perceived friendliness, aesthetics, and safety of a space. The purpose of the study is to determine the current walkability of University Avenue based on a multitude of criteria surrounding the functionality and aesthetics of the street. Further, we aim to see if the implementation of strategic features such as a public art would alter the perception of walkability and the street experience, further encouraging the street's use.

Through the use of direct observation, it is believed that the walkability of University Avenue is not currently being maximized and that through the implementation of certain aesthetic features, the users' street experience could potentially be enhanced. As University Avenue connects both ends of the Studley campus, with many university buildings along it, it presents many unique qualities and potential that the surrounding streets on campus do not possess. By determining what makes University Avenue a popular walking route and what factors could potentially make it more walkable, this information could in the future be applied to surrounding campus streets, as well as those located on other Dalhousie University campuses.

By increasing the walkability of University Avenue through the implementation of different features, both practical and aesthetic, the intention is to increase the number of pedestrian users on University Avenue, decreasing the number of users of other modes of transportation on the campus itself. This will help with Dalhousie University's goals of creating a more sustainable campus and "develop sustainable solutions that will preserve our planet for future generations" (Dalhousie University, 2014).

Although the study is being conducted on a Dalhousie campus, any future decisions regarding physical features being proposed for the street will have to be done in conjunction with the Halifax Regional Municipality, as they are the official proprietors of University Avenue. Working with the Municipality may in turn benefit the feasibility of potential future projects as they have the ability to employ many more resources than the university in a shorter timeframe.

If the Municipality is to take on the proposed project in conjunction with Dalhousie University and expending their resources to do so, it is believed that it would in turn benefit the HRM as a whole. On Studley campus, particularly along University Avenue, there are many buildings and lectures available to members of the general Halifax public. Creating a more walkable and aesthetically pleasing University Avenue will add another amenity added to the municipality allowing members of the community to benefit as well.

Overall, this project aims to transform University Avenue into a more walkable space, by foremost addressing perceived safety and aesthetics of the street by the street's users. By addressing the research question through applied research, the project aims to gain a better understanding of the current walkability of University Avenue and improve the problems associated with its current state in order to further expose its unique identity.

BACKGROUND AND RATIONAL

External Views and Opinions in Regards To “Walkability”

“Streets are some of the most valuable resource that a city has and yet, it’s an asset that is largely hidden in plain sight” – Sadrik-Khan, 2013

With ever-increasing globalization, society always seems to be on the move now-a days, more than ever. This is why the ideology behind maintaining a health city is crucial for society. A healthy city can be coined as cities that are “liveable, equitable, and sustainable. They provide urban environments in which the built and natural environments support health, mobility, recreating, safety, social interaction, and a sense of pride and cultural identity that is accessible to all their populations” (Perrotta et al, 2012, pg. 7). Where is the one place within a city that the majority of people will interact with on a daily basis? The streets. This is why the concepts behind “walkability” have found an ever-increasing need to become recognized and attended to. Walkability should be seen as a key aspect within creating and maintaining a “healthy city.” A growing body of evidence suggests “walkable and transit-supportive areas are healthier and more environmentally sustainable than non-walkable neighbourhoods because they allow people to walk, bicycle and use transit more, and to drive less for their day to day trips” (Perrotta et al., 2012, pg.15). Additionally, for a city to be deemed “healthy”, it goes beyond just physical health. The state of “being healthy” includes a balance between mental, physical, emotional and cultural wellbeing (Perrotta et al., 2012, pg. 22). By recognizing walkability as an important pillar of success for a healthy city, work can continue to be done on the other components of human and environmental health.

The Forgotten Importance of Walkability

Walkability is an important issue that needs to be further investigated as walking itself can be seen as the corner stone of human movement. Society has neglected to account for features of walkability in urban developments, resulting in subpart, inefficient streets. Historically, “almost all development in transportation technologies seems to have degraded the pedestrian environment. Roads have started to serve higher and higher-volumes of traffic, as a result leaving out pedestrian interaction and therefore, they have lost their human scale” (Southworth & Forsyth, 2008, pg. 17). Walking is one of the most important interactions of an individual’s day, and it is often left unaddressed by many developmental planners. Mentalities must change, and walkability must be taken into consideration when developing new spaces, and improving older ones.

Why is “Walkability” important to Dalhousie University?

As concern for our environment increases, Dalhousie continually strives to participate in environmental and sustainable efforts through many campus initiatives and actions. In 2008, Dalhousie established the College of Sustainability. The College of Sustainability at Dalhousie “acts as a focal point for Dalhousie’s scholars and students and members of the broader community, creating opportunities for synergies in learning, teaching, scholarship and community engagement” (Dalhousie University, 2014). The Office of Sustainability works to focus on ideas that continually challenge and work to improve our natural and built environments through the operations of Dalhousie University. It is in the best interest of both Dalhousie University and the Office of Sustainability to invest time, effort, and commitment into the area of “walkability” on campus, as it encompasses their commitments, obligations and interests. As Dalhousie is reaching a soaring 19,000 students as of 2014 (Dalhousie University, 2013), it is just as crucial to include these previously mentioned pillars of a “healthy city” to the Dalhousie community through the means of increasing campus walkability. Therefore, as the studies researched within this proposal, are

generally related to cities, it can be said that the same significance of ideologies can be applied to the Dalhousie University campus.

Previous “walkability” studies and/or findings conducted

Within the past few months, New York’s Time Square has undergone a mass “walkability” undertaking. They have recognized that the design of a city is a key issue moving forward. In 2007, “Plan NYC” recognized that “cities are in a global market place and that if we are going to continue to grow, thrive and attract many more residents to our cities, we need to focus on the quality of life and the efficiency of our infrastructure” (Sadik-Khan, 2013). The planning committees of New York have been working hard to refocus their agendas to maximize efficient mobility, more room for buses and bikes, and more room for people to enjoy the city (Sadik-Khan, 2013).

As previously mentioned, walkability is often left invisible within streets. The New York case study has recognized this flaw and used it to create change. They have also recognized that “the design of a street can tell you everything about what’s expected on it” (Sadik-Khan, 2013). They implemented a 6-month pilot program that closed Broadway from 42-47th space, creating two and a half acres of new pedestrian space (Sadik-Khan, 2013). If positive impacts came from this, they would get to keep this public space. Immediately, people gravitated to this new public space and began to enjoy it.

Local businesses volunteered to maintain the space by moving furniture and maintaining plants. This was a testament of a public’s interaction and engagement in a space that was implemented to benefit them. These businesses realized the sense of community this kind of environment created, and in turn, their businesses profited as well (Sadik-Khan, 2013). The public spaces committee moved very quickly when working to get this project rolling. They used paint and temporary materials instead of waiting years to test options on analytical data models. The success of the project is not in a computer model, but rather in the real-world performance of the street (Sadik-Khan, 2013). Through the increase of walkability measures, there has been real tangible evidence of success. Changes include: The first parking protected bike lanes to ever happen in the U.S., injuries fell 50%; 350 miles of bike lanes were built (Sadik-Khan, 2013). All in all, the conclusion that can be drawn out from New York is that, “is it possible to change your streets quickly, it’s not expensive and it can provide immediate benefits. You just need to reimagine your streets because they are hidden in plain sight” (Sadik-Khan, 2013).

The most remarkable feature of this project was the successful results with very limited funds, time, and materials. Although, this project was achieved at a much larger scale and capacity, it is one that could be easily and effectively modelled on University Avenue.

The Overlooked Value of Walkability

The concept of walkability today seems to be undervalued within conventional transport planning systems today. This is due to many economic, social, and cultural factors that have influenced the way in which people perceive, value and signify walkability.

Difficult to Measure

Firstly, walkability and walking trends are difficult to measure. “Travel surveys often collect little information on total walking activity, and it is relatively easy to count vehicles, measure traffic speeds and incorporate vehicle travel into travel models” (Litman, 2004, pg.10). Therefore, in comparison, walking is given little attention to within most travel models and as a result most walking goes un-noticed by transportation planners (Litman, 2004, pg.11).

Low Status

Walking in general is usually associated a lower status activity in comparison to vehicular travel activity. Therefore, because lower-income people use it, walking tends to be stigmatized while motorized transportation tends to be associated with higher rates of success and progress within society (Sallis, et al., 2004, pg. 7).

Benefits Ignored

Many benefits related to walkability within conventional planning tend to be ignored. The benefits are mostly ignored in areas such as health, enjoyment gained through walking and cycling, and the improved mobility options for non-drivers (Sallis, J. et al, 2004, pg. 8). As many benefits are often overlooked, the concept of walkability is taken for granted and walking and cycling facilities are often given low priority (Sallis, J. et al, 2004, pg. 9).

Economic Impact of Walkability

Many benefits occur when automobile travel is reduced within an urban setting. For example, some of the following benefits would include: reduced traffic congestion, increased traffic safety, energy conservation, and reduced air and noise pollution (Litman, 2004, pg. 63). Walking and walkability have a direct impact on consumer transport costs. Adequate walking developments allow consumers to save on vehicle expenses. For example, one study found that “households in automobile-dependent communities devote 50% more to transportation (<\$8,500+ annually) than households in communities with more accessible land use and multi-modal transportation systems (>\$5,500 annually) (Litman, 2004, pg. 63).

The Land Use Efficiency of Walkability

All land use development has and provides economic, social and environmental implications. For example, to increase the walkability of an area, the promotion of both clustered developments and land-use are necessary to centralize new developments by moving away from an automobile dependent to either a cycle or walk dependent area (Litman, 2004, pg. 65). Additionally, Litman states that, “walkability improvements can help reduce these costs by reducing the amount of land required for transport facilities and encouraging more accessible, clustered land use patterns, and supporting Smart Growth development patterns” (2004, pg. 60). Economically, land use can provide an increase in local business activity, a decrease in health costs from an overall improvement in reduced transportation costs, and varying property values (Litman, 2004, pg. 66).

