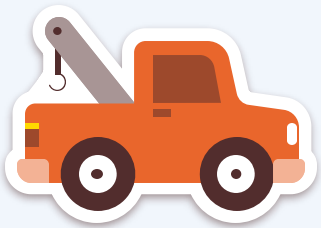
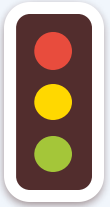


CAMPUS STREET SAFETY

IST 341 | Group 6
Carlton Hsu, Yuna Lee, Marcus Truong, Mark Young

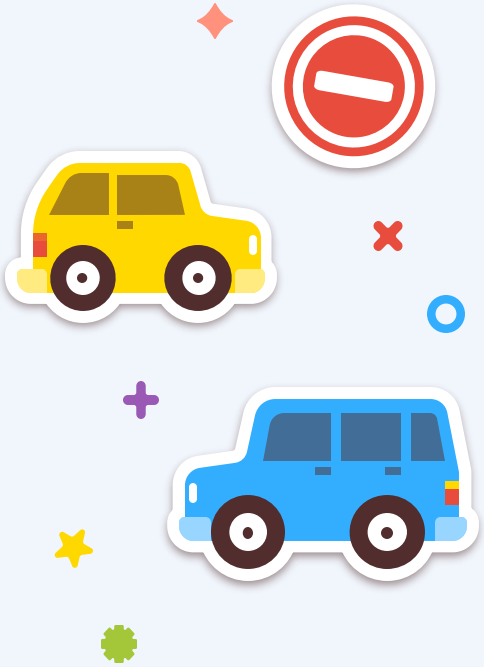




OVERVIEW



01

INTRODUCTION



BACKGROUND/CONTEXT

- My observation at Waverly Ave/University Ave Crosswalk during peak activity at 5 pm reveals diverse pedestrian behaviors.
- Despite busy traffic and a central campus location, there is a notable lack of adherence to safety measures.
- Many pedestrians engage in jaywalking, with some distracted by phones and headphones, and others carrying heavy loads.
- Instances of jaywalkers being aware of oncoming traffic and adjusting their pace are observed.
- Some individuals and groups wait for traffic lights, while others disregard the signals.
- The presence of fast-moving bikes adds complexity to the pedestrian environment.
- Findings underscore the need for improved signage, increased awareness, and potential interventions to enhance pedestrian safety at the observed crosswalk.

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OUR PROBLEM STATEMENT

Syracuse University faces a pressing issue with campus street safety, specifically at intersections controlled by traffic lights. Through data gathered through observation sessions, the problem revolves around instances of pedestrians ignoring red lights, using their smartphones while crossing streets, and going along with the herd or also known as "mob mentality". The complex problem is influenced by factors such as convenience, societal norms, and cultural disparities, and this leads to jaywalking, traffic accidents, and traffic congestion. The issue is further compounded by driver behavior, confusion regarding crosswalk signals, and the unpredictable behaviors of pedestrians.

To consider this issue effectively, it is important that we consider both traditional user-centered design approaches and critical design perspectives but for this project, we will mainly focus on the traditional user-centered design approaches. Our problem occurs in many streets across campus but is mainly focused on areas where there are a lot of vehicles that travel around the streets. Vehicle congestion mainly happens during rush hour and pedestrian crossings are busy before and after classes. There is no one reason behind the lack of compliance with street safety, however, our data and research show that time and convenience are the big factors that contribute to the problem. Our aim is to enhance campus street safety and promote responsible pedestrian behavior without making it something that is difficult to adjust or is a burden on pedestrians or drivers. Success will be measured by a reduction in unsafe crossing incidents and an increase in awareness and compliance, especially at these critical intersections with busy traffic lights.

Campus Street Safety Issues:
- Predominant issues at traffic light-controlled intersections include red light ignoring, smartphone use, and "mob mentality."

Complex Influencing Factors:
- Influenced by convenience, societal norms, and cultural disparities, leading to jaywalking, accidents, and congestion.

Problem Scope:
- Campus-wide issue, particularly in areas with high vehicle traffic, peaking during rush hour and class times.

Approach Consideration:
- Project primarily focuses on traditional user-centered design approaches.

Root Causes:
- Lack of compliance rooted in time and convenience factors, supported by data.

