The Intersection of Interaction Pattern Design & The University of Washington

Kay Waller | 10 June 2019

Summary
This study applies the principles of Interaction Pattern Design Theory, coined by Kahn, P. H., Jr., Lev, E. M., Perrins, S. P., Weiss, T., Ehrlich, T., & Feinberg, D. S. (2018) in Human-nature interaction patterns: Constituents of a Nature Language for environmental sustainability. Field study and interview research across various sites on the University of Washington (UW) campus revealed a set of interaction patterns at each site. Analyzing these for their wildest forms led to informed redesigns of the spaces. The redesigns are then generalized to create a set of guidelines for designing public spaces on college campuses. This work aims to increase the quality of nature interactions around college campuses to promote the health and productivity of students. See more on the role of nature in health in Frumkin, H., Bratman, G. N., Breslow, S. J., Cochran, B., Kahn, P. H., Jr., Lawler, J. J., Levin, P. S., Tandon, P. S., Varanasi, U., Wolf, K. L., Wood, S. A. (2017) on Nature contact and human health: A research agenda.

Introduction
This study applies the principles of Interaction Pattern Design Theory, coined by Kahn, P. H., Jr., Lev, E. M., Perrins, S. P., Weiss, T., Ehrlich, T., & Feinberg, D. S. (2018) in Human-nature interaction patterns: Constituents of a Nature Language for environmental sustainability to various sites around the UW campus. After reading Human-nature interaction patterns, I was inspired to see how the theory could be applied to improve student health and wellbeing around campus. Based on a 2017 National College Health Assessment, 48.2% of students said that anxiety was their top concern while attending college (LeViness, P., Bershad C., Gorman, K., 2017). With the positive impacts of nature on human health and productivity long established, I was curious as to how I could increase the quality of nature interactions to improve the above statistics (Frumkin, H et. al, 2017).

Thus, my central design question was: How can we employ Interaction Pattern Design principles at various sites around the UW campus to increase the quality of nature interactions and therefore foster student wellbeing?

Other questions guided my research and my interaction pattern analysis:

- What interaction patterns are currently occurring at each of the sites? How, when, and with whom are they occurring? (Kahn et. al, 2018).
- What features at the sight promote quality interactions? Which ones do not?
• What nature interaction patterns are valuable to students?
• How might we redesign various sites on the UW campus to increase the quality of nature interactions?
• How might we create a template for college campuses that facilitates various nature interaction patterns?

Method
Conducting Research

The research questions were investigated in relation to three sites on the UW campus: The Drumheller Roses, The Quad, and Red Square (Appendix B). These three sites were chosen because of their varying nature levels. Red Square is nearly completely devoid of nature except for a couple trees lining the south side. The Drumheller Roses contain slightly more nature including a pop of color but are hardly present in a student’s daily activities. The Quad has the most existing nature and is well known for its grassy spaces and cherry blossom trees.

I conducted a 30-minute observation at each of these sites to understand what type of interactions were occurring at the site, with whom, and when (Appendix C). To follow up my observations, I conducted eight of what I call “blitz interviews.” I reached out to eight unique people per site and asked them three to five questions over text if they consented to participate. I wanted to understand how individuals used the sites or why they did not. Although the questions varied slightly from site to site, the main three questions were: How do you feel about the site? What interactions do you have at the site? Is there anything you would change about the site, if anything? Because the screenshots contain the participant’s names, I have elected not to include them in the appendices for privacy reasons.

Coding Interaction Patterns

The first step to data analysis was coding the observation notes for each site into interaction patterns (Kahn et. al, 2018). Writing in the margins of the sketchbook, I was able to code nearly every observation into a broad interaction pattern that occurs on a spectrum of domestic to wild. For each site, I compiled the patterns in an Excel sheet and recorded their frequency (Appendix D). I analyzed my interview data for pain points and frustrations, applicable suggestions for improving the space, and any sentiments that stood out to me. Any interaction patterns contained in the interview screenshots were added to the existing interaction pattern list.

