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INDS 3002-003 Design Research and Innovation
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December 2, 2019

ASSIGNMENT 6

FINAL REPORT

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Abstract

This project is aimed at answering the question of “how might we empower cyclists new to Toronto to have genuine confidence while riding in the city?”, through design research. Our methodology includes secondary research in the form of literature reviews and environment scans, and primary qualitative research including semi-structured interviews and in-person user testing of a prototype application. The result is an application aimed at supporting cyclists in route preferences and selection, education on safety best practices, and generally, being informed of the environment they will be facing when riding. Feedback we received from our users suggests that opportunities exist for further refinement and expansion to additional features that address more of our design principles.

Keywords

Genuine confidence
Cycling
Infrastructure
Safety
Education

Introduction

This is a report on a design research project aimed at identifying and providing solutions for issues with the cycling environment in the city of Toronto. Specifically, its goal is to empower cyclists new to the city with a genuine confidence that they are prepared to handle this environment while riding a bike.

The motivation of our project came from the subjective perception that Toronto is not a “bike-friendly” city, and that people new to cycling in the city feel, in general, a high level of apprehension towards the prospect of going on a ride here that negatively impacts the adoption and sustaining of cycling behaviour. This perspective was, as we expected, riddled with assumptions and ambiguous definitions, such as what “bike-friendly” specifically means, and to whom. However, with some early secondary research, including reviews of academic literature and existing industry projects from several different cities, including Toronto, we quickly began to frame a real, more clearly defined problem.

Design Research Methodology

Throughout the project, we relied on a variety of design research methods, with differing goals and scope. Initially, the research was very broad, and not limited to the context of new cyclists or cycling in Toronto, but as we moved forward, we began to gather data from people who fit this description, in semi-structured interviews.

First, we conducted secondary research, mostly on open-access Twitter posts, blogs, and newspaper articles, in order to get a sense of the current state of cycling culture and infrastructure in Toronto and other comparable cities. We also looked for signs of the general impressions of the public on how motivating it is to cycle in Toronto and why that is, what obstacles people face that de-motivate them, and suggestions from the public on how the problems cyclists in Toronto face could be addressed.

Design Research Methodology

Following this, we conducted a literature review of scholarly articles, aiming to find sources discussing how a city might be defined as “friendly” to cyclists, how that could be achieved, and what factors could be at play in such a determination. Instead, we found an article that proposed an algorithm for changing how routes are prioritized in wayfinding apps, acknowledging that there are different motivating factors in what one would decide is the most ideal route besides which is the fastest or shortest distance. We felt that this translates well to cycling situations, since there are often different concerns for cyclists than simply taking the shortest or fastest route, such as the need for safety (infrastructure, traffic volume), the desire to view scenery, and other factors that we expected to be revealed in our interviews.

Another source we found was oriented around the cycling tourism industry, but its focus was on factors of “cycling satisfaction” and what motivates greater cycling adoption, albeit for the purpose of touring in Taiwan specifically. It was insightful, since it dealt with a context of people new to the area (tourists would not be locals, after all), and what motivates them to cycle in a city that may not have an ideal cycling environment. Both of these sources were effective in setting our expectations on what kind of data we might get from the interviews we would be conducting.

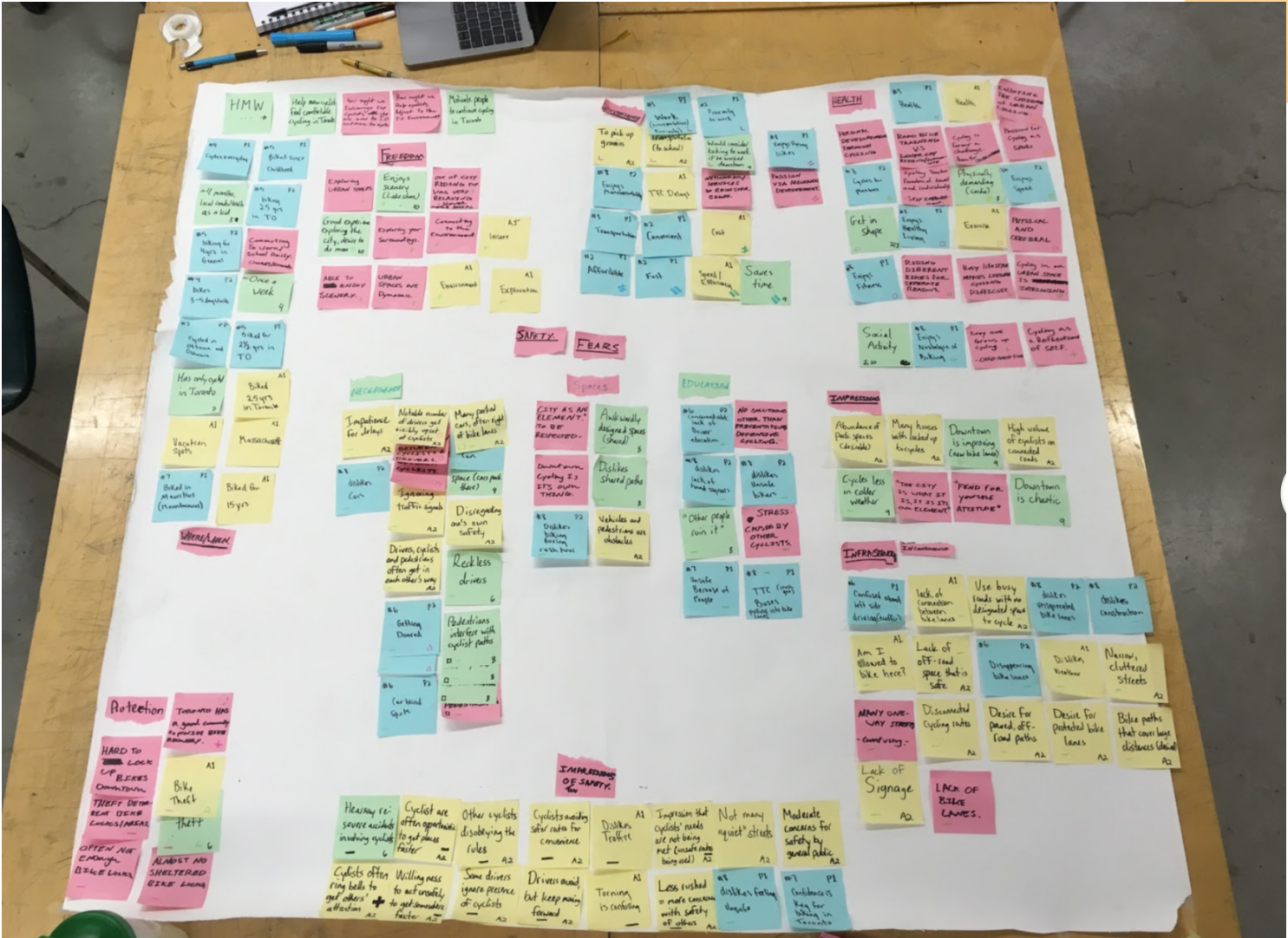
In conjunction with the literature reviews, we also looked to industry projects in an environmental scan. We studied a large Government of Ontario initiative to improve cycling safety throughout Ontario that provided principles for doing so, and examples of other, more successful cycling initiatives in other places, such as the Iowa Trails project, Quebec’s Route Verte, Copenhagen, and the Cycling Superhighway in London, U.K. On a more local level, the projects to improve cycling infrastructure at Toronto’s Richmond Street and Adelaide Street, as well as the transformation of King Street to one that does not allow vehicular traffic (only pedestrians, cyclists and TTC transit vehicles), were of particular interest. It was important to acknowledge the local efforts being made to improve the cycling environment before potentially discussing these happenings with our interviewees.

From here, we moved on to using autoethnography to further our depth of knowledge prior to interviews. Both David and Jillian happened to fit the profile of our target users, cyclists new to Toronto, and so an account of their personal experiences with the applied perspective of a design researcher promised to inform us even further. David approached this by using the AEIOU observational framework, since this approach fit well as a way to structure the observations he had made since arriving in Toronto on the cycling environment in the city, before this project and its goal manifested. Jillian opted to express her experiences and thoughts on cycling in Toronto as a newcomer to the city by answering the questions in our interview guide, essentially a semi-structured autoethnographic interview, because she felt that her experiences would be valuable if treated as though she was one of our participants in the interviews.

