*Down the Road*

Group 5

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**Table of Contents**

1. Introduction
2. Problem Definition
3. Empathy
4. Stakeholders
5. Constraints
6. Ideation
7. Concept Filtering
8. Prototyping
9. Testing
10. Conclusion
11. References
12. Appendix

**Introduction**

Texting while behind the wheel could affect more people than just yourself. Anyone near the roads or driving on the same road as you are endangered.  Our group wants to reduce the percentages of people who text and drive, as it can be very dangerous. This issue occurs daily. By this, we are taking the steps to creating an application where you cannot text while driving at all. This application uses the location ability to see that you are driving and stops your phone from any abilities. This application is free. We would incorporate a gamification aspect with users accumulating points through use, and earn digital medals and be featured on a global leader board with other avid users. Our group is aware that there are other applications that exist such as: Overwatch, and Safe Driving but these both cost money and do not have the ability to turn your phone. These two applications only have the ability to remind you not to use your phone while driving and notify your parent or guardian of the account that you are doing so, by this our application will be different from the others that exist. Our group’s ultimate goal is to reduce texting and driving.

**Problem Definition**

Our goal is to design an application that reduces texting while driving by disabling texting functionality from phones while the person is behind the wheel. Texting while driving is very dangerous, and many people are guilty of it. Drivers need to learn to put their phone down while behind the wheel. This issue only gets worse as time goes on.

**Empathy**

Our group decided to ask our community their opinion on texting and driving. We conducted a survey that consisted of five questions. We got a tremendous amount of people to respond to our survey which in return made for great results for our group project. The survey questions were: “Have you ever been directly affected by someone who was texting and driving?”, “If there was an application that decreased the ability to text and drive would you use it?” “Do you text while you drive?” “Do you currently have an application on your phone pertaining to texting and driving?”, and “what is your age range?” These questions covered our group’s whole topic, to see how many people do text and drive and if they would utilize an app such as this. Our group shared the survey on our social media sites over a week's time period. We had over two-hundred responses to the survey in that time. As we expected, only six percent of our respondents had said they have an app like this already on their phone. The rest of our respondents do not currently have something like this, but sixty percent of them said they would use one if it was available. The results from the survey showed our group that if this application such as this were to exist, then the texting and driving statistics may decrease. Reducing texting and driving is the ultimate goal for our project.

**Stakeholders**

Stakeholders can be the targets of the effort of those whose lives might be affected by the effort. Down the Road has identified that we want to help reduce the probability of accidents by reducing texting while driving with a phone application. Distracted driving by texting diverts an individual’s attention from the task of driving, thus endangering driver, passenger, and bystander safety. Texting while driving is considered one of the most distracting activities because it requires visual, manual, and cognitive attention from the driver.

With that being said, the primary stakeholders, those directly affected by Down the Road, would be those who have the application on their phone. These individuals can be adults and teenagers who are current drivers. However, according to the U.S. Department of Transportation Summary of Statistical Findings, all drivers in the age group of 15-19 years old have the largest percentage of drivers who were distracted at the time of vehicle crashes. 1 Those who text and drive have the highest influence and impact of Down the Road because we are aimed at reducing texting while driving a vehicle. What we need from these stakeholders is their agreement that texting and driving is a problem that is only getting worse, and their willingness to use our application that is a solution to this problem.

Secondary stakeholders, those whose lives might be affected, are an extensive list including: family members of texting drivers; parents of teenagers who text and drive; passengers in a vehicle with a texting driver; police officers on the road or on duty; medical officers who report to the scene of a vehicle accident, construction or road maintenance workers on the road; any motorist driving near a person who is texting and driving; and any bystander who is near a road while a driver is texting. All these secondary stakeholders are highly affected by texting and driving because they can become victim of injury or death, personally or indirectly from distracted driver accidents. Nevertheless, Down the Road can have a high impact in their lives as well. Although the initial attitude from these stakeholders may be very positive, the Down the Road application will only work if they help contribute to the usage our application.

1.<https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812132>

**Constraints**

Constraints are conditions or circumstances that limit the boundaries of our project and the expected results. Because our goal with Down the Road is to design an application that reduces texting while driving by disabling texting functionality from phones while the person is behind the wheel, there are many hard and soft constraints associated. Initially, a hard constraint, or one that must be met, is the drivers must have a smartphone that has applications. If the motorist has an older phone such as a “flip phone” that is not a smartphone, it will be impossible to place this application and implement Down the Road. According to the Statistics Portal website, statistics show that in 2014 there was 1.57 million smartphone users in 2014, 1.86 million in 2015, 2.1 million in 2016, and is predicted to grow every year. 2

A second constraint for the Down the Road application is the price to make an application. Based on the Savvy Apps website, applications built by smaller companies are likely to cost anywhere between $50,000 to $100,000. 3 However, based on information from the Fierce Wireless website a person would also need to calculate in the cost of maintenance, which is usually about 15% to 20% of the development cost.4 With that being said if the application cost $100,000 to fully develop, it is estimated that maintenance would cost $20,000 a year. Additionally, we would need certain technical expertise to fully develop and maintain the application.

A third constraint of Down the Road application that we are likely to experience is being up to date with software on phones. For example, we would need no earlier than iOS 8 for the iPhone, Lollipop for Android, and Windows 8.1 for Windows Phones. In relation to software on the phones, another constraint would be that we also need to consider updates and maintenance of the application when there are software updates on the phones to ensure that the application continues to work properly. In addition, when developing the apps, we would need to take into consideration the screen sizes and resolutions of different types of phones to ensure that Down the Road application is fully compatible with all applicable smart phones.