Project Objective:
- Enhance campus street safety without burdening pedestrians or drivers.

Success Metrics:
- Measure success by reducing unsafe crossing incidents and increasing awareness/compliance, especially at critical intersections

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02

RESEARCH PROCESS

USER RESEARCH PROCESS METHODS

Observations:

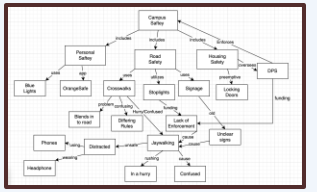
- Session #1 (2:10pm – 2:45pm)
  - Location: Outside of Ernie Davis Hall
- Session #2 (4:58pm – 5:28pm)
  - Location: Waverly Ave/University Ave Crosswalk

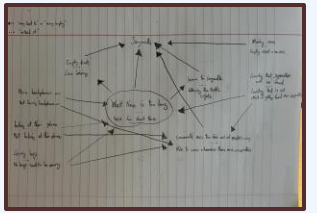
Interviews:

- All the interviewees have been around campus (Syracuse University)
- Include Students, international students, and family

Diagrams:

- Stakeholder Map Diagram
- Concept Mapping
- Cognitive Mapping





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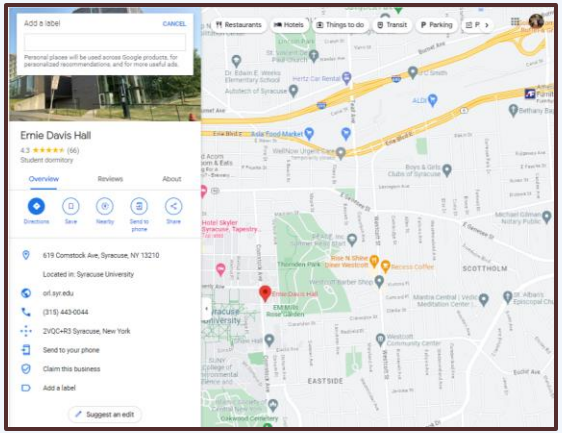
USER RESEARCH PROCESS OVERVIEW

Date: 10/13/23, Friday
Session #1 - Outside of Ernie Davis Hall (2:10pm – 2:45pm)
Session #2 – Waverly Ave/ University Ave Crosswalk (4:58pm – 5:28pm)



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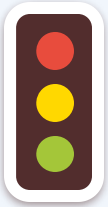
USER RESEARCH PROCESS OVERVIEW



What we observed overall:
Pedestrians crossed at the red crosswalk signal

Why we choose these location:

Session #1

- Busy traffic on Friday
- Lot of student going to this hall for the dining hall
- Lot of student pass by to get into University

Session #2

- Busy traffic, especially on Friday
- Lots of activity
- Students traveling to lectures/classes
- People heading home around 5pm

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USER RESEARCH PROCESS OVERVIEW

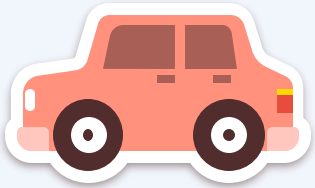
What We Noticed

Pedestrians:

- Most people have their headphones on
- Only a few of people presses the button to cross
- Few people look left and right before jaywalking (Some didn't even look for cars)
- Most likely to cross red in group
- Regular stars at phone
- People jaywalking while there are cars coming towards them

Driver:

- The cars tend to stop for people even on red light for crosswalk
- Some cars drive fast



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OUR DATA COLLECTION

Research: Marcus Truong

Week one sketching assignment we have relied on more visual data such as sketches to understand the pedestrian behavior. This time, we conducted interviews, allowing us to gather qualitative data and insights from the individuals we interviewed. The approach is more holistic understanding of the psychology when people crossroads.

Interviews have different insights based on their upbringing, personal experiences, and cultural influences. The interviewee from Queens, NYC mentioned the influence of peer pressure and mob mentality when crossing streets with others. The interviewee also mentions the role of signals, countdowns, and trust in drivers, and their experience of almost being hit by a car. The Driver and pedestrians' perspective shared experiences from both driving and being a pedestrian, discussing dangers associated with students jaywalking. Also mentioned the importance of engaging people visually, particularly drivers, and the distractions pedestrians face. Culture and Smart cities perspective delve into cultural and societal factors influencing pedestrian behavior, along with the impact of smart city concepts. The role of local environment, infrastructure, and urban planning was highlighted as significant factors. The international perspective (Korea) interview mentions how locations in Korea where jaywalking is not allowed, and violators are fined. This shared that they only learned jaywalking on campus and discussed the importance of reducing waiting times at traffic lights.