Finally, we developed our interview guide with the intention of conducting semi-structured interviews, in order to directly address the research questions we developed. We recruited four participants that each knew one of us personally, and after the first three interviews, we revised the guide in order to generate more substantive data than the early interviews were providing.

Key Insights and Design Principles

Once we completed our semi-structured interviews, we were able to begin analyzing and synthesizing the resulting data. We compiled the data from each interview and autoethnography report onto post-it notes, placed them on a large board, and rearranged them in accordance to commonalities that we were able to observe once the data was all in one place.



These commonalities were identified as core themes in our data, which we formally expressed. The themes that stood out as key were as follows:

Themes:

1. Poor infrastructure forces drivers, cyclists and pedestrians into awkward shared spaces and unsafe habits.
2. Poor Infrastructure causes confusion in what to do, where to go and how to interact with the road environment.
3. Difficulties in trusting that drivers and other cyclists are educated enough on road safety.
4. Perception that there is no hope for significant safety improvements to Toronto's streets.
5. The convenience of accessibility and traveling speed motivate cycling adoption.
6. People are motivated to cycle as a result of the freedom to explore areas much less reachable on foot.

Key Insights and Design Principles

From these themes, we considered how our potential solutions would address our findings from them directly. Starting from thinking in the form of “Our design must _ or else _”, we devised design principles that could be used more directly to sense whether or not a solution we generated appropriately responded to our findings or not. Here are the most key principles we identified:

Design Principles:

1. Focus on awareness of needs and responsibilities as a cyclist, but without hurting the convenience and accessibility of cycling
2. Create more effective communication and transparency for rules of the road, but delivered without adding confusion
3. Encourage accountability on your part and on others’ for one’s actions when sharing the road
4. Empower cyclists with as much knowledge to help them proactively stay safe as possible
5. Make education on road rules and safety as close to equally accessible to cycling as possible
6. Allow cyclists the freedom to explore with genuine confidence in their safety, but without encouraging unsafe behaviours

The process of data analysis and synthesis, and the development of these themes and principles, led to overall insights that we could use in developing concepts and early prototypes. We reached a point where we felt it was clear what our data was telling us was most important and carried the most opportunity. These were the most prominent points of insight we generated:

Insights

Perceptions and opinions of safety were the most frequently related data from our interviews, so much so that our initial grouping of every point of data relating to safety had to be broken two, and eventually became four separate themes.

For ideation: The core of our solution must address the need for cyclists to be able to feel safe.

Infrastructure was the next most related theme to our data, and represents another grouping that had to be divided because of its size. Within this group, we identified “negligence” as a theme, which referred to unsafe habits caused by drivers and cyclists needing to share space, and “confusion” as another theme, referring to uncertainty in what the infrastructure required them to do.

For ideation: This finding suggests a need for either improvements to infrastructure such as better segregation between cyclists and drivers or pedestrians, and clearer, more consistent signage, or some other way of aiding cyclists when encountering areas where the infrastructure incites these problems.

We observed a trend of participants mentioning not only drivers, but other cyclists and pedestrians as being unsafe, unpredictable, and unwelcome in sharing their space.

For ideation: Our solution should provide a platform of potential trust and empathy between its users.

The theme of poor trust in the education of drivers and other cyclists on the rules of the road prompted us to re-think our research question, and frame it around the concept of promoting genuine confidence in cycling in Toronto. This refers to the idea that a cyclist who is motivated to cycle, but poorly educated on how to do so safely, may become a danger to others as a result of the confidence we were aiming to instill.

For ideation: We must take advantage of opportunities to educate cyclists while, for example, aiding them in finding their way around the city.

Participants expressed in several different interviews a view that was pessimistic on the possibility for the cycling environment in Toronto to change for the better, using statements such as “the city is its own element” and “it’s a fend for yourself attitude”.

For ideation: Helping cyclists “fend for themselves” fits in with the other important insights we have uncovered: help educate cyclists, and make them aware of the safety issues they might face during their rides, and they will be equipped to be genuinely confident when they do it.

Refined HMW Questions

The theme of poor trust in the education of drivers and other cyclists on the rules of the road prompted us to re-think our research question, and frame it around the concept of promoting genuine confidence in cycling in Toronto. This refers to the idea that a cyclist who is motivated to cycle, but poorly educated on how to do so safely, may become a danger to others as a result of the confidence we were aiming to instill.

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Ideation and Ideation Synthesis

Our ideation process began in class, once the semi-structured interviews were complete. We participated in an ideation and prototyping session, which resulted in several concepts quickly outlined, including:

An elevated, completely separated cyclist superhighway

An app integrated with Waze to warn drivers of the presence of cyclists, with warnings when they are on routes that historically have high cyclist volume

An app that assesses drivers’ and cyclists’ habits in terms of safety and gives them a score in order to gamify safe behaviour

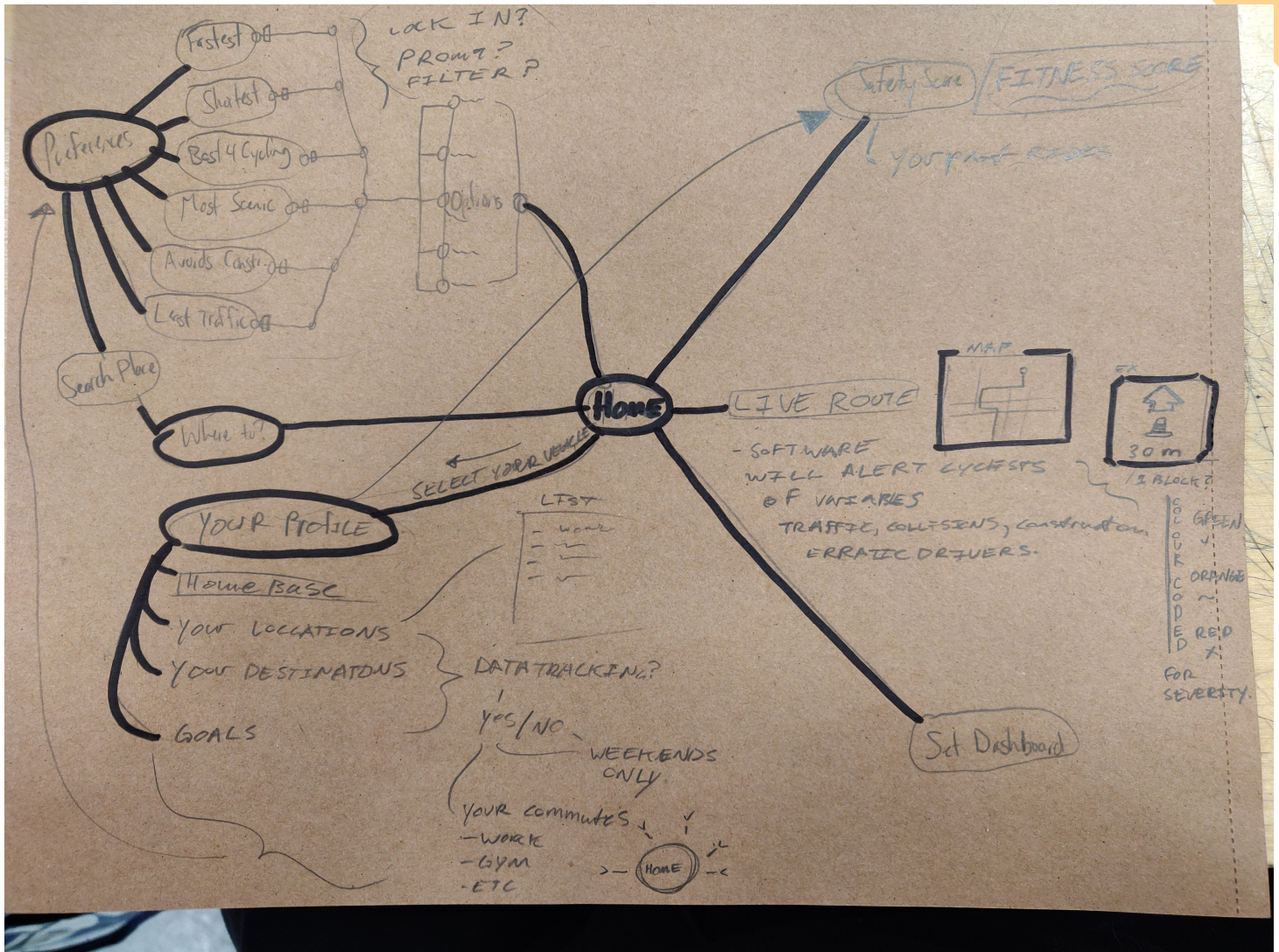
An app that gives cyclists preferences for their potential routes, such as how direct it is versus how much it conforms with cycling infrastructure, and proposes different routes based on those preferences.