Furthermore, we would also have to identify how much data and battery life this application would use because a person would be less likely to use this application if it killed their battery life or used too much of their data. Another constraint is that our application would need to be integrated with the phone’s functions to be able to turn off text capabilities while driving. With that being said, this app would also have to be in tune with the phone’s GPS functions to recognize when the user is traveling over 15 miles per hour. Furthermore, this app would also need access to the phone’s camera so it could recognize the user’s feet on the pedals.

The last constraint is that there are currently various other applications that help reducing texting while driving. However, when the Down the Road team conducted surveys of over 100 individuals from 16 and older, 93.75% answer “No” when asked “do you currently have an app on your phone pertaining to texting and driving”. Furthermore, because of the reason that there are other applications out there, yet texting and driving rates are still increasing. Our application would come preinstalled to phones purchased, so it would already be included in the interface of the phone and could not be uninstalled.

2.<https://www.statista.com/statistics/330695/number-of-smartphone-users-worldwide/>

3.<http://savvyapps.com/blog/how-much-does-app-cost-massive-review-pricing-budget-considerations>

4.<http://www.fiercewireless.com/developer/maintaining-app-critical-to-its-overall-success>

**Ideation**

Initially, the idea for our project started out on a Post-It note among other common problems that we as a team have experienced directly or indirectly. As we analyzed the other problems, texting while driving stood out because of the intensity of the problem that is continuing to grow every day. We then started a brainstorming session to come up with different solutions with this problem. In this simple brainstorming session, we deferred any judgement while encouraging wild ideas, but stayed on the topic of helping reduce texting and driving. One of the most important aspects of our brainstorming session is how we built on the ideas of others because classmates were walking around the classroom giving project ideas and new insights which is actually how we gained an additional team member.

Our group estimated that a majority of those who text and drive include the population between ages 16 and 25, therefore we needed a relatable and “cool” way to help eliminate some of the texting and driving. Some of the initial solutions that we brainstormed included a program that teaches awareness of texting while driving, system to link your car’s computer system to your phone, and finally an application on the driver’s phone that disabled the texting abilities. Of course we understood that there were already applications for phones that tried to reduce texting while driving but had failed, so we began brainstorming a way to make a new type of application that was different. From this we began to say that our application needed to be implemented by the public so we decided that it needed to be pre-installed on the phone and not able to be uninstalled rather than downloadable by people at their own volition. Furthermore, it was a mutual agreement that the application will be automatically turned on while the user is moving over 15 mph. Building off of this idea we agreed that our application needed to be more appealing so we include a gamification aspect similar to Fitbit in which the amount of minutes a person drives without unlocking their phone while driving over 15 mph will count towards a score which they will be listed in a global leaderboard in which they receive a “golden star” when they reach a certain amount of points or ranking.

As a team, we then continued to work on the design of the application which we mapped out in a mind-mapping technique to organize our thoughts. (see attached mind-map) The application would be available for iPhone, Androids, Windows, and any other compatible smart phones. This application will also allow the phone user to call emergency services while moving over 15 mph including 911.  We also realized that phone users may be angry if this application is pre-installed on their phone that turns on automatically but they are just a passenger so we were came up with the idea to have the camera on the phone sense if there are pedals or no pedals thus allowing the person to text if it does not recognize pedals a function similar to Amazon Prime’s camera detection. During this brainstorming process, we agreed that we would come up with a name for the app “down the road” when we finished designing it but then we realized that “Down the Road” was the name that stuck.

Lastly, we also figured out that we needed to conduct surveys to determine whether the public would approve and agree to an application such as this one. After receiving positive feedback, 66.33% of our 200 surveyors responded “yes” to “if there was an application that decreased the ability to text and drive, would you use it”, we determined that we needed to decide whether this application was feasible, that is if it could be technologically designed.  With that being said, one team member has contacted his coding/computer science professors.

**Concept Filtering**

        Given the complexity of phone applications and all of the background functions that needed to be accounted for to make the idea of the application feasible from a technical stance, the group had to develop many ideas on the different functionalities of each aspect of the application, and then combine those separate aspects to make one smooth concept. Several of these aspects were easy to filter down to one method/idea. For example, the obvious best choice for tracking the phone’s speed of movement was to use the “Location Services” functionality which comes standard to every smartphone.

The largest difficulty was finding a feasible way to reduce texting and driving with an app without limiting access for passengers (not driving) and also make the verification strong enough that drivers couldn’t access their phone's features without going to extreme and extraneous measures. At first the group could not brainstorm any viable ideas to meet the limitations given. The idea of just locking the phone entirely occurred, but that would have completely destroyed the capability of a passenger using their phone; which would overall cause the app to become a failure because no one would want to be unable to use their smartphone to pass time during a trip. The final and most viable idea was to use an app such as “Amazon Flow” which uses the phone’s camera to scan the area at which it is pointed at for items that could be for sale on Amazon’s online marketplace. Using the same concept, the team realized it would possible to use the same functionality for verification when movement speed has excelled 15 miles per hour, having the phone’s user point the camera at their own feet. When pointed at their feet, the app would then look for shoes/feet and brake/gas pedals. If pedals or no feet/shoes were scanned by the camera the app would not allow the person to access their phone. This idea was perfect because it would be easy for the passenger to verify they are not driving and gain access to their phone.

**Prototyping**

**Testing**

**Conclusion**

**References**