Social Impacts of Walkability

One of the largest social factors directly related to walkability is the issue of community liveability. Community liveability refers to “the environmental and social quality of an area as perceived by residents, employees and visitors” (Litman, 2004, pg. 61). Community liveability can have direct impacts on the local environmental quality, community cohesion, and existence of culture and environmental resources (Litman, 2004, pg. 61). Therefore, walkability plays a large role within this as it fundamentally impacts community liveability. As streets play a major role within the public realm of a community, streets therefore play a role within the walkability of a community. The streets within a community do not only define its walkability, but also play a large role in the community culture. For example, “residents on streets with higher traffic volumes and speeds are less likely to know their neighbours, and show less concern for their local environment than residents on streets with less vehicle traffic” (Litman, 2004, pg. 65).

Health Impacts of Walkability

Inadequate physical activity is a major contributor to health issues. Walking is known to be one of the best forms of exercise, but is becoming more and more easy to avoid within our ever-evolving world. Currently, there are increasing percentages of the population, many being

children, that lack regular physical activity (Litman, 2004, pg. 46). Some diseases associated with physical inactivity can include any or all of the following: heart disease, hypertension, stroke, diabetes obesity, osteoporosis, depression, and some types of cancer (Litman, 2004, pg. 46). Health experts believe that more balanced transportation systems can contribute to improved public health by accommodating and encouraging active transportation (Litman, 2004, pg. 47). One way to achieve a more balanced transportation system is to increase the walkability both to and from urban settings. Therefore, the health benefits of increased walking and improved walkability are potentially very powerful.

Environmental Impacts of Walkability: Road Safety

International research suggests that shifting to non-motorized transport increases road safety overall (Pucher and Dijkstra, 2004, pg.4). For example, the Netherlands has a high level of non-motorized transport, yet per capita traffic deaths and cyclist death rates per million km ridden are much lower than in more automobile dependent countries (Pucher and Dijkstra, 2000, pg. 4).

Peer reviewed literature: Lessons from The Netherlands & Germany

In the past two decades, both The Netherlands and Germany have taken important measures to improve aspects of walkability, pedestrian safety, and stricter enforcement of traffic regulations for both pedestrians and cyclists (Pucher and Dijkstra, 2000, pg.2). Over time, policy within North America has done little to promote walking and cycling (Pucher and Dijkstra, 2000, pg.4). Transportation and land-use policies have made walking and cycling less feasible, less convenient, and more dangerous (Pucher and Dijkstra, 2000, pg. 4).

In the United States, from 1977 to 1995, walking's share of urban trips fell from 9.3% to only 5.5%. The current levels of walking and cycling within North America are far lower than in many other countries (Pucher and Dijkstra, 2000, pg.5). Most European countries make at least a fourth of their urban trips through walking or cycling, and a few countries – like Denmark and The Netherlands– report over 40% for non-motorized travel (Pucher and Dijkstra, 2000, pg. 5).

Pedestrian and bicyclist safety has been central to transportation and land-use planning in Europe. Many European countries have sharply reduced pedestrian and cyclist injuries by implementing a wide range of measures: urban design oriented towards people and not cars; restrictions on auto use and stricter enforcement of traffic laws. The Netherlands and Germany have implemented the following in order to sustain a friendly, walkable city for pedestrians and cyclists.

The differences between Europe and the United States are quite dramatic for walking. In the Netherlands, walking accounts for twice as high a percentage of trips for the elderly as for those in the age group 18-24 (24% vs. 12%) (Pucher and Dijkstra, 2000, pg. 10). In Germany, walking accounts for almost three times as high a percentage of trips for the elderly as opposed to those 18-44 (48% vs. 17%) (Pucher and Dijkstra, 2000, pg.10). In the United States, the percentage of walking trips made remains low at every age, and declines slightly from 7% in the 16-24 age group to 6% in the over 65-group (Pucher and Dijkstra, 2000, pg. 10). It is noteworthy that the Dutch and German elderly make half their trips by either walking or cycling (48% in the Netherlands, 55% in Germany), while the American elderly make up only 6% of their trips that way (Pucher and Dijkstra, 2000, pg. 11). This enables elders living without European cities to gain valuable exercise and remain the possibility of being mobile still even when they can no longer drive cars.

The Differences between Europe & North America

Improved Facilities for Walking and Bicycling

Dutch and German policies have improved the transportation infrastructure used by pedestrians and bicyclists through the use of: auto-free pedestrian zones, clearly marked crosswalks, *sidewalks on both sides of all streets*, *pedestrian and bicycle traffic lights*, *bicycle streets*, *bike lanes*, and bike paths. Another major success within the Netherlands and Germany has been the implementation of pedestrian infrastructure. Pedestrian zones have now become very common throughout the majority of Dutch and German cities. In larger cities, many zones often encompass much of the city centre, providing a large area where pedestrians will always have the right of way (Pucher & Dijkstra, 2000, pg. 19). Other measures to increase pedestrian safety include: zebra crosswalks with highly visible striping, pedestrian-activated crossing signals, pedestrian refuge islands for crossing wide streets, and wide, well-lit sidewalks, often furnished with benches for resting (Pucher & Dijkstra, 2000, pg. 19).

Urban Design Oriented to People and Not Cars

There is an increasing need for urban developments to provide safe and convenient pedestrian and bicycling access through residential developments. It is also important that residential developments include multi-purpose functional and accessible uses such as shopping centers and service establishments that can easily be reached by foot or bike (Pucher and Dijkstra, 2000, pg. 22). In the Netherlands and Germany, new suburban commercial developments have implemented sidewalks and bicycle paths to serve non-motorists (Pucher and Dijkstra, 2000, pg. 22). Additionally, parking lots almost never surround buildings as in the United States; instead, they are built next to or behind buildings, thus permitting easy access to pedestrians and cyclists (Pucher and Dijkstra, 2000, pg. 22). Furthermore, the lack of adequate sidewalks in most American main streets and suburbs further exacerbate the problem of walkability (Pucher and Dijkstra, 2000, pg. 22). All in all, the Netherlands and Germany highlight the importance of restrictions on motor vehicle use by providing and highlighting the accessibility from suburban developments to shopping centers. This provides further evidence that key issues related to walkability are crucial in regards to making urban developments safe and accessible for both pedestrians and cyclists.

METHOD

After considering the best possible method to use to test our research question, it was decided that both qualitative and quantitative research would be needed to achieve the most accurate results. In order to do this, it was determined that the researchers would conduct an initial walkability assessment, followed by a survey of walkability by study participants. The initial walkability assessment was conducted as a means to further understand the study area, and pinpoint which components of the street were most lacking from a walkability standpoint. Using the information collected, a survey was developed in order to determine which areas were of foremost concern to the street's users. It was seen as important to include the public in this process, as they are the ones using the street and being affected by any changes that occur on it.

By conducting an initial walkability assessment followed by a user survey, targeted areas could be identified making the survey more easily accessible and understandable to the street users who do not have background knowledge of the topic. The data collected was then condensed and examined to determine where future changes could be made. This will later be discussed in the results and discussion sections. These methods were selected to collect data above others as they are time and resource effective, and have the ability to collect the same data that other methods such as interviews would have gained.

In order to collect the data for the initial walkability assessment, the researchers met at the beginning of the research phase and brought a copy of the initial assessment and a clipboard. The researchers individually studied the sections of the assessment, human scale, complexity, transparency, enclosure, and imageability, and data for each section was recorded. At the end of the assessment period, the researchers regrouped to compare data. All researcher data was within the same range, exemplifying the universal understanding and consistency of both the method and the data. This allowed the researchers to move forward with accurate and reliable data. In addition, the walkability assessment used is considered to be reliable, accurate, and unbiased, as it has been used and tested in many other past walkability studies. Also, it uses quantifiable data to assure that the researcher is not subconsciously imputing any biased data. After analysing the score of this assessment, walkability components of the streets that were potentially in need of change were brought forth and a survey addressing these needs was drafted.

Once the final survey form was established, researchers took to the street with chocolate bars and gathered individuals to participate in the study. Participants were questioned in the area in front of the Student Union Building. This area was targeted due to the constant influx of people in and out, and also because it is located directly in the study area. This was important as participants were interacting with the area at that moment making the results more reliable than if they had been conducted somewhere else. In addition, this ensured that participants were truly users of the street. Although chocolate was used to attract street users to approach the researchers to inquire and take the survey, this was not seen a factor that would affect the reliability, validity, or trustworthiness of the research, as the individual were on the street, therefore making them users. Their opinions were determined to be as valid as if no incentive had been provided. The survey used qualitative data that was later quantified by the researchers. Twenty surveys were completed, and the results were imputed into a chart were they were analysed and synthesized using words, images, and charts.

The participant survey asked ten questions which were mostly formatted to be answered on a Likert scale, with two questions being yes or no, and two others requiring participants to write a short description. The Likert scale was used as it provides a simple yet effective means for collecting data. It was particularly effective for this research study as it targets individuals perceived sense of walkability in the study area. This tool allowed them to answer the questions effectively without pressure and complexity. Survey questions are as follows:

1. What is your perception of walkability on University Avenue?
2. Do you think there is enough green space (including gardens and plants) in this area?
(1 strongly disagree, 5 strongly agree)

1 2 3 4 5
3. Rate the noise level of University Avenue (1 not loud, 5 very loud)

1 2 3 4 5
4. How enclosed or contained (such as in a box) do you feel in the area (due to building height)?