The route preferences app seemed promising enough to build a prototype for, and although it was a very crude prototype, we did get some useful feedback from another team in the class. Each of the other ideas we generated were either not feasible (due to requiring major changes to the Toronto cycling infrastructure, signage, or other unrealistic alterations of the city’s public space), or were seen as possible features for a fairly extensive application aimed at supporting new cyclists in ways that coincide with our design principles.

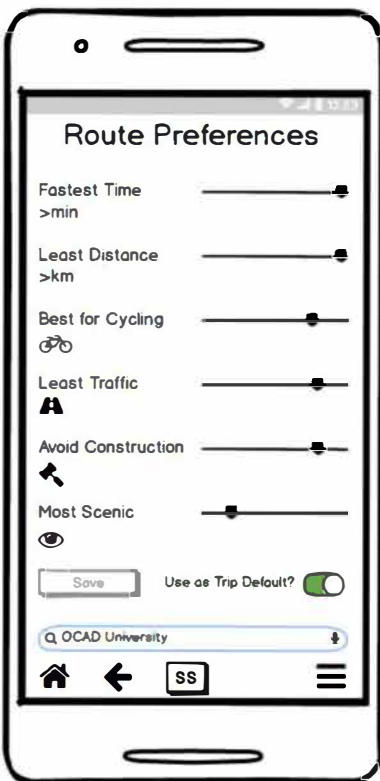
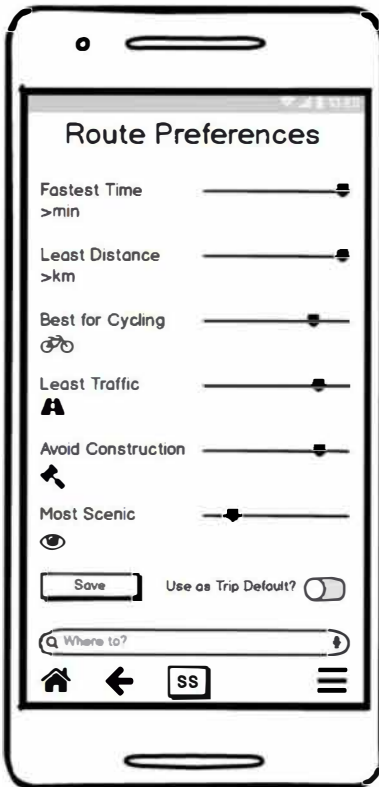
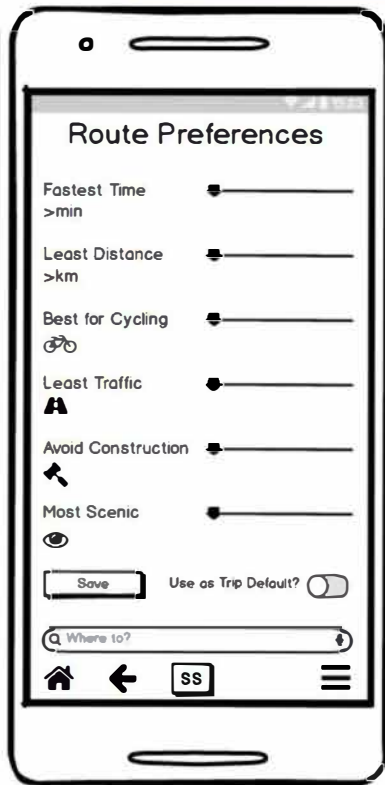
We began to develop the concept of this app, which reflected the diverse nature of our design principles, many of which were aimed at addressing distinct problems, such as safety, education, rewarding exploration, and promoting socialization. However, we used the frequency and perceived importance of the themes they were based on from the interviews as a guideline to choosing a handful of the most important issues to design for, to maintain an achievable scope. These ended up being route preferences and selection, guidance and safety notifications while riding, and cycling education.

Prototype Walkthrough

After determining the core experiences around which we wanted to centre our app prototype, we discussed the form it would take as a group. As a result, we built a small handlebar-mounted screen prototype that would display notifications during a ride, and mapped out the rough information architecture of the app, shown here:



From this, we moved on to prototyping rough screens in Balsamiq's mockup tool, focusing on presenting the activities and options we were envisioning for setting preferences for the route of a ride, viewing routes and their attributes informed by the preferences, selecting the route, viewing step-by-step directions with safety and infrastructure concerns built in, and starting the ride with the help of the small handlebar screen. We also added a few extra screens to illustrate the basic concept behind our "Safety Score" feature, in order to see if the idea behind this resonated with our users.





The reactions of our users, who would be asked to role play as if they were a new cyclist (most of them indeed were), would inform us of whether or not the concepts we were attempting to validate are valuable to our target users. It is for this reason that we chose to use Balsamiq mockups, which are intentionally designed to look sketched and lacking in specific UX detail, placing the focus squarely on what a user can do with the prototype, and why it is or is not valuable. After designing the mockups, we felt confident that the visuals of the mockups would not be too much of a distraction from their purpose.

Usability Testing Methodology

To help ensure that we could find enough participants on short notice and gain a variety of perspectives, we did not completely restrict ourselves to participants who fit the criteria of “cyclist new to Toronto”. Instead, we opted to employ a degree of role playing as a method of properly setting up what we are aiming to achieve and why, as well as prompt each participant to adopt the perspective of being new to cycling in Toronto.

We began each user testing session with a brief description of our project and our goals in developing the app prototype, then established the following scenario:

Prior to discovery of the app:

You are a cyclist, and want to cycle to commute to work.

You work at OCAD and you live at 1134 Dupont St.

You aren't certain what the best way to do that would be.

You find an app called “GO Bikes” that seems to help cyclists ride in Toronto, and you decide to give it a try.

You see that the app has a small notification screen device that can be attached to your handlebars, and is available at most local bike shops.

Prior to embarking on a ride:

You decide to stop at a bike store and pick up the handlebar screen

You want to use the app to decide on an ideal route to take to work

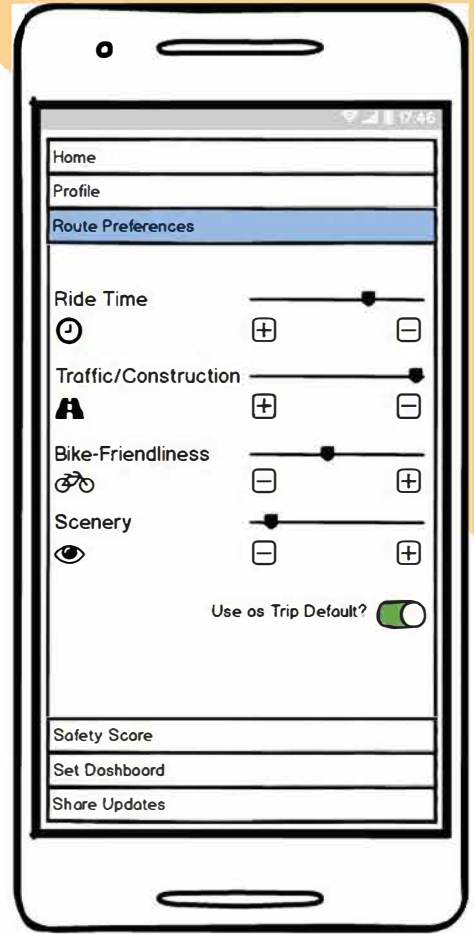
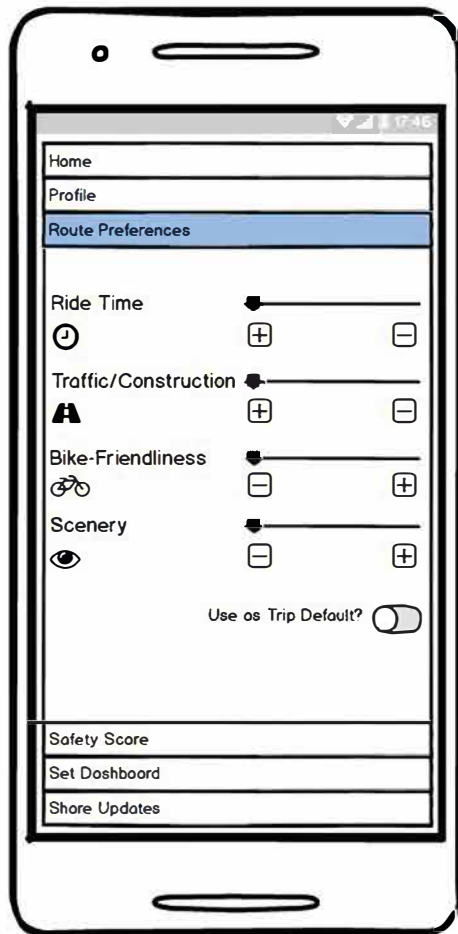
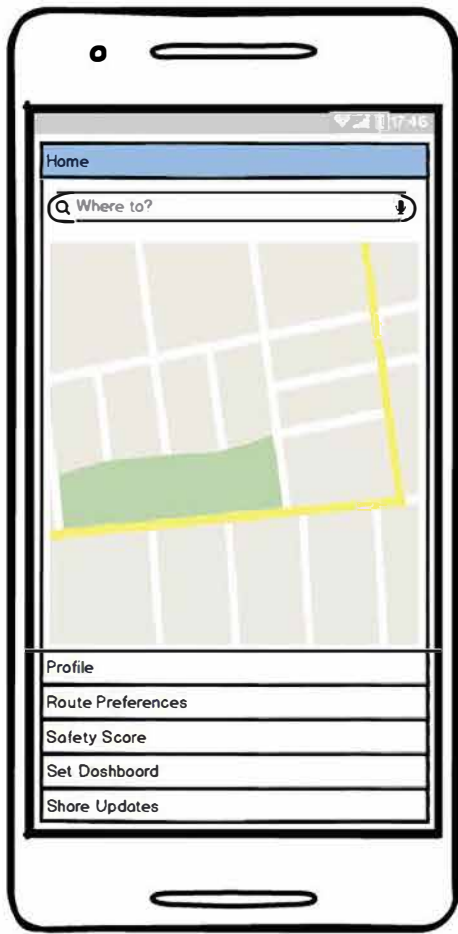
Upon setting up this scenario, we focused on presenting the prototypes and observing the participant's reactions to them. We asked them to speak aloud throughout the session, to clarify what they were thinking and how they were interpreting what they were seeing and interacting with. We followed the testing sessions with a set of open-ended questions, aiming to document their impressions on how well we succeeded in addressing our design principles and how-might-we question (see Appendix).

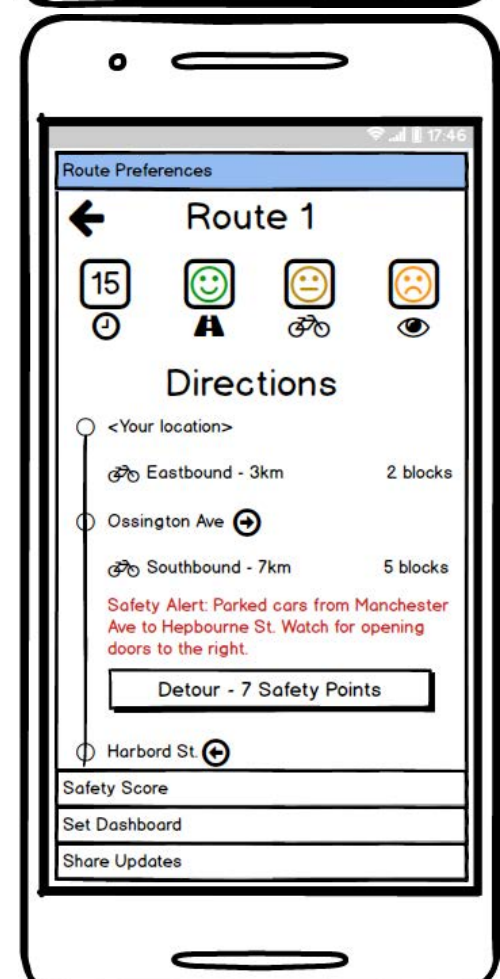
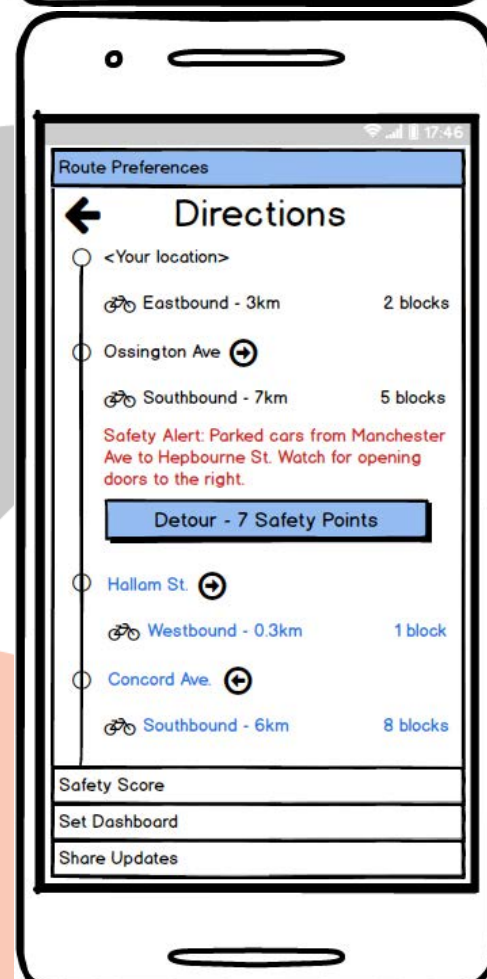
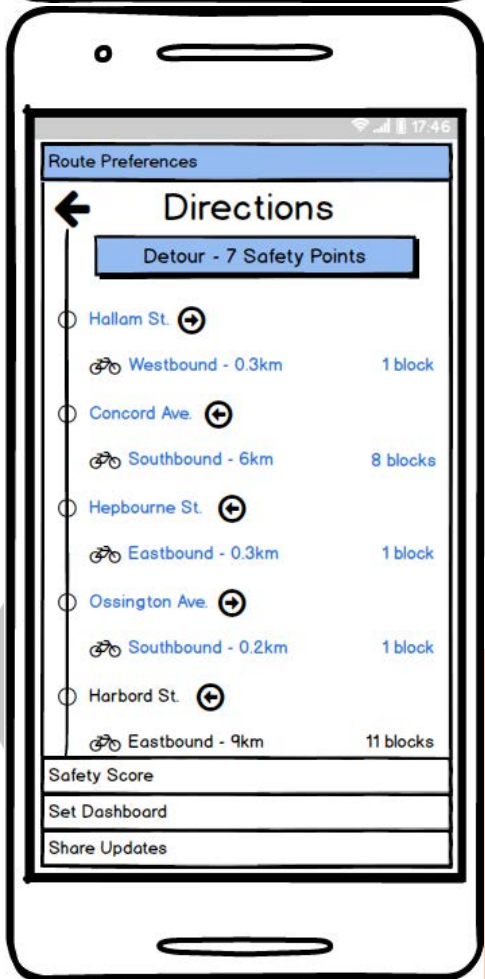
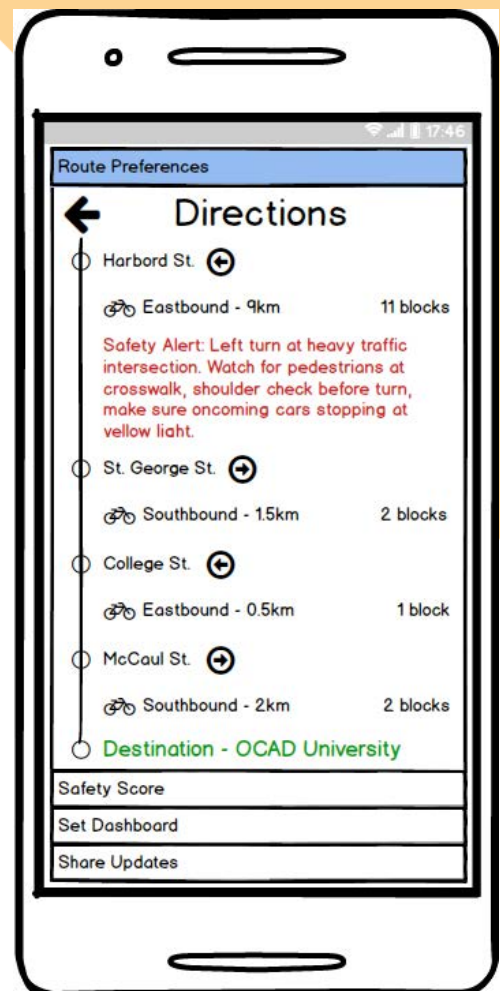
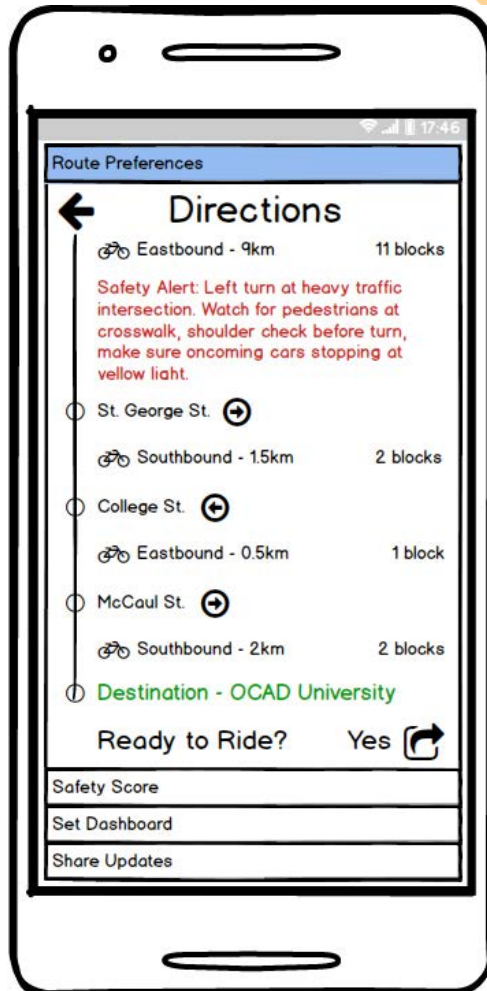
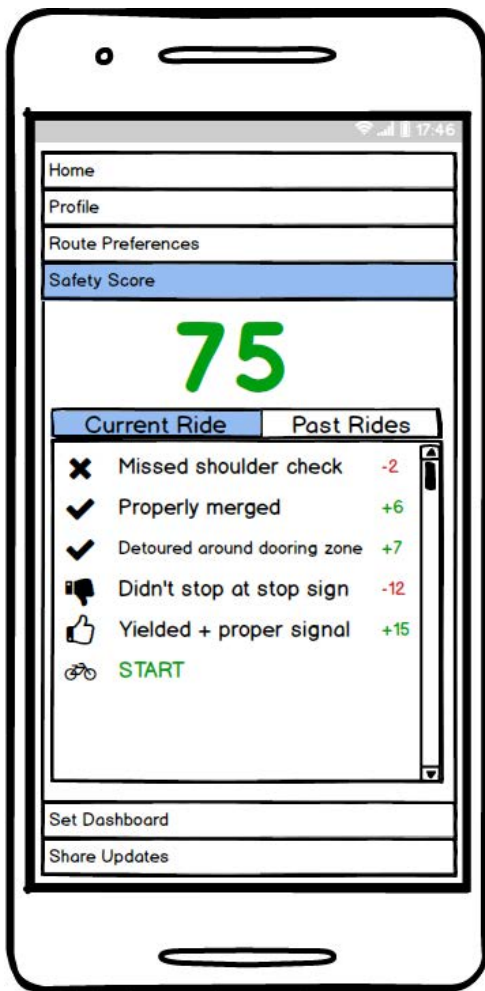
Usability Testing Results and Changes Made to Final Prototype