Interviews provide insight into the thought process, motivations, and experience of individuals. Observations are more focused on visual cues and behaviors. However, they do not reveal the underlying reasons for their actions. The interviews provide context and depth to observed behaviors. They offer explanations for why people behave the way they do and how culture and environments factor in their choices. This also allows us as policy makers to come up with potential solutions and improvements based on the interviewee suggestions and experiences.

<u>What we discovered from the interviewees:</u>

- Traffic lights take too long
- No places with nearby crosswalk
- Crossing the street in the middle of the road
- Poorly designed infrastructure can impact pedestrians behave negatively
- Decide to jaywalking when seeing a group of people does it

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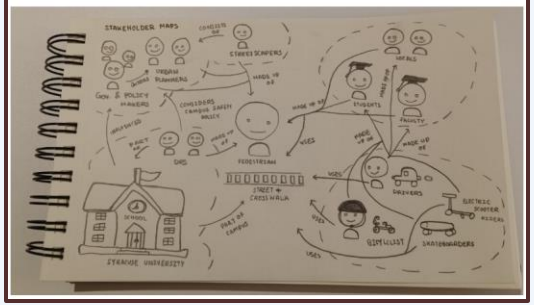
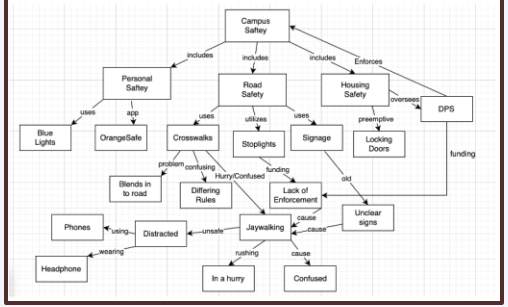
OUR DATA ANALYSIS

Diagram #1: Stakeholder Map Diagram



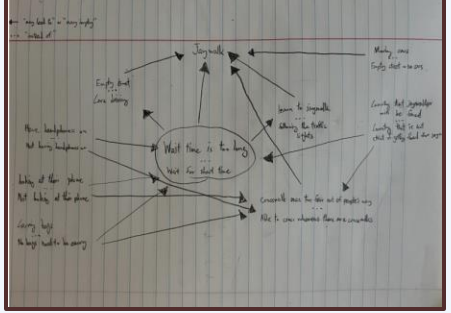
Stakeholder Map – Best represent in a visual format who is the key player in our problem

Diagram #2: Concept Mapping



Concept Map – Allow us to create a visual framework that would connect our ideas and identify the relationships

Diagram #3: Cognitive Mapping



Cognitive Map – Allow us to understand our observations and data collected through interviews

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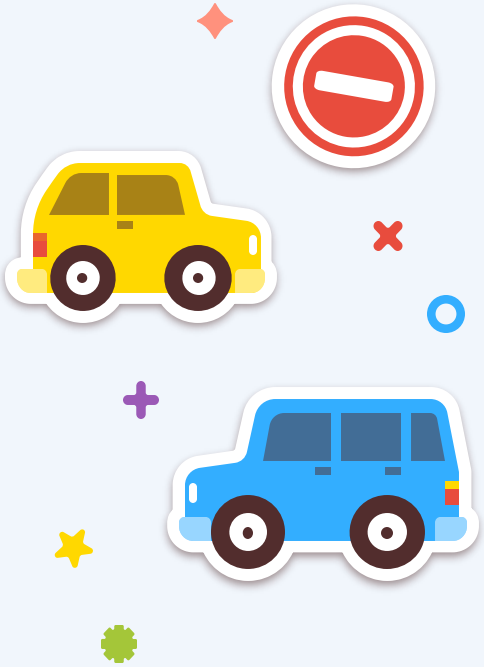
RESULTS