1 2 3 4 5
5. How aware are you of the windows at street level? (1 not at all, 5 overly)

1 2 3 4 5

6. How colourful do you find University Avenue? (1 not at all, 5 overly)

1 2 3 4 5

7. Do any features on University Avenue stand out to you?

Yes No

If yes, please specify: _____

8. Is there an enough amount of seating on this street?

1 2 3 4 5

9. Would you benefit from more places to sit on University Avenue?

Yes No

10. Has your perception of walkability changed?

Limitations and Dellimitations

This study was strongly limited by the amount of time given to complete it. With only three months to complete it from start to finish, including the time necessary to have the ethics application approved, there was limited time to complete the survey period. Due to this limitation, only twenty surveys were completed. With more time, a more accurate representation of University Avenue's users could have been seen. The survey would have been distributed in a way that accurately represented the number of male, female, student, faculty, staff, and disabled individuals who use the street. Each of these users has different needs for the street, and by not ensuring that each of their concerns be weighted accordingly due to time restrictions, an accurate representation of what the users of the street need to make it more walkable cannot be seen. The number of participants that were willing to take the survey also limited us.

Another limitation caused by the short amount of time available for the project is the time of day and year the data collected. Because the research occurred only at one time of day and one time of the year, it is unclear if needs for the street varies, especially with the diverse climate changes the City of Halifax sees monthly. The needs of the month in which data was collected may be different than another. If data had been collected year round and at different times of day, the results could have been synthesized to see which walkability needs were constant.

Present in the study were also a few delimitations that could not be addressed due to time restrictions. In questions ten of are survey we asked participants, "Has your perception of walkability changed?" We did not ask for further explanation, but if we had had more time to complete the study we would have. We did not want to make the survey too long out of fear for lack of participation. This prevented us from knowing why or why not peoples view changed.

Another delimitation of our study is that we did not provide a definition of the term walkability on the survey sheet itself. Although we provided the individuals with an oral definition,

it is believed that it would have been more effective if it had been included on the survey page itself.

RESULTS

In order to fully understand the walkability of the study area, both qualitative and quantitative research methods were used. These methods were executed by the use of a walkability assessment and a survey, which consisted of ten perception-based questions to be asked to users of the street. Upon the finalization of these methods, the walkability assessment concluded that the study area is not currently walkable as it lacks colour, artwork, greenery, and adequate seating. The survey resulted in similar conclusions, with the majority of users stating that they would benefit from more seating in the area.

The walkability assessment that was conducted consisted of factors to be determined based on complexity, human scale, enclosure, imageability and transparency. Each of these aspects were individually assessed and ranked to determine the walkability of the area. When tallied up, the walkability of the area was determined. Scores and specific results from each aspect are as follows:

Complexity is the measure of various items from the physical environment, including different types of architecture, design features, and landscaping. The assessment showed that the majority of the buildings colours in the study area were dull and unappealing especially during winter months when vegetation in the area is sparse and seems to blend into its surroundings (due to the lack of colour in buildings). There are currently only two main pieces of art located outside of the Weldon Law building and outside of the Kenneth C. Rowe Management building. Without visually appealing factors, the walkability of the area also decreases.
Complexity: 9.21

In human scale, physical elements are not limited to buildings in the area but also include trees, vegetation, and other visuals in the area. The study area has a good amount of vegetation within it. However, closer to Robie street we see the vegetation dwindle. This section of our study area is the main entrance to the university, and is unfortunately the least visually appealing place within our study area, decreasing the walkability of the campus.
Human Scale: -1.61

Enclosure includes long sight lines and proportions. The study area was difficult to judge in terms of enclosure as results varied throughout the walk-through. Building heights remain somewhat the same until the corner of University and Robie, which create the effect of an enclosed area which can result in poor walkability results. Sight lines in the area are blocked by trees surrounding and within the area, which can also result in poorer scores.
Enclosure: 0.42

The imageability of the study area resulted in quite low scores. This aspect focuses on defining features and the assessment proved to have little to none. While the area has a handful of courtyards and landscape features, there are no historic buildings and little outdoor dining features to attract pedestrians. Noise plays a role in imageability as well, which during our assessment was quite low due to the time of day, which was early on a Sunday morning.
Imageability: 13.03

The study area has a significant amount of windows and doors along street level, which is a contributing factor to high walkability. However, most windows and doors use reflective glass, which discourages viewing activities within the buildings. Small and medium sized trees within the

divider previously mentioned can disrupt the proposed transparent interconnectedness to the other side of the street resulting in a lower transparency score.

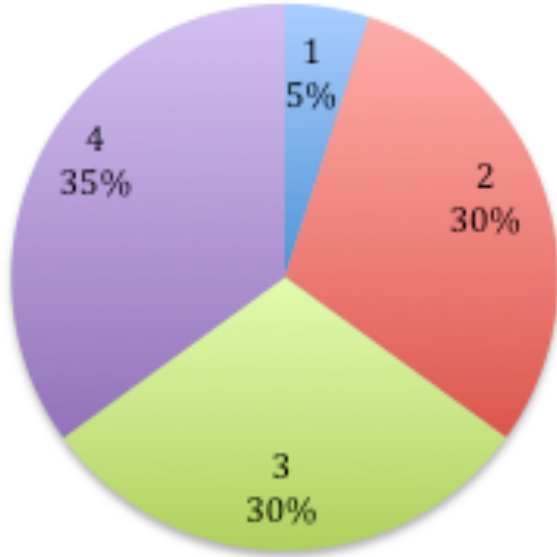
Transparency: 2.91

Overall Walkability Score: 24.96

The survey questions and results are as follows:

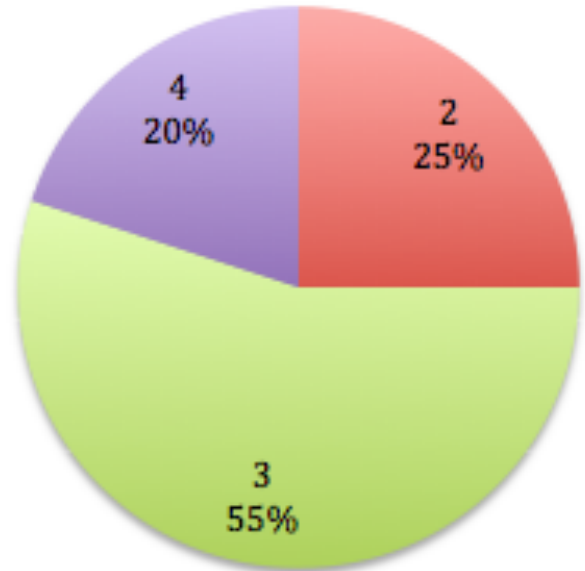
| | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q10 |
|-----|----|----|----|----|----|----|-----|----|-----|-----|
| P1 | | 4 | 3 | 2 | 2 | 3 | No | 3 | Yes | No |
| P2 | | 2 | 4 | 1 | 2 | 3 | Yes | 4 | Yes | No |
| P3 | | 4 | 3 | 2 | 2 | 3 | No | 4 | No | No |
| P4 | | 3 | 2 | 2 | 2 | 2 | Yes | 3 | Yes | No |
| P5 | | 4 | 3 | 3 | 2 | 1 | Yes | 2 | Yes | No |
| P6 | | 4 | 2 | 2 | 2 | 2 | Yes | 5 | No | No |
| P7 | | 1 | 3 | 4 | 2 | 3 | No | 2 | Yes | No |
| P8 | | 3 | 3 | 2 | 2 | 2 | No | 2 | Yes | No |
| P9 | | 2 | 3 | 2 | 1 | 3 | Yes | 2 | Yes | Yes |
| P10 | | 4 | 3 | 2 | 2 | 2 | No | 3 | No | No |
| P11 | | 2 | 4 | 5 | 3 | 1 | Yes | 3 | Yes | No |
| P12 | | 3 | 3 | 3 | 4 | 1 | Yes | 3 | Yes | No |
| P13 | | 4 | 2 | 1 | 3 | 3 | Yes | 3 | No | No |
| P14 | | 2 | 3 | 3 | 1 | 1 | No | 1 | Yes | Yes |
| P15 | | 2 | 3 | 4 | 2 | 1 | Yes | 1 | Yes | Yes |
| P16 | | 3 | 2 | 3 | 4 | 3 | No | 3 | No | No |
| P17 | | 4 | 4 | 3 | 2 | 2 | Yes | 1 | No | Yes |
| P18 | | 3 | 4 | 2 | 1 | 2 | Yes | 2 | No | No |
| P19 | | 2 | 3 | 4 | 2 | 1 | Yes | 1 | Yes | Yes |
| P20 | | 3 | 2 | 2 | 1 | 2 | No | 2 | Yes | Yes |

QUESTION 2



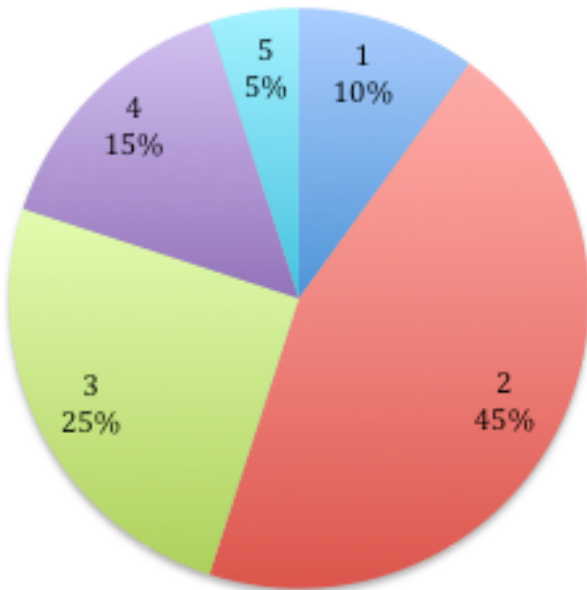
2. Do you think there is enough green space (including gardens and plants) in this area?