(plus reasons for making the changes we did):

Following the first two user testing sessions, much of the feedback we received was that the prototype was too complex, in terms of the quantity of information for the user to take in, how it is organized, and what options it provides, unnecessarily in some cases. There were also several instances where the context of an activity was not clear, such as whether or not the user was riding a bike or simply planning a ride, where the feedback would be coming from (the app, or the handlebar screen?), and what “Best for Cycling” means.

As a result, we modified the prototype prior to testing it again. In response to the comments about the sliders lacking meaning (which direction is “more” and “less”?), and some of them not being useful (construction separate from traffic, distance separate from time), we pared them down to four options, with traffic and construction integrated into one slider, and added '+' and '-' symbols to make the value of the sliders more clear. For the directions guide, we removed some repetitive text indicating turns and time frames, using arrow symbols for the turns instead, to streamline the information being shown.





Using the revised prototype, we conducted one more user testing session, and received additional feedback. The responses we got resulted in the concept of broadly categorizing routes under types (such as “Fastest”, “Most Infrastructure”, or “Most Scenic”), and allowing users to simply browse routes rather than filter them through preferences. This approach would likely help with the problem of overloading users with too many options, but without removing the element of choosing routes based on their preferred types of cycling routes.

Discussion

One major takeaway from conducting the full design research process with our specific goals is the observation of just how much variety in our participants’ concerns were found. Depending on who the participants are, what they value most as cyclists, and how they chose to think about the scenario of being a new cyclist in Toronto, the issues that were observed to be most important, and simply the number of different possible issues that people face cycling in Toronto vary wildly. Perhaps this is an indication of why we did not discover any comparable solutions to our How-might-we question that already exist: with so many different issues being faced and potentially needing to be designed to solve the problem in a satisfactory way, it may have simply been regarded as too complex to do so by most if not all others who have made attempts.

That said, however, when we began to see what the issues were, and witnesses how much pessimism there was for the potential of making cycling in Toronto an experience people could be genuinely confident in, we felt that a design research project with this goal certainly does have the potential to make a positive impact. Specifically, and this again comes directly from our observations and data synthesis, this perception that the city “is what it is” and that defensive cycling is the only real solution prompted us to consider the idea of “genuine confidence” as a way of meaningfully empowering cyclists new to Toronto with the knowledge and support to overcome the de-motivational factors that affect them, such as needing to understand safe behaviours, facing hazards with no warning, and dealing with poor infrastructure.

Future Work and Conclusions

There are numerous opportunities to further develop the concept we arrived at, in terms of addressing feedback and including features that address more of our design principles. Some ideas for further exploration of the principles are integrating more social elements, such as route sharing and community building, theft prevention measures, and opening up the app to use by drivers as well, to build more trust between drivers and cyclists.

The question of how we might help that trust develop is one we see as a new challenge we would face in developing this concept further. If we structured the use of the app around Waze-style user input and allowed the presence and social content of both drivers and cyclists to be shared between them, a path towards improving this relationship is possible.

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Appendix

Autoethnography Report 1:

What made you decide to cycle in the first place?

Transportation, exercise, cost, comfort with surroundings, environment

What reason do you cycle now?

Transportation, cost, exercise, speed/efficiency, TTC delays

How often do you cycle?

Daily to 3 days/week

What do you and don't you enjoy about cycling? Tell me more, what would you like to change about that?

Enjoy: Scenery, leisure, exploration, exercise, health

Dislike: infrastructure, weather, traffic, bike theft

What kind of cyclist would you consider yourself

Regular but casual

Have you cycled in other places/ would you like to relate them to Toronto?

Massachusetts/ vacation spots

Massachusetts biking was in the suburbs. Although there was no infrastructure, backstreets, sidewalks, and polite drivers made biking easy and safe.

Vacation spots were catered to bikers so there wasn't much interference from cars and the infrastructure was good.