Analyzing Interaction Patterns for Their Wildest Form

Once all the data was compiled, I began to analyze the interaction patterns and the point on the domestic to wild spectrum at which the interaction took place (Kahn et. al, 2018). For each interaction pattern I noted the wildest instantiation of that interaction, taking into consideration the affordances of the site. For example, the wildest instantiation of Walking Along the Edges of Nature could be scaling a mountaintop, but factoring in affordances of the site makes the wild instantiation more applicable. I did this for every pattern, then compared the current interaction with the wildest instantiation. If they matched, I focused on encouraging that interaction through
my redesigns. If they did not match, I brainstormed redesign features that included the wildest instantiation of this pattern. When the analysis was finished, I had a complete list of interaction patterns per site and redesign suggestions that followed the principles of Interaction Pattern Design (Kahn et. al, 2018, Appendix D).

**Results**

*Drumheller Roses*

The Drumheller Roses are currently split into two sections, one on each side of the north end of the fountain (Appendix B, Figure B1-B3). The UW has strict rules about touching and interacting with the roses, and thus they are protected by a barrier of shrubs (Appendix B, Figure B1-B3). Although I understand why the UW protects the roses so fiercely, I believe that a design that has both rose security and meaningful interactions exists.

The most common interaction pattern I noticed was *Walking Slowly Around Nature/Taking the Time to Look at Nature* (Appendix D). Individuals would occasionally walk slower with their head turned towards the roses when passing, and many individuals stopped at the shrub barrier and surveyed the roses (Appendix C). *Documenting Nature*, also a common pattern, was mostly comprised of individuals taking pictures of the roses. This pattern directly corresponded to *Leaning Against Nature*, as individuals would lean into the shrub barrier trying to get as close as possible to the roses (Appendix C). *Walking Along the Edges of Nature* was also a common pattern, and some individuals would walk against traffic just to walk by the roses (Appendix C). Overall, there were very little interaction patterns that dealt with senses other than sight. One participant said she touches the roses when they are close enough to the shrub barrier, and three interview participants said they smelled the roses occasionally (Appendix D).

Interview participants had positive remarks towards the roses when asked how they felt about them (Appendix D). However, when asked what interactions they had with them, few went beyond “I look at them.” Based on this qualitative data and the interaction patterns largely devoid of any sense other than sight, it was clear that by Interaction Pattern Design standards the Drumheller Roses do not play a large part in student’s lives.

I sought to change this in my redesign, and my central question was: How can we improve accessibility of the roses so that students can fully enjoy them? To answer this question, I attempted to design every interaction at its wildest form. For example, *Walking Along the Edges of Nature* is at its wildest form when there is nature on as many sides as possible. Thus, in my redesign I tried to have nature on at least two sides at every point in the space. To encourage *Smelling Nature*, the shrub barrier decreased in width. The barrier still sends the same message of security, but no longer hinders quality interaction with the roses. For *Walking Slowly Around Nature/Taking the Time to Look at Nature*, I tried to design paths that turned frequently to encourage individuals to slow down and look at the nature in front of them. Perhaps the biggest change I made for that interaction pattern was the inclusion of seating, which also increases the interaction pattern *Sitting on a Raised Edge Near Nature*. By designing features that enable
individuals to spend time in the space (benches, tables, etc.), they will be more likely to spend time in nature.

Based on these patterns, I submit the following redesign of the Drumheller Roses (Figure 1):

*Figure 1: Redesign sketch of the Drumheller Roses*

Splitting up the roses into smaller sections increased interaction patterns *Walking Along the Edges of Nature*, *Referencing Nature*, *Viewing Nature from Multiple Perspectives*, and *Touching Nature*. The grass ledge, picnic tables and benches maximize interaction patterns *Sitting on a Raised Edge Near Nature*, *Utilizing Nature as a Spot to Pause* and *Utilizing Nature as a Meeting Point*. This redesign plays with height differences which creates visual interest and the ability to interact with nature at every level. Someone walking on the path above will have the roses at waist level, perfect for viewing. Individuals below can turn around and see the rose bushes from a different angle and touch the dirt, which also increases *Viewing Nature from Multiple Perspectives*.

Overall, I believe the redesign creates a dynamic and accessible space that accentuates the roses instead of trapping them. Through Interaction Pattern Design, individuals can experience the roses instead of just viewing them from behind a barrier. The space surrounding the roses has been redesigned to foster interactions as well, so the Drumheller Roses have the potential to become a hang-out spot for students.
The Quad

The Quad is known for having open grassy areas and beautiful cherry blossoms that draw huge crowds when they bloom in the spring (Appendix B, Figure B4-B5). The space also holds large amounts of traffic during passing times, and the webbed paths crossing in every direction enable students to travel quickly.