QUESTION 3



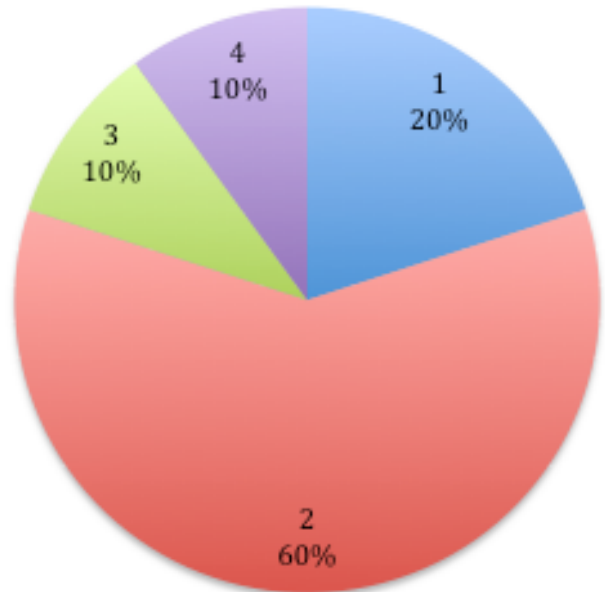
3. Rate the noise level of University Avenue.

QUESTION 4



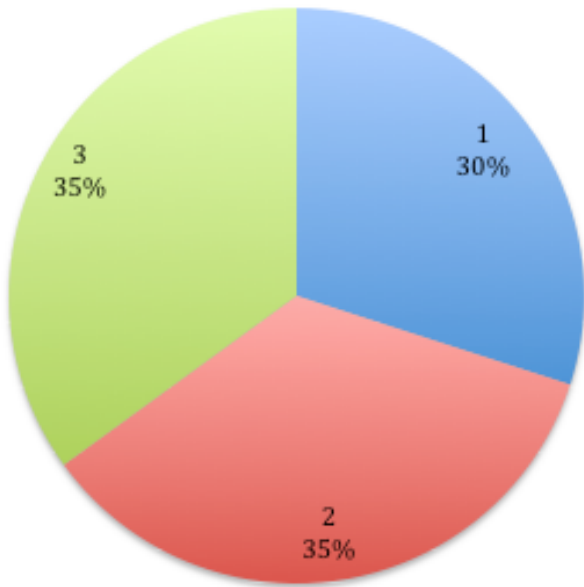
4 How enclosed or contained (such as in a box) do you feel in the area (due to building height)?

QUESTION 5



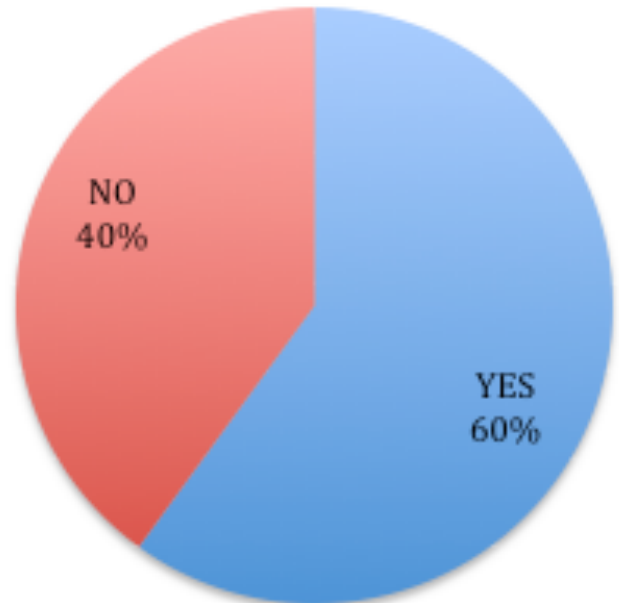
5. How aware are you of the windows at street level?

QUESTION 6



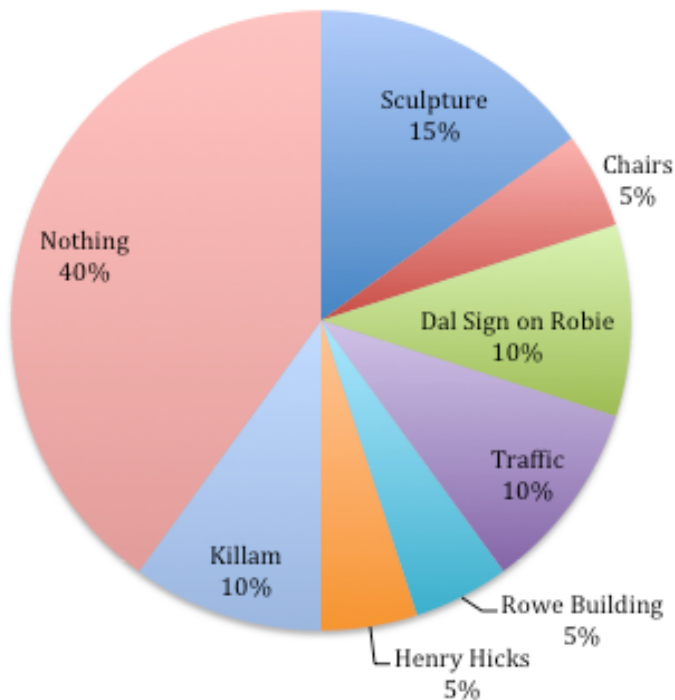
6. How colourful do you find University Avenue?

QUESTION 7



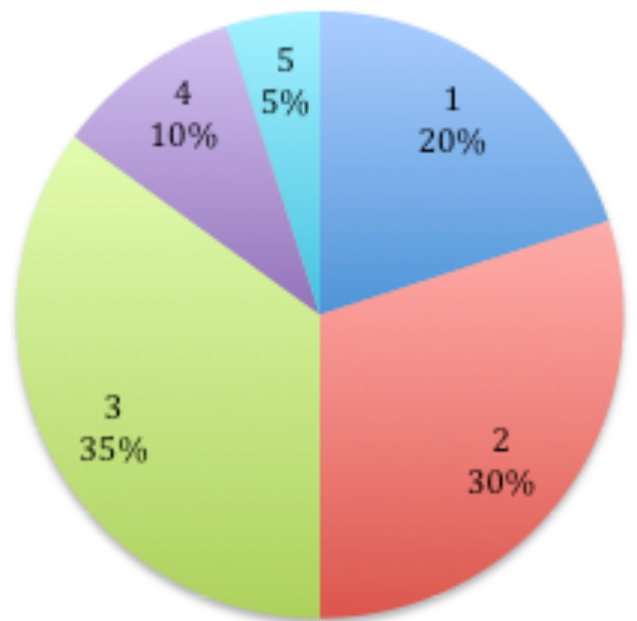
7. Do any features on University Avenue stand out to you?

QUESTIONS 7



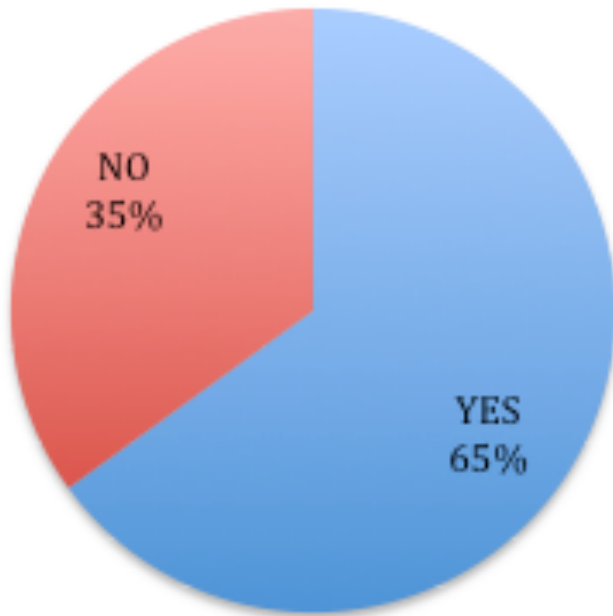
7. Do any features on University Avenue stand out to you?

QUESTION 8



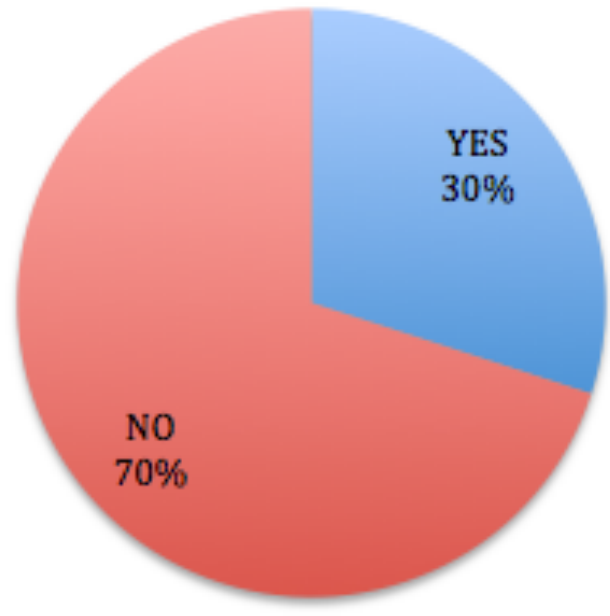
8. Is there an enough amount of seating on this street?