Is there anything about initially biking in Toronto that confused you?

Turning left or right, disappearing bike lanes, lack of connection between bike lanes, uncertainty whether you were allowed to bike in that location.

How long have you been biking in Toronto?

2.5 years

And in general?

15 years

AEIOU Autoethnography Observations (A2)

A: Activities

I am walking through the city, both in my own neighbourhood, nearby neighbourhoods, and in areas near OCAD.

I am observing my environment, looking for signs that a particular area/road would be suitable for me to cycle on.

I am looking specifically for signage indicating a designated cycling route.

I am watching for hazards.

I am watching the behaviour of other cyclists, pedestrians and vehicles, assessing how safe these actions make the environment in question.

Other cyclists I observe are exhibiting a variety of actions:

Some obey the designations of roads as proper cycling routes by virtue of there being a painted bike lane on the road.

Many use busy roads that lack any designated area for cyclists to cycle on, seemingly for commuting purposes.

Some use off-road space, such as in parks, and many on sidewalks, to ride to where they need to go.

Some completely disregard their own safety and that of others by taking their bicycles directly into traffic and into the path of vehicles, expecting the vehicles to stop and allow them to pass by.

Similarly, many cyclists ignore traffic signals and begin to ride as soon as they believe they can safely make it through an intersection or across a road.

Many drivers of motor vehicles slow down or swerve around cyclists, acknowledging their presence and attempting to avoid them, while still making progress to their own destinations.

Some drivers of motor vehicles disregard the presence of cyclists and drive dangerously while near them.

E: Environments

I have observed a variety of environments since arriving in Toronto: mainly, extremely busy major streets, some with cycling infrastructure, and many without; significantly busy routes outside the downtown core that both have and lack cycling infrastructure, and quiet residential streets that mostly lack cycling infrastructure, but a small number have indicated their appropriateness for cycling through signage.

Generally, very few streets I have observed could be described as "quiet" - most have continuous vehicle traffic driving through, with varying volume. Only the most minor, relatively disconnected streets are relatively free of vehicle traffic.

In observing the houses on each street I visit, I have noticed what I believe to be a high degree of bicycle ownership, particularly on semi-major streets that are not far from major corridors (for example, Symington between Davenport and Dupont, where nearly every house has one if not several bicycles locked up at the front).

Every street I have observed that is not a disconnected residential street has considerable cyclist volume.

A few drivers of motor vehicles I have observed getting visibly upset by the presence of cyclists, shouting at them and/or honking their horns. Though, this is usually due to inappropriate behaviour on the part of the cyclist.

The cyclists generally appear to be focused on cycling, being attentive to what is happening in their surroundings, and avoiding being in the way of vehicle traffic.

Many of them are opportunistic when the chance to get somewhere more quickly presents itself, even if this chance is not safe.

I: Interactions

My read on the suitability of each street I observe for cycling is an interaction with the environment. I notice potential obstacles, disruptions in the continuity of the infrastructure, and potential detours I may have to take, and how dangerous those would be.

I observe many interactions between cyclists and vehicles/pedestrians. Usually this is in the form of getting in each others' way (cyclists swerving around pedestrians, parked cars, into traffic to avoid an obstacle, cars cutting cyclists off to turn, parked cars opening their doors into the bike lane, etc).

Cyclists often ring bells mounted on their bicycles to alert others in their surroundings to their presence, as vehicles do with their car horns.

O: Objects

Most of the streets I have observed appear narrow and cluttered, with many parked cars, trees and fences on the edge of sidewalks, and many pedestrians continuously moving through.

Many streets are poorly paved, with rough patches and large potholes, especially residential streets with little vehicle traffic.

Many parked cars are within or directly to the right of marked bike lanes, making traversal impossible, or at the very least, unsafe due to the possibility of being doored.

The vehicles and pedestrians represent obstacles for a potential cyclist, and often cause streets that on the surface seem like an appropriate route to take to be perceived as dangerous and unsuitable.

U: Users

My characteristics:

Concerned with my safety as a potential cyclist, thus concerned with assessing the environment near where I live and where I need to go on a regular basis on its safety and suitability as a cycling route.

Knowledgeable on potential hazards as a cyclist, inclined to look for signs of these issues' presence or absence in my observations.

Familiar with the conventions of cycling infrastructure present in my home city (Vancouver), and somewhat concerned with finding similar attributes in Toronto's infrastructure.

Observant of the actions and interactions of others on the road (drivers, pedestrians, other cyclists), with the expectation to soon be a cyclist within this environment.

Characteristics of other people being observed:

Moderately concerned with their own safety and the safety of others during travel.

Impatient when it comes to delays in their journey and/or obstacles on their route.

Quick to make their presence known to others (bells, horns)

Interactions with others tend to be more courteous and respectful if the people involved are in less of a rush (I observed more respectful interactions during off-peak hours and on weekends than during rush hour, for instance) or if they have not come into spatial conflict with one another (getting in each others' way tends to spur more animosity, and this is a frequent occurrence at all times)

Autoethnography Report (A1 Ext)

Observations of Cycling Environment:

Prior to the shipment of my bicycle from Vancouver (I have yet to go on a ride), I used my regular walks to assess much of my environment, both near home and downtown near OCAD, for its suitability for cycling. I wanted to get a clear sense of where I should be planning my routes for going on recreational rides, picking up groceries, and perhaps cycling to school instead of taking the TTC. Since I am accustomed to Vancouver's cycling infrastructure, I was particularly interested in off-road paved routes, protected on-road bike lanes, and most importantly when observing the city's environments, clear signage designating specific roads and paths as cycling routes that cover large distances.

Motivations and execution:

I started with planning walks to view all of the nearby streets to where I am staying, and to the numerous nearby grocery stores, since I would have to be able to get from home to these destinations or to major corridors that would allow me to reach my intended destinations. I immediately observed a total lack of signage for cycling routes, and my observations of the roads included many cyclists using sidewalks and busy road space with no infrastructure at all for cycling. This left an immediate impression that cyclists' needs were not well met in the areas I visited, leading to dangerous behaviour and disorderly travel.

Pain Points:

After learning more about the availability and locations of cycling infrastructure by researching this online, since the environments I observed did not sufficiently communicate the presence of my desired forms of cycling infrastructure, I found that I was correct in my impression that the network of cycling routes in Toronto are largely disconnected, and that planning a route from where I live to go to any desired destination I had that avoids danger entirely would be difficult. That said, I also began to realize that I cannot judge much of the suitability or safety of the roads I observed simply based on the behaviour of other cyclists, and many I encountered were avoiding safer and more consistent routes in favour of more direct travel, at their own risk.

Positive Experiences:

While conducting my observations, I did make note of many streets that are quiet, scenic and largely absent of vehicle traffic. Many residential roads are simply not busy enough to cause significant problems for cycling, and would serve me well if I had regular access to them along a planned route. Additionally, I find that the city does indeed have an abundance of park spaces with paths that are safe and usable for cycling, so I began to plan for excursions to places like High Park and Trinity Bellwoods Park for individual rides. This is a significant advantage for Toronto in terms of recreational cycling appeal.

Reflections and Emerging Questions:

What I most did not expect from my transition from Vancouver to Toronto as a cyclist was the effect of public space having “cyclist-friendliness”, or a lack of it, embedded into its outward presentation. With initial observation, the feeling that I was in a city that is not sufficiently accessible or safe for cyclists was palpable, a feeling that was quickly supported by my secondary research upon starting this project.

This led me to consider the question of to what extent a city’s open welcoming of cycling must be present in its spatial fabric to be effective. Every cyclist or potential cyclist has the option of doing deeper research into their city’s cycling infrastructure, or looking for organizations and social groups that support their cycling community in many ways, but how many are permanently discouraged just from experiencing the immediately observable relationship between a city’s public space and its potential for supporting cycling? The feeling of a city not being welcoming to cyclists is a powerful, discouraging one.

To that end, my experiences described here have provoked me, since the early stages of this project, to think about how we might shift a space from “unfriendliness” towards “friendliness” for cycling, a problem that may go deeper than infrastructure or communal support, and demands of us, as researchers, to make sure we make an effort to grasp how other cyclists, new to the activity, or simply new to this city, view this relationship or how it might change as well. The answer is likely very subjective, requiring many different viewpoints, and could be very innovative in the urban design space.