I expected The Quad to have interactions that were already at their wildest instantiations. For the most part, this was true. Patterns Sitting in Nature, Laying in Nature, Feeling Light on Skin, Using Nature to Find Respite from Nature and Leaning Against Nature all seemed to be at their wildest instantiation based on the affordances of the space (Appendix D). Students were sitting and laying in the grass, utilizing both sun and shade spots (Appendix C). Interacting with Others in Nature was a frequent pattern, and many students were walking, taking pictures of, or petting dogs (Appendix C). Sitting on a Raised Edge Near Nature was also a common pattern, as there were eight benches around The Quad that were all occupied (Appendix C).

Based on the observations, The Quad seemed to satisfy Interaction Pattern Design requirements. Interviews revealed that participants had emotional connections to The Quad, and half the respondents said that the space made them happy and relaxed (Appendix D). However, when asked about their interactions in The Quad, participants said that the time they spend there is mostly comprised of going to class. I was intrigued by this disconnect, and my guiding question for the site redesign was: How might we redesign The Quad to be a destination that is visited beyond cherry blossom season and despite an individual not having class there?

For my redesign, I tried to maintain what students loved about The Quad: its large, open, grassy areas and the cherry blossom trees. I focused on improving the patterns Utilizing Nature as a Meeting Point, Sitting in Nature, and Using Nature as Respite from Nature. The UW campus is largely devoid of outside areas that provide some shelter from the eight-month rainy season. This means that all the interaction patterns I just observed only occur during those four months, two of which are summer break. In my redesign I focused on improving the accessibility of The Quad during other months, focusing on respite from nature.
Based on these considerations, I submit my redesign for The Quad (Figure 2 and 3):

**Figure 2:** Redesign sketch of The Quad (Aerial)

**Figure 3:** Redesign sketch of The Quad (Detail)

The interaction pattern *Sitting in Nature* is improved by the bench (see Appendix F, Figure F4 for inspiration and description of use), the seating underneath the pergola, and the seating around the tree. Although a pergola is not exactly the wildest instantiation of *Using Nature to Find Respite from Nature*, I believe that designs are only strong if they are utilized. Knowing what I know about me and my friends, no one will frequent The Quad for meaningful interaction if they must sit in the rain or wet grass. Based on this, my compromise is a pergola—open to the air, wind, and grass but closed from the rain above. *Utilizing Nature as a Meeting Point* is improved by both the pergola seating and the benches in the middle of The Quad. The table and bench surrounding the tree facilitates sight, touch, and smell of the tree, simultaneously providing students a spot to do homework.

Overall, my redesign does not change much. I found quality interactions exist in The Quad, especially with Others. The Quad facilitates sight, touch, and smell (of the fresh air), and I maintained these interactions by keeping both the large, grassy areas and the open feeling. My redesign focuses on encouraging students to come to The Quad despite the weather.
Red Square

Red Square is a vast, brick covered square that has entrances to four main buildings and is a main thoroughfare for students traveling to and from classes (Appendix B, Figure B6-B7). Registered Student Organizations (RSO’s) table there, and the square is a hub for activity. Despite this, the square is almost completely devoid of nature except for seven trees clustered near Gerberding Hall.

There was little to observe in Red Square in relation to nature interaction. Choosing the Nature Route, Documenting Nature, and Taking Time to Look at Nature all happened with respect to Mount Rainier, which can be seen from the steps of Red Square in between Suzzalo Library and Gerberding Hall (Appendix C). The two nature interactions that happened in Red Square, Sitting on a Raised Edge Near Nature and Finding Solace in Nature were both referring to students sitting on benches underneath the large trees in front of Gerberding Hall (Appendix C). The other interactions I observed were Utilizing Space as a Meeting Point, and Laying/Sitting Down on a Raised Edge. RSO’s were tabling, and friends would congregate around their booths. Additionally, the platforms in the middle of Red Square were normally frequented by three or four students sitting or lying down (Appendix C).