QUESTION 9



9. Would you benefit from more places to sit on University Avenue?

QUESTION 10



10. Has your perception of walkability changed?

DISCUSSION

The purpose of the research was to determine the walkability of the study area and to understand what the perception that those who use the street currently have on its walkability. This led to the second purpose of deducing whether or not changes need to be made to enhance the areas walkability.

Initial Assessment Discussion

The walkability assessment proved to have low scores for each of the criteria. This method was performed to gain a quantitative view of the study area, opposed to the second method used so that each aspect of the area would be fully understood and transparent. A main finding from this assessment was that the study area is extremely bland and becomes even duller in the winter seasons. This can lower the overall look of the street, resulting in a decreased overall walkability score, which is what the result was after performing the assessment. This assessment provided plenty of information to be used for the enhancement of the study area to improve its walkability. It was also noted that results of the assessment might differ according to season and time of day, as the street would become greener in the summer months and noise levels would be higher during peak school hours.

Survey Discussion

As the results show, question 1 was omitted during the evaluation of results as each response varied. It was noted however, that the majority of users specified that a main issue with the study area was traffic and that they did not feel safe with cars in the area, especially during

peak pedestrian hours (ie. 8:00 am – 5:00pm, Monday – Friday). This was a major finding in our research, as there was no traffic based questions within the survey, yet users of the street felt obligated to state that they felt unsafe with cars in the area.

Results from questions 8 and 9 showed that users feel the need for more seating throughout the street. There are currently clusters of colourful chairs along the street, but the survey results concluded that many people do not find this to be enough. With implementing more seating areas along the street, the walkability of the area will increase.

Question 7 has been broken down to further exhibit what stood out to users of the street. It can be noted that the majority of users had no object in particular that stood out to them, while other features that did stand out included: the sculpture outside of the Rowe Building, the Killam Library, the Dalhousie University sign at the intersection of Robie street and University avenue, the Rowe Building, the Henry Hicks Building, and the colourful seating. Another feature was traffic, which stood out to 10% of those who took the survey. This furthers the importance of traffic in the area and shows that many users would prefer to have the area closed off to traffic, especially during school hours. Along with these results, roughly half of those who took the survey believe that there are objects within the area that either stand out or are visually appealing. It is believed that with the incorporation of more artwork, users of the street will be more inclined to view the street as more walkable and a better place to be.

CONCLUSION

As a result of the research methods used, it can be concluded that there are numerous recommendations that can be made to enhance the walkability of University Avenue. It is recommended that the first step to continuing the study be to contact the head of sustainability at Dalhousie University to deem the project feasible or not. Second, it will be required to take the proposal to City Hall to have it approved. Specific recommendations to enhance walkability include the inclusion of more artwork. With this, there will be a greater amount of visually appealing aspects to the street, and sense of community will be created. The incorporation of more seating throughout the area will also improve walkability. As the results showed, traffic on the street was a large concern with many of those who took the survey. Since there were no traffic-based questions included in the survey, it can be deduced that many users view this as an important issue. Further research should be conducted on the possibility of closing the street off to traffic to see whether or not it would be feasible, or if a larger group would want to continue the research process. In regards to removing cars from the area, the University could also look into building parking in close proximity for those who may be inconvenienced, perhaps on one of the streets that join into University Avenue.

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ACKNOWLEDGMENTS

The researchers would like to foremost thank the individuals who participated in this research study without whom the study would not have been possible.

Secondly, we would like to thank our mentor Tim Cashion who provided use great assistance and guidance throughout the process and was always there to answers questions and concerns. Thank you for taking the time to read and review our work.

Thank you to Professor Hendricus Van Wilgenburg who supported our ideas and taught us about the importance of different methods for research and where to find academic sources.

Finally, thank you to Dalhousie University's College of Sustainability for facilitating the course, SUST 3502: The Campus as a Living Laboratory, without which we would not have had the opportunity to conduct this study.

Alix Tier, Carly Wiitala, Szeren Domokos
Walkability of University Avenue

APPENDICIES

Appendix A: Initial Walkability Assessment

| Imageability | Recorded Value | Multiplier | (Multiplier x RV) |
|--|----------------|------------|-------------------|
| 1. number of courtyards, plazas, and parks (both side, within the study area) | | | |
| 2. number of major landscape features (both sides, beyond study area) | | | |
| 3. proportion historic building frontage | | | |
| 4. number of buildings with identifiers (both sides within study area) | | | |
| 5. number of buildings with non-rectangular shapes (both sides, within study area) | | | |
| 6. presence of outdoor dining (your side, within study area) | | | |
| 7. number of people (your side, within study area) Walk through 1 | | | |
| Walk through 2 | | | |
| Walk through 3 | | | |
| Walk through 4 | | | |
| Total | | | |
| Total divided by 4 | | | |
| 8. noise level (both sides, within study area) Walk through 1 | | | |
| Walk through 2 | | | |
| Walk through 3 | | | |
| Walk through 4 | | | |

| | | | |
|--|--------------------|-------|--|
| | Total | | |
| | Total divided by 4 | | |
| Imageability Score constant +2.44 | add | +2.44 | |

Appendix B: Walkability Informed Consent



INFORMED CONSENT FORM

Project Title: The Walkability on Dalhousie Campus- Perceptions of Walkability vs. Walkability Assessment Results

We invite you to take part in a research study being conducted by Alix Tier, Carly Wiitala and Szeren Domokos whom are students at Dalhousie University, as part of their ENVS/SUST degree. 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 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 Alix, Carly or Szeren.

Who Is Conducting the Research Study

Conductors of the study include: Alix Tier, Carly Wiitala, and Szeren Domokos.

We hope to gain an understanding of how people view the study area (University Avenue between Robie and the Killam Library). This is a chance for the student body to provide us with feedback (according to our survey) on their views of this section of the campus.

Questions asked will require participants to answer honestly so that we can fully understand and compare with our own findings in that what needs to be done to make the study area more walkable. If you have any further questions relating to the overall approach of this study, please discuss these issues with either Alix, Carly or Szeren.

Who Can Participate in the Research Study?

You may participate in this study if you are a student at Dalhousie University. No other requirements will be necessary. There will be no screening activities about whom can participate.

What You Will Be Asked to Do?

To help us understand the walkability of the study area, we will ask you to complete a survey comprised of various questions detailing your experience in the area. You may complete the survey at the location or you may take your time to walk around and observe the area. This should take no longer than 10 minutes for the participant to complete. You as a participant will experience only your thoughts and perceptions that are specifically asked throughout the survey.

Possible Benefits, Risks and Discomforts

There are no discomforts related to our research question. If participants decide that questions are too “personal”, they are not obligated to complete the survey.

There is minimal risk in completing our survey. In no way should this study provide discomfort to you physically, emotionally, or psychologically. If it does in any way, please feel free to withdraw your participation immediately.

Participating in this study might not benefit participants directly, but it may expand your current knowledge on the topic of walkability.

Compensation / Reimbursement

To reimburse you for your time, we are providing candy. The conductors of this study will provide the reimbursement. You can choose to take the reimbursement or not.

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 within our final study proposal, in the forms of qualitative and quantitative research results. We will be very careful to only talk about group results so that no one will be identified. This means that **you will not be identified in any way in our reports**. The people who work with your information have special training and have an obligation to keep all research information private. Also, we will use a participant number (not your name) in our written and computerized records so that the information we have about you contains no names. All your identifying information will be kept in a separate file, in a locked cabinet, in a locked room. All electronic records will be kept secure in a password-protected, encrypted file on the researcher’s personal computer.

Confidentiality: Research participants should be informed how the data that they will be providing will be aggregately treated and stored on a password protected computer, and who will have access to it. There will not any limits to confidentiality imposed on the researchers drawing from this study. All results will be securely protected and stored within trustable and locked computers. The results of these surveys will stay never be exposed to any third-parties.

Anonymity: The researchers will ensure complete anonymity for participants whom will complete this survey. No participants will be identified in any reports or publications.

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. You can also decide for up to 1 month if you want us to remove your data. After that time, it will become impossible for us to remove it because it will already be analyzed and submitted.

How to Obtain Results

We will provide you with a short description of group results when the study is finished. No individual results will be provided. You can obtain these results by including your contact information at the end of the signature page following the completion of your survey. Results can be obtained in 1 month.

Questions

If you have questions about the research or about your role in the study, please feel free to contact Dr. Hendricus Van Wilgenburg either by telephone at (902) 678-3844, or by e-mail hwilgenb@dal.ca. This research has been reviewed and approved by the Dalhousie University's Environmental Science Program Ethics Review Committee and conforms to the standards of the Canadian Tri-Council Research Ethics guidelines. If you have any questions about this process, or about your rights as a participant in the study, please contact Research Ethics, Dalhousie Research Services, 5th Henry Hicks Building, Rm 231, Dalhousie University, PO Box 15000, Halifax, Nova Scotia B3H 4R2 (telephone 1.902.494.3423 or e-mail ethics@dal.ca).

Legal Rights and Signatures:

I _____, have had my questions answered to my satisfaction and consent to participate in the perceptions of Walkability on University Avenue at Dalhousie University study conducted by Alix Tier, Carly Wiitala

and Szeren Domokos. 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.