Revised Interview Guide:

What kind of cyclist would you consider yourself?

What made you decide to cycle in the first place?

What reason do you cycle now?

How often do you cycle?

How long have you been cycling in Toronto? And in general?

Was there anything about initially biking in Toronto that concerned you?

Have you cycled in other places? If so, how would you compare and/or contrast them to Toronto?

What do you and don’t you enjoy about cycling? Tell me more / What would you like to change about that?

How motivated do you feel to cycle in Toronto? For what reason(s)?

One last question: Could you tell us about any particularly memorable experiences you’ve had while cycling?

P1 Interview:

What made you decide to cycle in the first place?

Affordable, convenient, fastest compared to TTC

What reason do you cycle now?

Transportation, work(uber), health

How often do you cycle?

Every day

What do you and don't you enjoy about cycling? Tell me more, what would you like to change about that?

Enjoys health/ fitness/ fixing bikes

Has biked since childhood(nostalgic), means of transportation

Unsafe - doored, ignored by cars, parked cars, TTC buses

What kind of cyclist would you consider yourself

Regular for commute and leisure

Have you cycled in other places/ would you like to relate them to Toronto?

Biked in Mauritius

Mountainous at home/ flat in Toronto

Winding roads at home/ grid like streets in Toronto

Biking in Mauritius is short distance.

Feels unsafe in Toronto and Mauritius but for different reasons.

Unsafe in Toronto because of people and unsafe at home because of infrastructure and terrain

People are more respectful of laws in Toronto.

Cyclists need to be confident to be safe

Is there anything about initially biking in Toronto that confused you?

Driving on the right side of the road and left turns.

How long have you been biking in Toronto?

3 yrs

And in general?

Since childhood

P2 Interview:

What made you decide to cycle in the first place?

Proximity to work, too long to walk/not long enough to take transit

What reason do you cycle now?

Same reasons as above/ pleasure(would be biking outside the city/waterfront bike trail)

How often do you cycle?

3-5 days/week

What do you and don't you enjoy about cycling? Tell me more, what would you like to change about that?

Enjoy: Speed/ fast transit, 1 way streets can take bikes but not cars/ maneuverable

Not Enjoy: bike lanes not separate, cars don't see bikes, bikers don't wear helmets, cars, almost getting hit by cars, rush hour biking(especially when biking solo but even with groups of bikers cars ignore you), lack of hand signals, disconnect between cars and bikers, construction.

What kind of cyclist would you consider yourself

Casual, for commute and leisure.

Have you cycled in other places/ would you like to relate them to Toronto?

Has cycled in Ottawa. Downtown Toronto is easier to bike in than downtown Ottawa but suburban Ottawa is easier to bike in than suburban Toronto.

Oshawa: no bike lanes but easy to travel on backroads(no major roads)

Is there anything about initially biking in Toronto that confused you?

Initially biking in Toronto was daunting because of:

Disappearing bike lanes

Car blind spots

Getting doored

Uncertain about drivers education about biking

How long have you been biking in Toronto?

2.5 years

And in general?

4 years

P3 Interview:

What made you decide to cycle in the first place?

"Everyone Grows up cycling, learned it at a very young age and always enjoyed the self empowerment, self propelled speed and adrenaline of the activity.

Always room for development
Great for connection to the environment
Exploring the city/spaces.

What reason do you cycle now?

Grew up cycling in the suburbs of Ottawa, Cycling in a city was always more intriguing, more dynamic scenery.

How often do you cycle?

Expressed difficulty in finding time for the passion of cycling as a leisure/sport opposed to commuting for responsibility (work/school errands)

What do you and don't you enjoy about cycling?

Has not ridden his bike in about 3 weeks due to needing maintenance.
Does not blame the environment of Toronto for the necessary repairs, "The city is what it is, it is it's own Element"

Cycling is a reflection of self, Personal and mechanical development, always room for improvement.

What kind of cyclist would you consider yourself?

He considers himself a more serious urban cyclist, Rides a fixed gear bike- Enjoys the challenge of urban riding. Also rides a race style road bike for time trial training.

Have you cycled in other places? How would you relate them to Toronto?

Once travelled to Wasaga Beach-North of Toronto. While there he rode beach cruiser style bikes with friends, slow/relaxed/chill riding, enjoyed every minute of it, said it was very different than cycling in Toronto.

Is there anything about initially biking in Toronto that confused you?

The abundance of One way streets was confusing to get used too.

How long have you been biking in Toronto? And in general?

Has ridden a bicycle since youth, 3 years riding in Toronto

Other notes:

STRESSES of Cycling in Toronto: Other cyclist; believes cyclists are responsible for their own safety, Riders seem uneducated on safe riding habits within the city.

There is a lot of aggression between cyclists and drivers. Observes that it is a "Fend for yourself Attitude".

Locking a bicycle up in public space is difficult, often not enough space, Not enough sheltered bike lock spaces/ theft deterrent locking areas.

Lack of Bike lanes is a big problem.

Notices that Toronto has a good community to provide theft recovery of a bike that has been stolen/ networks and services to register your bikes.

Notices that Toronto has many communities and public groups that facilitate different cycling activities.

He believes that there is no real way to solve the problems other than preventative/defensive riding in the City.

P4 Interview:

What kind of cyclist would you consider yourself?

Casual cyclist, not main form of transportation.

What made you decide to cycle in the first place?

Decided to cycle because many friends were cycling and going on recreational, social rides, felt the need to join them, also wanted to get in shape through the cardio (has a desk job, sits all day).

What reason do you cycle now?

Similar reasons, wanting to stay in shape, friends riding mostly for work, not in social rides with friends.

How often do you cycle?

About once a week, was not cycling at all before, grew out of an old bike.

How long have you been cycling in Toronto? And in general?

About 4 months, used to cycle frequently as a child, but only on local streets/trails.

Was there anything about initially biking in Toronto that concerned you?

Fear of theft, reckless drivers in downtown core, hearing about many serious accidents involving cyclists being struck by vehicles downtown, including one account from a friend who told him he nearly gets hit by vehicles almost every day.

Have you cycled in other places? If so, how would you compare and/or contrast them to Toronto?

Has not cycled outside of Toronto, other than at cottage.

What do you and don't you enjoy about cycling? Tell me more / What would you like to change about that?

Found it tough to get into cycling, because of physical shortcomings early on ("cardio learning curve"), dislikes common bad behaviours by pedestrians, who frequently take up space in bike lanes, travel too slowly when in path of cyclists.

He makes a comment here about the bike lanes on Lakeshore, and how even though the bike lane is farther from the water, people walk in it and park on it. Goes on to say pedestrians don't pay attention to incoming cyclists on shared paths, are not self-aware of what problems their behaviour may be causing ("other people ruin it" → referring to pedestrians and drivers with this comment).

Dislikes the design of shared paths and how easy it is for pedestrians and cyclists to get in each others' way, awkwardly designed spaces (Cole knew exactly what he meant by this).

How motivated do you feel to cycle in Toronto? For what reason(s)?

Steady motivation to maintain his current cycling behaviour. Mentioned he would consider biking to work if he got a job downtown ("would save a lot of time"). Less likely to cycle because it is getting colder. Finds downtown very chaotic, but believes it is improving, mentioned new bike lanes being put in, people don't respect their presence, treat them like parking lots.

One last question: Could you tell us about any particularly memorable experiences you've had while cycling?

Talked about positive experiences while exploring the city, finding new places to ride, viewing scenery along lake shore, doing this in social groups.

User Testing Guide:

How well do you feel a product like this would improve cyclists' genuine confidence riding in Toronto?

Which aspects of the system stand out to you as beneficial to cyclists' confidence and why is that?

What would you add, subtract or change to the product to improve it, and why?

How beneficial or not beneficial do you consider the notifications on the handlebar mounted screen to be? Why is that?

How clearly did the route selection component communicate how it can be used, and what else do you envision it being used for?

What do you like or dislike about how the product functions and displays information?

User Testing Session (P4):

Walkthrough:

The sliders need labels, was not sure which way meant "higher" and "lower".
Quickly noticed the difference in text colours in the directions section.
Prefers the small screen over mounting a phone on the handlebars.