All the interview participants said they did not spend time in Red Square when asked. Instead, they referenced The Quad as a place they would spend time in. When asked why, the responses centered around the barrenness, lack of seating, and the feeling of being exposed. While asking for redesign suggestions for the other sites, many participants declined to respond because they did not have any suggestions. With Red Square, only two declined to respond. The rest were adamant about adding places to sit, trees, grass, and flowers to break up all the brick.

Based on these strong reactions, my redesign question was: How can we maintain the functional necessities of the space (large thoroughfare) and preserve the energy and life of the space while adding meaningful nature interactions? I wanted to increase Interacting with Others, so I knew I needed large grassy spaces where Others could congregate. I wanted to extend Sitting on a Raised Edge Near Nature beyond just a couple benches beneath the only trees in the square. This pattern, coupled with Utilizing Nature as a Meeting Point, and Laying in Nature were the reasons for the increased seating. For the Taking Time to Look at Nature pattern, I wanted to focus on having nature on all four sides at every point in Red Square. Specifically, I wanted to ensure that every path was flanked by nature.

Because Red Square has virtually no nature interactions in its original form, I viewed its redesign as a blank canvas. Thus, I submit my redesign for Red Square (Figure 4):
Figure 4: Redesign sketch of Red Square

My redesign focuses heavily on landscape design that employs Biophilic Design principles as laid out by Kellert, S. R., Heerwagen, J. H., & Mador, M. L. (2008) in *Biophilic Design*. The grass bench (Detail D) was inspired by Figure F3 in Appendix F. This bench maximizes *Sitting on a Raised Edge Near Nature* as there is nature at multiple levels to interact with. The seat level grass encourages students to interact with the grass via touch, providing a much more meaningful interaction than just viewing nature from a raised edge. The grass nook (Detail E) plays with height differences in large, grassy areas. The space declines gradually the closer you get to the middle of the grassy area. Each seating area is in a grass alcove, with grass behind, above, in front, and below the students sitting in the chairs. This feature encourages *Utilizing Nature as a Meeting Point*, *Sitting on a Raised Edge Near Nature*, and *Using Nature to Find Solace*. The alcoves provide some privacy and were meant as a point for personal introspection or quieter meet ups. The bench (Detail A) is a similar feature to what already existed. However, adding much more of these offers more spots for *Using Nature to Find Solace*, and *Sitting or Laying on a Raised Edge Near Nature*. It also maintains the opportunity for *Using Nature to Find Respite from Nature*, as the large trees the benches are placed beneath offer shade. The grassy stairs (Details B and C) are based on Figures F1 and F2 in Appendix F. They are based more on aesthetics but create the feeling the nature is ubiquitous.
Overall, the large pathways are maintained to support Red Square as a thoroughfare. The little red dots in the redesign sketch are crumbled up Red Square brick. One interview participant said she enjoyed the history of Red Square, and I wanted to pay homage to what Red Square once was in my redesign. Thus, the smaller paths that weave in and out of the grassy areas are Red Square brick gravel. Large grassy spaces are also left open for RSO tablers, and there is plenty of sidewalk space to support multiple canopies and tables.

I believe that my redesign significantly improves the amount of nature interaction that can occur in Red Square. Interaction Pattern Design based improvements allow for the affordances and architecture of the space to mimic the lively, energetic, atmosphere that is present in the square already.

**Discussion**

The features in my redesign can be generalized to create a set of loose guidelines for college campuses to follow when designing public spaces.

All three of my redesigns have grassy areas, and two out of the three contain grassy areas that are large. I believe that these areas afford flexible interactions. Sight and touch are both stimulated, and *Sitting in Nature, Laying in Nature, Interacting with Others in Nature*, and *Utilizing Nature as a Meeting Point* can all be maximized.

Because the user group of a college campus is students, my redesigns added significantly more seating and tables to the areas. Laptops are the common mode of homework, and seating with a backrest and a place to put a laptop is crucial in encouraging students to spend time there. While this does not encourage meaningful interaction, getting students to congregate and spend time there is a precursor to them partaking in the interactions the space affords.

Two out of the three redesigns play with height differences. I believe this significantly increased the wildness of the patterns that occur on a *Raised Edge Near Nature*, and simultaneously adds visual interest to the space. Going forward, I would be interested to see if this feature continues to be valuable in campus redesigns.