Appendix C: Survey Participant Signature Page 1

| | |
|--|----------------------------|
| <u>Signature</u> | <u>Date</u> |
| <u>Signature</u>  | <u>Date</u> March 21, 2014 |
| <u>Signature</u>  | <u>Date</u> March 21, 2014 |
| <u>Signature</u>  | <u>Date</u> March 21, 2014 |
| <u>Signature</u>  | <u>Date</u> March 21, 2014 |
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| <u>Signature</u>  | <u>Date</u> March 21, 2014 |
| <u>Signature</u>  | <u>Date</u> March 21, 2014 |
| <u>Signature</u>  | <u>Date</u> March 21, 2014 |

Appendix D: Survey Participant Signature Page 2

Signature _____

Date _____

Signature *Kiera J*

Date *March 21, 2014*

Signature *[Handwritten Signature]*

Date *March 21, 2014*

Signature *[Handwritten Signature]*

Date *March 21, 2014*

Signature *M. Alivi*

Date *March 21, 2014*

Signature *Jayden Khan*

Date *March 21, 2014*

Signature *[Handwritten Signature]*

Date *March 21, 2014*

Signature *[Handwritten Signature]*

Date *March 21, 2014*

Signature *[Handwritten Signature]*

Date *March 21, 2014*

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Date *March 21, 2014*

Signature *[Handwritten Signature]*

Date *March 21, 2014*

Signature *[Handwritten Signature]*

Date *March 21, 2014*

Signature *Megany Robert*

Date *March 21, 2014*

Signature *[Handwritten Signature]*

Date *March 21, 2014*

Appendix E: Initial Walkability Assessment

Imageability

| Imageability | Recorded Value | Multiplier | (Multiplier x RV) |
|--|-----------------------|-------------------|--------------------------|
| 1. number of courtyards, plazas, and parks (both side, within the study area) | 10 | 0.41 | 4.1 |
| 2. number of major landscape features (both sides, beyond study area) | 6 | 0.72 | 4.32 |
| 3. proportion historic building frontage | | 0.97 | |
| 4. number of buildings with identifiers (both sides within study area) | 11 | 0.11 | 1.21 |
| 5. number of buildings with non-rectangular shapes (both sides, within study area) | 6 | 0.08 | 0.48 |
| 6. presence of outdoor dining (your side, within study area) | 1 | 0.64 | 0.64 |
| 7. number of people (your side, within study area) Walk through 1 | 5 | | |
| Walk through 2 | 6 | | |
| Walk through 3 | | | |
| Walk through 4 | | | |
| Total | | | |
| Total divided by 4 | 5.5 | 0.02 | .11 |
| 8. noise level (both sides, within study area) Walk through 1 | 1 | | |
| Walk through 2 | 2 | | |
| Walk through 3 | | | |
| Walk through 4 | | | |
| Total | | | |
| Total divided by 4 | | -0.18 | -0.27 |

| | | | |
|-----------------------------------|-----|-------|-------|
| | | | |
| Imageability Score constant +2.44 | add | +2.44 | 13.03 |

Enclosure

| Enclosure | Recorded Value | Multiplier | (Multiplier) x (recorded value) |
|---|----------------|--------------------|---------------------------------|
| 1. Number of sight lines (both sides, beyond study area) | 6 | -0.31 | -1.86 |
| 2a. Proportion street wall (your side, within study area) | 2 | 0.72 | 1.44 |
| 2b. Proportion street wall (opposite side, within study area) | 2 | 0.94 | 1.88 |
| 3a. Proportion sky (ahead, beyond study area) | 1 | -1.42 | -1.42 |
| 3b. Proportion sky (across, beyond study area) | 1 | -2.19 | -2.19 |
| | | Add constant +2.57 | .42 |

Transparency

| Transparency | Recorded value | Multiplier | (Multiplier) x (recorded value) |
|--|----------------------------|-------------------|------------------------------------|
| 1. Proportion windows at street level (your side, within study area) | * need to re-do this value | 1.22 | 0 |
| 2. Proportion street wall (your side, beyond study area) | 1 | 0.67 | |
| 3. Proportion active uses (your side, within study area) | 1 | 0.53 | |
| | | Add constant+1.71 | 2.91 |

Complexity

| Complexity | Recorded value | Multiplier | (Multiplier) x (Recorded value) |
|--|----------------|--------------|------------------------------------|
| 1. Number of buildings (both sides, beyond study area) | 13 | 0.05 | .65 |
| 2a. Number of basic building colours (both sides, beyond study area) | 11 | 0.23 | 2.53 |
| 2b. Number of basic accent colours (both sides, beyond study area) | 9 | 0.12 | 1.08 |
| 3. Presence of outdoor dining (your side, within study area) | 2 | 0.42 | .84 |
| 4. Number of pieces of public art (both sides within study area) | 3 | 0.29 | .87 |
| 5. Number of walking pedestrians (1) | 7 | | .21 |
| 6. Number of walking pedestrians (2) | 11 | 0.03 | .38 |
| | | add constant | +2.61 |
| Complexity score | | | 9.17 |

Human Scale

| Human Scale | Recorded value | Multiplier | (Multiplier) x (Recorded Value) |
|---|----------------|--------------|---------------------------------|
| 1. number of long sight lines (both sides, beyond study area) | 6 | -0.74 | -4.44 |
| 2. proportion windows at street level (your side, within study area) | | 1.10 | |
| 3. average building height (your side, within study area) | 60ft | -0.003 | -.18 |
| 4. number of small planters (your side, within study area) | 0 | 0.05 | 0 |
| 5. number of pieces of street furniture and other street items (your side, within study area) | 10 | 0.04 | 0.4 |
| | | Add constant | +2.61 |
| Human Scale Score: | | | -1.61 |

Appendix 6: Walkability Survey

Date / Time:

1. What is your perception of walkability on University Avenue?
2. Do you think there is enough greenspace (including gardens and plants) in this area?(1 strongly disagree, 5 strongly agree)

1 2 3 4 5
3. Rate the noise level of university avenue (1 not loud, 5 very loud)

1 2 3 4 5
4. How enclosed or contained (such as in a box) do you feel in the area (due to building height)?

1 2 3 4 5
5. How aware are you of the windows at street level? (1 not at all, 5 overly)

1 2 3 4 5

6. How colourful do you find University Avenue ? (1 not at all, 5 overly)

1 2 3 4 5

7. Do any features on University Avenue stand out to you?

Yes No

If yes, please specify: _____

8. Is there an enough amount of seating on this street?

1 2 3 4 5

9. Would you benefit from more places to sit on University Avenue?

Yes No

10. Has your perception of walkability changed?

Appendix F: Preliminary Proposal

Preliminary Proposal



SUST/ENVS 3502: The Campus as a Living Laboratory
Professor Hendricus A. Van Wilgenburg
February 27th 2014

Group Members:
Alix Tier
Szeren Domokos
Darlynton Nonju
Carly Wiitala B00577686

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Project Definition:

One of the most utilized spaces on the Dalhousie University Studley campus is University Avenue, specifically between the Mark Hill Accessibility Centre and Robie street and thus it was selected as the street of focus for a case study focusing on walkability. This was done in order to determine the pedestrian experience on said campus, in addition to the variables affecting its current perception by the Dalhousie student body, personnel, and other users of the campus' street. This section of the campus was selected above others as there is space available to make adjustments if deemed necessary, and through direct observation it was determined to be one of the more utilized areas on campus.

The purpose of our study is to determine the current walkability of University Avenue based on a multitude of criteria surrounding principally the functionality and aesthetics of the street. Further, we aim to see if the implementation of strategic features such a public art would alter the perception of walkability and the street experience, further encouraging the street's use. Walkability is a measure that identifies the perceived friendliness, aesthetics, and safety of a space.

Through the use of direct observation, it is believed that the walkability of University Avenue is not currently being maximized and that through the implementation of certain aesthetic features, the users street experience could potentially be enhanced. This project will be approached both conceptually and geographically as certain features of the street will be address in particular, allow with the unique location of this street being on a university campus. As University Avenue connects both ends of the Studley campus, with many university buildings along it, it presents many unique qualities and potential that the surrounding streets on campus do not posses. By determining what makes University Avenue a popular walking route and what factors could potentially make it more walkable, this information could in the future be applied to surrounding campus streets, as well as those located on other Dalhousie University campuses.

By increasing the walkability of University Avenue through the implementation of different features, both practical and aesthetic, the intention is to increase the number of pedestrian users on University Avenue, decreasing the number of users of other modes of transportation on the campus itself. This will help with Dalhousie University's goals of creating a more sustainable campus and "develop sustainable solutions that will preserve our planet for future generations" (College of Sustainability, 2014).

Due to the timely nature of this proposal, and the climate dependent aesthetics of the University Avenue, the potential results and feedback the campus body presents in relation to this concern will be taken into consideration and measured accordingly. On this note, the seasonal variances in the walkability of University Avenue will also be taken into consideration as Halifax deals with this heavy variances in climate yearly. Weather resistant implementations will be further explored and considered

once the initial consultations with the campus body has been addressed.

Although the study is being conducted on a Dalhousie campus, any future decisions regarding physical features being proposed for the street will have to be done in conjunction with the Halifax Regional Municipality as they are the official proprietor of University Avenue. Working with the Municipality may in turn benefit the feasibility of potential future projects as they have the ability to employ many more resources than the university in a shorter timeframe.

If the Municipality is to take on the proposed project in conjunction with Dalhousie University, expending their resources to do so, it is believed that it would in turn benefit the HRM as a whole. On Studley campus, particularly along University Avenue, there are many buildings and lectures available to members of the general Halifax public. Creating a more walkable and aesthetically pleasing University Avenue will add another amenity added to the municipality allowing members of the community to benefit as well.

Overall, this project aims to transform University Avenue into a more walkable space, by foremost addressing perceived safety and aesthetics of the street by the street's users. By addressing this topic, the project aims to improve both these problems as improve the unique identity that University Avenue possesses. While achieving these goals, the amount of sustainable transportation seen on campus is expected to increase, continually exemplifying the commitment to sustainability of both Dalhousie University and the Halifax Regional Municipality.