How well do you feel a product like this would improve cyclists' genuine confidence riding in Toronto?
Suggests that being able to select the detours and see the resulting changes in route on the small screen rather than on the app before the ride would be preferable.
Inclination towards the app being helpful for directions, but not so much for safety.

Which aspects of the system stand out to you as beneficial to cyclists' confidence and why is that?
Finds the notifications on the small screen useful.
Maintains that the difficulty with other people on the road is a problem, does not consider the app and small screen to help with this issue.
Finds the safety score helpful, mentioned that showing hand signals and warnings about merging and dooring to be beneficial towards education (he said this with no prompting that we are aiming to improve cyclist education).
The small screen works well, it is not too large or too small, and it does not provide enough of a distraction to be a problem.
What would you add, subtract or change to the product to improve it, and why?
Mentions that the ability to change things on the small screen, rather than having an app at all, would be preferable, especially for routing aspects.
How beneficial or not beneficial do you consider the notifications on the handlebar mounted screen to be?
Why is that?
Mostly covered already
Reiterates that the screen is sized appropriately, not distracting, could be a better medium for using the system than an app on a phone.
How clearly did the route selection component communicate how it can be used, and what else do you envision it being used for?
Some form of time and speed tracking would be very helpful, showing time taken to get places, speeds, time saved when taking detours versus the original route.
What do you like or dislike about how the product functions and displays information?
No part of the system is too "in your face", you just get enough to know what's going on.
For the on-ride notifications component, the audio portion may not be necessary, and might not be effective either, if there is a lot of noise around you while riding, could be too loud to hear it.

User testing session (P5):

Walkthrough:

There are too many sliders, the options make sense, but several of them aren't necessary, or could be combined with others.

It should be simpler overall, there are lots of options, and lots of data points to take in, but a less complex setup would be preferable.

Does not understand what "best for cycling" means.

Likes the idea of tailoring a ride between scales of "traffic" vs "scenic".

The route screen is complex, has too much information, especially text.

There is no frame of reference for the scores on preferences (A, B, C+, etc).

Doesn't sound impressed with what he is seeing on the route screens.

Says he doesn't pay too much attention to directions, would stick to important indicators, but otherwise rely on knowing his route, or being told where to turn by the small screen.

Says he would forget all the information seen in the app during the ride planning portion of the experience, once he puts his phone away, thus questioning the need for any of it.

How well do you feel a product like this would improve cyclists' genuine confidence riding in Toronto?

Tough to say, could see a part of it being useful, maybe not specific things like merging.

Doesn't trust an app to tell him when to change lanes (for example).

Which aspects of the system stand out to you as beneficial to cyclists' confidence and why is that?

Likes the idea of being rewarded for exploration (trophies).

Finds the safety score annoying, would expect to get 100% all the time, would blame the app if he doesn't.

What would you add, subtract or change to the product to improve it, and why?

It would be useful for the system to track time and speed, would like to know the differences in time taken to reach a consistent destination.

Focusing on the challenge/athletic side of the cycling experience would be better

For planning more complex routes, the app route preferences component would be useful, but not for shorter and more consistent rides.

Map integration for cyclists on apps like Google Maps and Waze would be very useful.

Traffic (avoidance) is the biggest concern for cyclist safety, so easy detours around traffic should be prioritized.

Would not mind taking longer to get somewhere in order to avoid traffic.

Shoulder checking doesn't really matter, not worth pointing out.

How beneficial or not beneficial do you consider the notifications on the handlebar mounted screen to be?

Why is that?

Feels as though if the app was trusted, it would work very well for new cyclists.

Long notification messages would be distracting

The one for dooring could easily be ignored

Reminders before you leave instead of popups on the small screen that make you look down

How clearly did the route selection component communicate how it can be used, and what else do you envision it being used for?

It's too complex as it is, needs to be simplified, and some options like distance and time can be combined, because their meaning is effectively the same (I believe what he means is that people using this wouldn't care about distance, because it correlates with time enough that time alone would be an indicator of when the distance is too much).

More interested in social and exploration aspects, Waze-type sharing.

Speed and traffic are the most important aspects of route selection, along with how scenic the ride is, those are the only important things.

What do you like or dislike about how the product functions and displays information?

The notification screen as a simple informative addition is a nice touch.

It takes advantage of peripheral vision, and the colour change makes its importance obvious from the periphery, so it doesn't need to be constantly monitored.

User testing session (P6):

Walkthrough:

Did not understand why the route selection feature included a "Traffic/Construction" feature.

Not sure why there should be an option to make the time of the ride longer.

Believes a "yes/no" button for "more scenery" would make more sense than a slider.

Suggested having the ability to save multiple "default" setting for route preferences, based on the possibility of having different preferences for different contexts

Perhaps the ability to save them and give them descriptive names? This would take into account different reasons for cycling.

The icons on the route selection screen are helpful, allows easy comparisons, colours make sense.

Wasn't sure if the colours map to the preferences on the slider (for example, whether green for "Traffic" meant more traffic or less traffic).

Directions are clean, looks like Google Maps.

Confused by detour and safety points (is it a dash after "Detour" or a minus sign indicating you would lose safety points?)

Understood that the detour's purpose is to redirect around the area with the identified safety concerns (dooring).

Understood the turn icons, but not right away.

Likes that it indicates directions to turn, rather than relying on cardinal directions being properly interpreted (i.e. "turn left onto Harbord" rather than "turn east onto Harbord").

Understood the change back to the original colour indicates a return to the original route.

The detour option should display the change in how long the ride will last if it is taken.

Did not understand that the use of the app up until this point was all done pre-ride, this changed only once he saw the "Ready to Go?" button at the end of the directions, but once he saw this, it clarified everything.

Warnings in different colours (on the handlebar screen) is a nice touch.

Shoulder checks should be in a different colour than directional arrows.

"Ride Complete" should be indicated in a different colour as well.

Confusion about safety score: does it indicate a safe route, or safe behaviour?

The notifications are simple, easy and quick to look at and understand.

Would like it if the notifications were accompanied by audio (I chose not to pretend I was giving audio notifications during this test).

Likes the simplicity of the safety score screen that shows the cumulative results on the score from the completed ride.

How well do you feel a product like this would improve cyclists' genuine confidence riding in Toronto?

New cyclists would feel more comfortable with the risks if shown what to expect, like the notifications on the handlebar screen do.

It is good at informing how the routes differ, in terms of their advantages and disadvantages.

Notifications like the ones for shoulder checking would be helpful to new cyclists, and to others with more experience too.

The safety score features could be more in-depth, such as showing the score for the past week in an infographic, for example.

Which aspects of the system stand out to you as beneficial to cyclists' confidence and why is that?

The options to compare routes and to detour around less safe areas work well because they allow you to make an informed choice, rather than being forced to choose something you don't understand.

He would not like having a phone mounted on the handlebars, so the small screen device is very helpful.

What would you add, subtract or change to the product to improve it, and why?

Suggestion of presenting users with route options under different broad categories (like "shortest", "fastest", "most scenic", etc) rather than setting preferences, selecting defaults, browsing how routes score in each area.

Categories instead of explicit choices would rely on quick browsing instead.

How beneficial or not beneficial do you consider the notifications on the handlebar mounted screen to be?

Why is that?

Likes the notifications, clear with the colours (though more diversity in those colours would be better).

Not too complicated for interpreting on-the-fly.

Should not use too many colours, only 4 or 5, in order to categorize types of notifications.

Having some types of notifications could mean missing something important, for example, since all of the "Continue" notifications are blue, and can easily be glanced at and otherwise ignored, other notifications in blue might be missed because of the assumption that they are just "Continue" notifications.

How clearly did the route selection component communicate how it can be used, and what else do you envision it being used for?

Really likes seeing the route visually, plus the attribute comparisons.

Very secondary (his words), but having the option to share routes with others, and perhaps other social options, would be a good addition.

What do you like or dislike about how the product functions and displays information?

Consistent, clean visuals.

Having a separate device that you need to purchase and mount on handlebars might be de-motivating for a lot of people.

But, the benefits of this device outweigh this issue.

Audio cues for the notifications, specific one for each type? (Jill suggested this, but he agreed it would be a good idea).

THANK YOU