USER NEEDS SUMMARY

- **How might we increase pedestrian awareness and compliance with traffic signals at campus intersections?**
  - This question addresses the main problem of pedestrians ignoring red lights, which has been identified through our observations in assignment A3.1. Increasing awareness and compliance is important for improving safety and reducing accidents.
- **How might we minimize distractions caused by smartphone usage while crossing streets?**
  - This is a user need that is directly related to the problem of pedestrians using smartphones and their unpredictable behaviors from those distractions. It aligns with our observation findings and aims to reduce distractions in order to enhance street safety.
- **How might we design crosswalk signals that are easy to understand and reduce confusion for both pedestrians and drivers?**
  - Mentioned in our problem statement and interviews we found lots of confusion regarding crosswalk signals. This question focuses on user needs for clarity and understanding, which is critical to improve campus street safety.
- **How might we optimize pedestrian flow and vehicle traffic at busy intersections to reduce congestion and waiting times?**
  - This is a user need to address the issue of traffic congestion during rush hours, which is another aspect of our problem. Efficient traffic flow and reduced waiting times are essential for both pedestrians and drivers in terms of their needs.
- **How might we encourage responsible pedestrian behavior without causing inconvenience or burden to pedestrians or drivers?**
  - This question is essential because it relates to the overarching aim of the project. It aligns with our findings that time and convenience are the main factors contributing to the problem and emphasizes the need for a user-friendly approach.

Why these 5 User Needs are Important

- Address potential issues and challenges in the problem statement
- Observations guide us to focus on:
  - Improving pedestrian compliance
  - Reducing distractions
  - Enhancing clarity
  - Optimizing traffic flow
  - Promoting responsible behavior
- Direction for generating possible solutions that prioritize safety, convenience, and user friendliness

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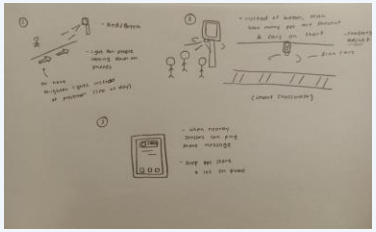
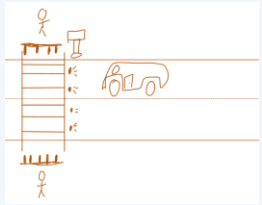
BRAINSTORMING SESSION

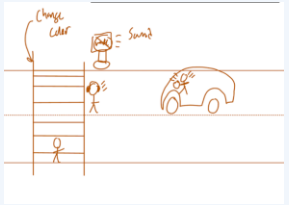
- Conducted two brainstorming sessions
- Had various ideas ranging from refuge islands to teleportation
- Some were more realistic compared to others
- Drew out some sketches of potential ideas
- Narrowed our ideas down to what solutions met our user needs

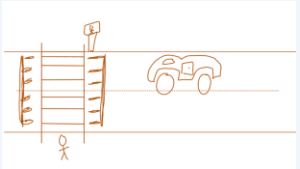
Session #1

Session #2









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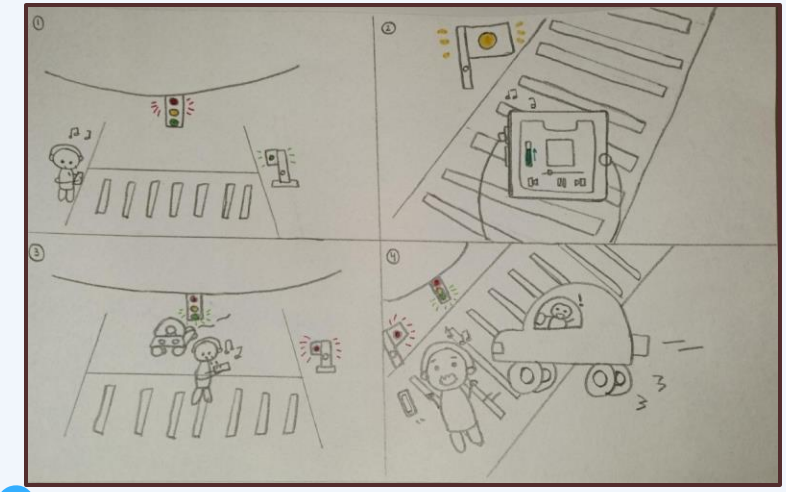
DESIGN ALTERNATIVES #1



Through our observations, we found that many pedestrians stare at their phones at crosswalks. Since many pedestrians are looking at the ground because of their phones, lights on the street crosswalk ground would help the pedestrian to know when to cross the street. This would reduce any pedestrians mindlessly crossing a red light because of their phone usage.