Background & Rationale:

External Views and Opinions in Regards To "Walkability":

"Streets are some of the most valuable resource that a city has and yet, it's an asset that is largely hidden in plain sight" – Sadrik-Khan, 2013

With ever-increasing globalization, society always seems to be on the move now-a days, more than ever. This is why the ideology behind maintaining a health city is crucial for society. A healthy city can be coined as cities that are "liveable, equitable, and sustainable. They provide urban environments in which the built and natural environments support health, mobility, recreating, safety, social interaction, and a sense of pride and cultural identity that is accessible to all their populations" (Perrotta, Campbell, Chirrey, Frank & Chapman, 2012). Where is the one place within a city that the majority of people will interact with on a daily basis? The streets. This is why the concepts behind "walkability" have found an ever-increasing need to become recognized and attended to. Walkability should be seen as a key aspect within creating and maintaining a "healthy city." A growing body of evidence suggests "walkable and transit-supportive areas are healthier and more environmentally sustainable than non-walkable neighborhoods because they allow people to walk, bicycle and use transit more, and to drive less for their day to day trips" (Perrotta, Campbell, Chirrey, Frank & Chapman, 2012). Additionally, for a city to be termed as being "healthy", it goes beyond just the physical health. The action of "being healthy" includes a balance between mental, physical, emotional and cultural well-being. Therefore, by recognizing walkability as a main pillar of success to a healthy city, walkability can work to increase these other pillars of health as well.

The Forgotten Importance of Walkability:

Walkability is an important and crucial issue that needs to be investigated further because as walking can be seen as the corner stone of human movement, it has seemed to be neglected within recent urban developments. Historically, “almost all development in transportation technologies seems to have degraded the pedestrian environment. Roads have started to serve higher and higher-volumes of traffic, as a result leaving out pedestrian interaction and therefore; they have lost their human scale (Southworth & Forsyth, 2008). Walking seems to be one of the most important daily transportation interactions in which is often left invisible to many developmental planners.

Why is “Walkability” important to Dalhousie University?

As a concern for our environment has greatly increased, Dalhousie continues to strive for environmental and sustainable efforts through many campus initiatives and actions. Recently, in 2008, Dalhousie has established the College of Sustainability. The College of Sustainability at Dalhousie “acts as a focal point for Dalhousie’s scholars and students and members of the broader community, creating opportunities for synergies in learning, teaching, scholarship and community engagement” (Dalhousie University, 2014). The College works to focus on ideas that continually challenge and work to better our environment through the operations of Dalhousie. Walkability is something in which is in both the College of Sustainability and Dalhousie’s best interest to invest time, effort, and commitment to as it runs parallel to their obligations and interests. As Dalhousie is reaching a soaring 19,000 students as of 2014 (Dalhousie University, 2013), it is just as crucial to include these previously mentioned pillars of a “healthy city” to the Dalhousie community through the means of increasing campus walkability. Therefore, as the studies researched within this proposal, are generally related to cities, it can be said that the same significance of ideologies can be applied to the Dalhousie University campus.

Previous “walkability” studies and/or findings conducted:

Within the past few months, New York’s Time Square has undergone a mass “walkability” undertaking. They have recognized that the design of cities is a key issue for our future. In 2007, the plan, “Plan NYC” recognized that “cities are in a global market place and that if we are going to continue to grow, thrive and attract many more residents to our cities, we need to focus on the quality of life and the efficiency of our infrastructure” (Sadik-Khan, 2013). The planning committees of New York have been working hard to refocus their agenda to maximize efficient mobility, maximizing more room for buses, bikes, more room for people to enjoy the city (Sadik-Khan, 2013).

As mentioned previously, that walkability is often left invisible within streets, this case study in New York had recognized this flaw and used this as their pillar to bring about change. They have also recognized that “the design of a street can tell you everything about what’s expected on it” (Sadik-Khan, 2013). In addition, New York planning committees confirmed the fact that today the design of a street is to maximize cars and it misses all the other ways the street is used (Sadik-Khan, 2013). They produced a 6-month pilot closing Broadway from 42-47th space, creating two and a half acres of a new pedestrian space (Sadik-Khan, 2013). Then if there were positive impact branching from this, then they would get to keep this public space. Immediately, people had gravitated to this new public space and began to enjoy it.

The public space interaction had even engaged working closely with local business to whom have volunteered to maintain the spaces, move the furniture, maintain the plants, etc. because they realize the sense of community in which this environmental brings about, and in their case, in turn benefitting their business sales (Sadik-Khan, 2013). The public spaces committee moved very quickly when working to get this project rolling. They have used paint and temporary materials instead of waiting years to test options on analytical data models. And therefore, the success of the project is not in a computer model, but rather in the real-world performance of the street (Sadik-Khan, 2013). Through these increased walkability measures, there has been real tangible evidence of success deriving from this such as, the first parking protected bike lanes to ever happen in the U.S., injuries fell 50%, and an increased of 350 miles of bike lanes were built (Sadik-Khan, 2013). All in all, the conclusion that can be drawn out from New York is that, “is it possible to change your streets quickly, it’s not expensive and it can provide immediate benefits. You just need to reimagine your streets because they are hidden in plain sight” (Sadik-Khan, 2013).

Some of the most remarkable features of this project were the achievement of very successful results with very limited funds, time, and materials. Although, this project was achieved at a much larger space and capacity, it is one that could be easily and effectively modeled after. Many aspects of this project could be used to successfully implement on Dalhousie campus. Please see Appendix 1,2, and 3 to see some of the featured photos of the public space in chairs, the results from opening up this public space, and the final edit of the closing of Times Square.

Current Gaps Within The Literature:

Within the current literature, there are many journals that fail to incorporate or produce studies on the ideas of “walkability” on university campuses in general. It was very easy to find information pertaining to cities and towns, but even cities with universities in them, there was no mention of it. Also, after countless searches, it was very difficult to locate academic literature pertaining to existing studies about the importance of walkability for the *overall health* of a city. Many of the results connected the ideologies about walkability to very specific physical issues such as diabetes and heart or lung problems. Unfortunately, these limitations have ultimately found it difficult to find concrete academic evidence to back up this project. In the future, other avenues of research will take place such as different books, journals, magazines, and films.

Proposed Research Methods:

After considering the best possible way to approach our study, it has been determined that both quantitative and qualitative research will need to be used. These methods will consist of surveys, walkability assessments, analyses and interviews with those who are in charge of the campus’ sustainability. Since the study of walkability requires both student participation and inclusion in decisions, we need to determine what their wants would be to provide a more walkable street.

In order to fully comprehend the amount of research needed to further the want for an incorporation of a walkable area, initial research methods have been utilized. Each group member has taken a walkability assessment as an initial research step to determine the

different factors that contribute to the walkability of our study area. The components of the walkability assessment include human scale, which is the physical aspects of the elects in the area, complexity which is the visual appeal of the street and its surroundings. Transparency is the degree to which people can see or perceive what lies beyond the edge of a street or other public space, enclosure s the degree to which streets and other public spaces are visually defined and finally, imageability which is what makes the place distinct and recognizable. Each of these are highly important aspects to consider when determining the walkability of a space. Our results in each of the contributing factors are as follows:

Human Scale:

In human scale, physical elements are not limited to buildings in the area but also include trees, vegetation, and other visuals in the area. Our study area showed that there is a good amount of vegetation separating the left and right sides of University. However, the divider closer to Robie Street has hardly anything within it and is not being utilized properly or to its full potential to increase the walkability of the area. Suggested alterations of this section include transforming the area into a community garden, a lounge space (in the summer) complete with trees and other vegetation to help students study, or other ideas. This section of our study area is the main entrance to the university property. Unfortunately, this is the least visually appealing place within our study area and decreases the walkability of the campus.

Complexity:

Complexity includes various items from the physical environment, including different types of building architecture, design features and landscaping. It was noted that the majority colours of the buildings in the study area were dull and unappealing especially during winter months when vegetation in the area is sparse and seems to blend into its surroundings (due to the lack of colour in buildings). Public art is not a major aspect of the study area. There are only two main pieces located outside of the Law building and outside of the Rowe. We believe that the incorporation of sculptures, gardens, or some sort of artwork would help the area to become more walkable and aesthetically pleasing.

Transparency:

Transparency includes physical elements such as walls, windows etc. The model that we followed during our assessment suggested that the ability to see into buildings and having human activity along the street are both contributing factors to the perception of transparency. It was noted that our study area has a high amount of windows and doors along street level. However, difficulties with this aspect of the walkability assessment included that while the windows in our study area were on street level, most of the buildings used reflective glass which discouraged viewing activities happening inside buildings. Small and medium sized trees within the divider on University can disrupt the proposed transparent interconnectedness to the other side of the street. It has been stated “streets with many entryways contribute to the perception of human activity beyond the street, while those with blank walls and garages suggest that people are far away (Spooner, 2011). We suggest that Dalhousie needs to implement more active design uses by creating more bike lanes. This would be beneficial because history has shown that environmental design can play a large role in improving public health. This would not only benefit students, but local residents who use University Avenue as well since the Nova Scotia Public Archives and the Hospital are both on this street.

Enclosure:

Enclosure includes long sight lines and proportions. The study area was difficult to judge in terms of enclosure because results varied throughout the walk-through. Building heights remain somewhat the same until you reach the corner of University and Robie, which creates the effect of an enclosed area which can result in poor walkability results. Sight lines in the area are blocked by trees surrounding and within the area, which can also result in poorer scores.