I believe than an extension of my research is justified, although I would like to stress that these are loose guidelines. With time constrained research methods and a small sample size, my set of guidelines is small and may not pertain to every college campus. However, I believe the thought of extending Interaction Pattern Design to create a set of guidelines is both valid and important for placing the health and productivity of students first. I look forward to future research on this topic, either done by me or professional researchers.

**Reflection**

The case study I conducted can be viewed as a personal exploration into Interaction Pattern Design Theory as an attempt to understand the concept and apply it to meaningful areas in my
life. The research methods conducted, while sound, do not cover as much breadth or depth as the topic demands. Thus, my redesigns should be taken as an exploration of how the theory could manifest itself on a college campus instead of hard and fast rules to be strictly followed.

A strength of this research is the care taken to analyze the interaction patterns for their wildest instantiation. This ensures the health and productivity benefits for the space are maximized. A weakness of this research is the small sample size. I conducted eight blitz interviews, but I feel eight regular interviews would have provided richer data about a student’s relationship to a site.

Overall, I enjoyed this research, as it gave me a glimpse into the possibilities of urban landscapes if Interaction Pattern Design was followed regularly. Additionally, while I was conducting my 30-minute observations at each of the sites I was able to relax and take in nature myself. Although more related to nature and health than Interaction Pattern Design, I found myself much more relaxed and less anxious after completing my observations at The Quad and the Drumheller Roses. Conversely, I felt anxious to get home during my observation at Red Square. I do not believe that is a coincidence.

**Next Steps**

If I were to continue this research I would want to research if any interaction patterns are more valuable in terms of fostering human health and productivity than others. Does *Walking Along the Edges of Nature* carry the same weight as *Laying Down in Nature*? The answer to this question, if one can be found, would inform my redesign further.

Additionally, I would like to spend more time in the research phase. Talking to environmental landscape architects, psychologists, and the authors of *Human-nature interaction patterns: Constituents of a Nature Language for environmental sustainability* would provide me with a more nuanced understanding of the complexity and scope of the Interaction Pattern Design Theory that I was unable to receive from one reading.

Lastly, I would like to extend my discussion about a template for college campuses further by visiting other colleges and conducting similar research. Does the template hold true for all colleges across the United States, or should the template be split up by geography? Those in rainier, colder states might have a different template than campuses in warm and dry states.

**Final Thoughts**

Overall, I very much enjoyed this project as it allowed me to blend the research, design, and analytical skills I have learned in Human Centered Design & Engineering (HCDE) with my passion for environmental sciences. I would like to thank Professor Kahn, and Thea Weiss for inspiring me with their research.
References


Appendix A

Research Plan

Research Questions

Based on Interaction Pattern Design theories that say quality nature interactions can improve human health, can we improve various sites around the UW campus to encourage quality nature interactions? I would like to conduct research on various sites around the UW campus, examine and analyze the current interactions, submit redesigns of the sites, and possibly generalize my data to create a set of guidelines for college campuses to follow when designing outdoor spaces on their campus.

Research Questions

• How might we increase the quality of nature interactions at various sites on the UW campus?
• How might we create a template for college campuses that facilitates various nature interaction patterns?
• What interaction patterns are currently occurring at each of the sites? How, when, and with whom are they occurring?
• What features at the site promote quality interactions? Which ones don’t?
• What nature interaction patterns are valuable to students?

Sites

1. Drumheller Roses
2. The Quad
3. Red Square

Method

Being by conducting 30-minute observations at each site. During these observations, I will make observations about current interactions with the space, including where they are, whom they are with, and what they are. I will supplement this field study data with something I call “blitz interviews,” quick, three question interviews that can be conducted over text. I will “interview” eight people per site, just to get more nuanced data and details about interactions I noticed in my observations.

Blitz Interview Questions- Drumheller Roses

• How do you feel about the Drumheller Roses?
  o Why?
  o Can you elaborate more on that?
• What interactions do you have with the Drumheller Roses?
  o Why?
• Is there anything you would change about the Drumheller Roses?
  o Why?
Blitz Interview Questions- The Quad

- How do you feel about The Quad?
  - Why?
  - Can you elaborate more on that?
- When you spend time at the Quad, what do you normally do there?
  - Why?
- Is there anything you would change about The Quad?
  - Why?

Blitz Interview Questions- Red Square

- How do you feel about Red Square?
  - Why?
  - Can you elaborate more on that?
- When you spend time at Red Square, what do you normally do there?
  - Why?
- Is there anything you would change about Red Square?
  - Why?