Imageability:

The imageability of the study area was quite low on our walkability assessment since imageability focuses on defining features of an area and there are no “wow” factors in the area. While the area has a handful of courtyards and landscape features, there are zero historic buildings and little outdoor dining features to attract pedestrians to. Noise plays a role in imageability as well, which during our assessment was quite low due to the time of day, which was early on a Sunday morning. Noise levels will change during the week depending on concerts, pedestrian levels etc.

Surveys & Other Methods:

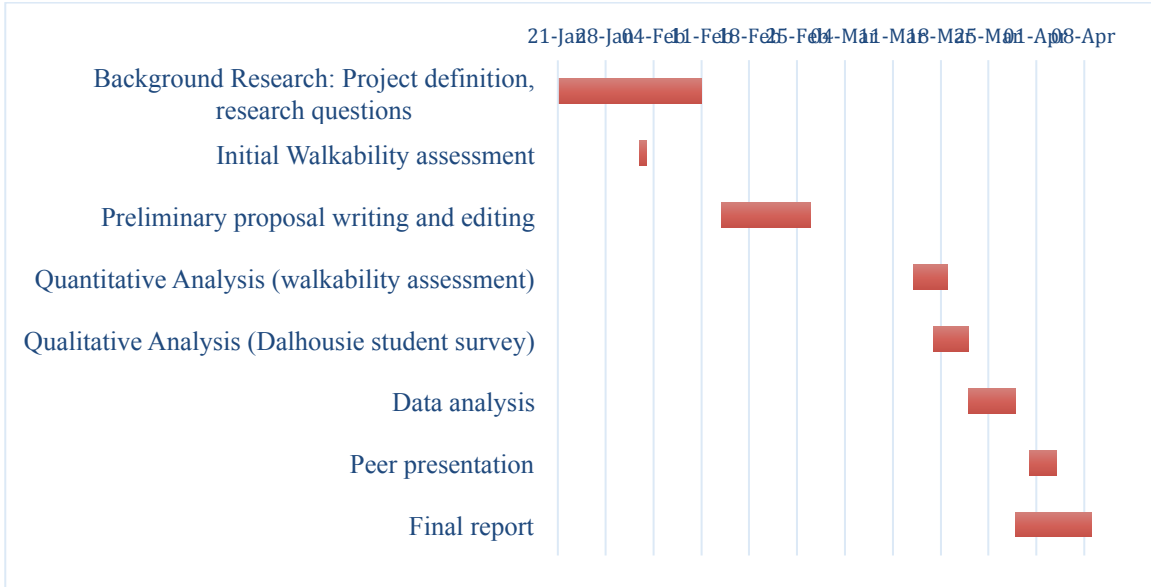
We intend to provide a questionnaire to students who regularly walk along our study area to determine whether or not they view the street as walkable or not. The group of students will be required to not have any prior knowledge to the topic to remain unbiased. Names of students will not be required, nor will any personal information on those taking the survey. Our main objective for participants is to see how often they are in the area followed by the questionnaire. An ethics review will need to be created for this as we plan to further our survey answers with interviews with the university’s sustainability department heads to determine feasibility of our goals. Upon concluding our findings from students and professors, we will have furthered our knowledge and understanding of what users of the area find beneficial to create a more walkable environment.

Another research method that we would like to look into is the use of GIS. This could help us view the ranking of other universities walkability. By using GIS, we could determine the proximity of Universities to landscape features, streets, tourist attractions etc. With this, we would like to contact certain members of the sustainability departments of other universities to further understand and conclude what needs to be done in our study area. Since Halifax is an Urban area and our study area intersects with a main street it will be beneficial to research other urban areas as well opposed to simply focusing on walkability information found from universities.

Limitations & Delimitations:

Limitations of our research methods include the time of day and time of year. The area will become busier with higher pedestrian traffic throughout the school year while during the summer months and vacation periods, the area will be used less often. Delimitations of our study is the participation of students to participate in our surveys. However, results will vary on how students perceive the study area depending on questions asked. Questions posed will include various time formats to best provide accuracy with relation to season and time of day. We expect for students to be encouraged by our survey so that we gain a better understanding of how others view the area and whether they view it as walkable or not. Definitions will be provided so to disregard a lack of understanding as a limitation.

Schedule:



Detailed Budget:

A budget will not need to be considered until further stages of the proposal have been implemented. If the proposal is accepted, costs of vegetation, sculptures, and street furniture will need to be considered. Research methods pose budgetary limitations as we will be asking students who are willing to answer questions and therefore payment is not required.

It is possible that funding could come from the school of sustainability, however we will be required to further look into who could fund this project. It could be beneficial for the government and university to provide funding, as having a walkable area on campus and in the HRM could give people a positive outlook on the city.

Sculptures and Art Pieces:

It is believed that students could be asked to design public art pieces for the area and therefore payment for these pieces would not be required as they would be provided out of the students own free will.

Sculptures (if needed) will pose more of a budgetary restraint as materials and shipping would end up costing more. It is possible to find people or companies who are willing to donate sculptures or funding to the cause, however more research would need to be done to determine who could play this part. We can not yet determine costs of sculptures as it has not been concluded of whether or not we will require them as we have posed less costly options.

Flowers:

On average according to Halifax Seed, flower seeds range from \$1.00 - \$4.00: We believe that this is a small sacrifice to our budget in order to provide a garden within a divider in our study area. Since the prices of these seeds are so low, the incorporation of many different types of plant species and colours would be more feasible and would increase the walkability of the area.

Community Garden:

Vegetable seed prices differentiate depending on whether or not it is sold as a bulk item or not (Halifax Seed). Proposed community garden contents with their prices have been detailed below to provide a general idea of what the community garden would cost:

| |
|---|
| Carrots: \$2.99 / packet |
| Corn: \$7.95 / 125 G |
| Pumpkin: \$1.99 / packet |
| Tomatoes: \$1.99/ packet |
| Cabbage: \$1.99/ packet |
| Broccoli: \$1.99 / packet |
| Green Beans: \$1.99 / packet |
| Rhubarb: \$8.95 / 1 root |
| Strawberries: \$15.95 / bundle (1 bundle = 25 plants) |

These prices would vary, depending on what students wanted to plant. However, they would be limited to their choices depending on the budget. Other costs pertaining to the community garden are as follows (Canadian Tire Pricing):

| |
|---|
| General Gardening Shovel: \$11 |
| Fertilizer: \$17 |
| Other tools such as watering cans or gloves (optional): \$5 |

A budget of a minimum of \$1500 would suffice to purchase seeds, fertilizer and tools with an extra \$100 each year for maintenance. Maintenance would include new fertilizer, potential fencing or protectors, or new seeds. It would be ideal for students to actively participate

Project Deliverables:

This proposed project contains two deliverables: the results of our quantitative and qualitative analysis, and a poster presentation of our studies amongst peers (classmates).

The qualitative study (University avenue walkability assessment) and the quantitative (Dalhousie student survey) will both contain vital information that the client, department of sustainability can use to make informed decisions about which section of the Dalhousie University avenue needs improvement and what necessary upgrades are required to foster increased street walkability perception and actual street safety. The information from both studies we conduct will be delivered through tables and figures (graphs, charts). This data will show the current walkability status of our study site (Section of University Avenue between Le Merchant Street and Robie Street). Data from the student survey will provide the client with valuable information with regards

to pedestrian route choice, perceived pedestrian safety, and students' tendency to drive as opposed to walking along University Avenue during peak and off-peak times on campus. Data from the walkability assessment will provide the client with information regarding sidewalks, lighting, streetscapes, street visibility, aesthetic quality, and the actual walk score of this section of the University Avenue.

The second deliverable, the poster presentation, will offer us the opportunity to explain the result of our findings and possible recommendations to the client. The client requested that the poster should encourage reducing the University's ecological footprint and fostering a sustainability goal in the mind of students and staff of the institution. The project aims to create a poster that can be used in future development strategies on campus. The project will therefore be easy to conform to and be able to stand the test of time.

Project Communication Plan:

Introduction & Background:

The purpose of this project communication plan will ensure the project can be carried out from start to finish in a consistent, effective, and timely manner. This project communication plan will be the responsibility of everyone within the group. This plan will assist all group members to enhance communication strategy and delivery throughout the project.

Team Group Members:

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Darlynton Nonju
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Communication Objectives:

Awareness:

- Ensure all group members are aware of upcoming due dates and meeting times
- Ensure that communication is shared in a timely manner
- Ensure all group members are aware of individual schedules and time conflicts

Interaction:

- Coordinate communication between all group members on a daily basis
- Include all members of the project to ensure everyone is always on the same page
- Keep lines of communication to more than one method (i.e., telephone, social media, face-to-face, etc.)

Effectiveness:

- Conduct regulation review of project deliverables and Gantt schedule.
- Communication must focus on all members of the group in order for it to be effective.

Target Audience:

The target audience of our group will be members of the Dalhousie community, students, faculty, members, residents and business owners of the Halifax Regional Municipality (HRM)

Communications Tools:

In order to effectively produce a successful project, as a group, there will be certain tools in which will help to keep everyone on task and motivated. Some of the main ones that we will use

internally among all group members will be social media, Skype meetings, email, telephone, and face-to-face interactions. In order to communicate our project results to both the T.A. and the professor will be email and face-to-face interaction. By using communication tools effectively it allows for project completion to occur in a timely, organized, and thought out way.

Timetable:

Please see above for included Gantt chart.

Measurement of Efforts (Evaluation):

In order to keep track of our efforts and evaluate our overall communication effectiveness, there will be two weekly meetings, one in class time and one outside of class time.. By having two weekly meetings, this will ensure two opportunities for meeting times in case one member is absent from one. This allows for no group member to fall behind schedule

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