Data Analysis

I will begin by coding the observation notes by interaction pattern. I will put those in an excel sheet and note the frequency of the interaction. I will code the qualitative interview data as well, noting both the interactions and frequency together with the field study data. However, I will also examine the texts for pain points and relevant wishes in the space to help guide my redesign.

I will then ask questions about the interactions occurring at the site. Mainly:

- Is the interaction observed the most wild instantiation of the interaction that can be supported by the site?
- How can we increase the wildness of the interaction?
- If the interaction is substantially wild for the space, how can we encourage this interaction?

By answering these questions, I will have a better idea about what to include in my redesigns and how to make the sites at UW have more quality nature interactions.

Redesigns

Using my data analysis excel sheet, I will create redesigns of the space that promote quality nature interactions, one for each site. Every decision should have a justification that has its root in Interaction Pattern Design theory.

Extension

Once I have my redesigns, I will examine both them and the interaction patterns excel sheet for similarities across sites. If there are quality interactions and design features that occur at multiple
sites, they could possibly be generalized to a whole college campus. My goal is to create a handbook for college that they can consult when they are looking to design an outside space to maximize human health through nature interaction.

**Work Back Schedule**

<table>
<thead>
<tr>
<th>Monday, 6/3</th>
<th>Tuesday, 6/4</th>
<th>Wednesday, 6/5</th>
<th>Thursday, 6/6</th>
<th>Friday, 6/7</th>
<th>Saturday, 6/8</th>
<th>Sunday, 6/9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drumheller Roses Observation 10:30am</td>
<td>The Quad Observation 10:30am</td>
<td>Red Square Observation 2:00pm</td>
<td>Observation Data Analysis</td>
<td>Interview Data Analysis &amp; Interaction Pattern Analysis</td>
<td>Redesign Sketches</td>
<td>Finish Sketches &amp; Report Writing</td>
</tr>
<tr>
<td>Drumheller Roses Blitz Interviews</td>
<td>The Quad Blitz Interviews</td>
<td>Red Square Blitz Interviews</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Monday, 6/10</th>
<th>Tuesday, 6/11</th>
<th>Wednesday, 6/12</th>
<th>Thursday, 6/13</th>
<th>Friday, 6/14</th>
<th>Saturday, 6/15</th>
<th>Sunday, 6/16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Report Writing</td>
<td>Finalize Report w/ APA formatting</td>
<td>RELAX :)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix B

Site Images

Figure B1: Drumheller Roses

Figure B2: Observation Position (Roses)

Figure B3: Observation Position (Roses)

Figure B4: Observation Position (Quad)
Figure B5: UW Quad (Photo not taken by me)

Figure B6: Observation Position (Red Square)

Figure B7: UW Red Square (Photo not taken by me)
Appendix C

Observation Data
Appendix D

Data Analysis
Understanding How to Feed

6

Unexplained nausea

10

Possible causes of nausea include:

- Motion sickness
- Food poisoning
- Stress or anxiety
- Medications

If nausea persists, consult a healthcare professional.

Understanding How to Sleep

3

Sleeping on a firm mattress, with a comfortable bed, and in a cool, dark, and quiet environment can improve sleep quality.

Eating Healthy

2

Eating a balanced diet rich in fruits, vegetables, whole grains, lean proteins, and healthy fats can enhance overall health and well-being.

Understanding How to Reduce Stress

5

Practicing mindfulness and relaxation techniques, such as deep breathing, meditation, or yoga, can help manage stress levels.

Understanding How to Manage Pain

3

Managing pain can involve a combination of strategies, including medication, physical therapy, and lifestyle changes.

Understanding How to Improve Communication

4

Effective communication involves active listening, clear expression of ideas, and empathy.

Understanding How to Set Goals

8

Setting specific, measurable, achievable, relevant, and time-bound (SMART) goals can help achieve personal and professional success.
Figure E1: Thumbnail sketches for the Drumheller Roses
Figure E2: Thumbnail Sketches for The Quad

Figure E3: Thumbnail sketches for Red Square
Appendix F

Redesign Inspiration

Figure F1: Grass steps

Figure F2: Grass step coverings

Figure F3: Grass bench

Figure F4: Bench