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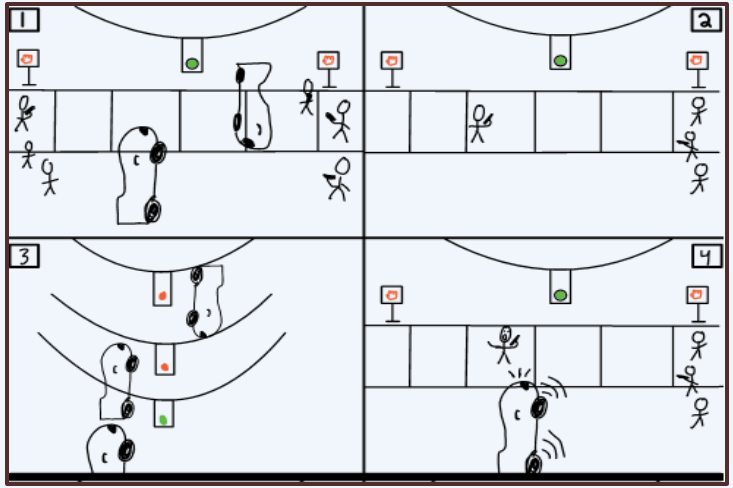
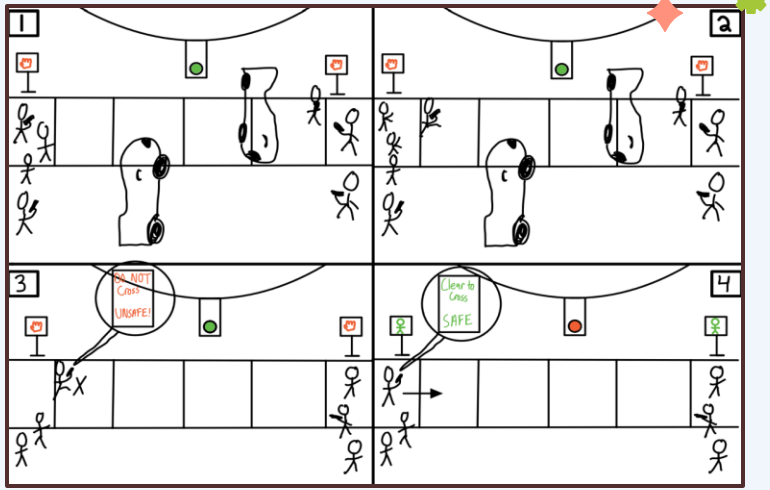
DESIGN ALTERNATIVES #2





A phone alert notification for people waiting to cross the streets that are on their phones that tells them when to cross. The alert would automatically be sent to people's phones that are approaching the crosswalk.

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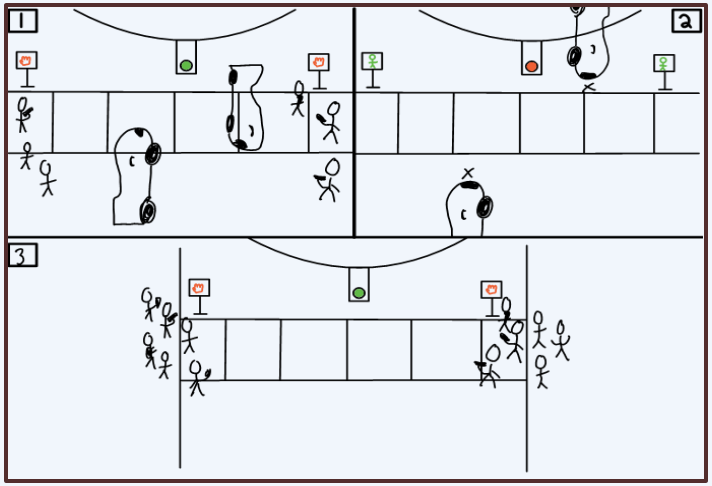
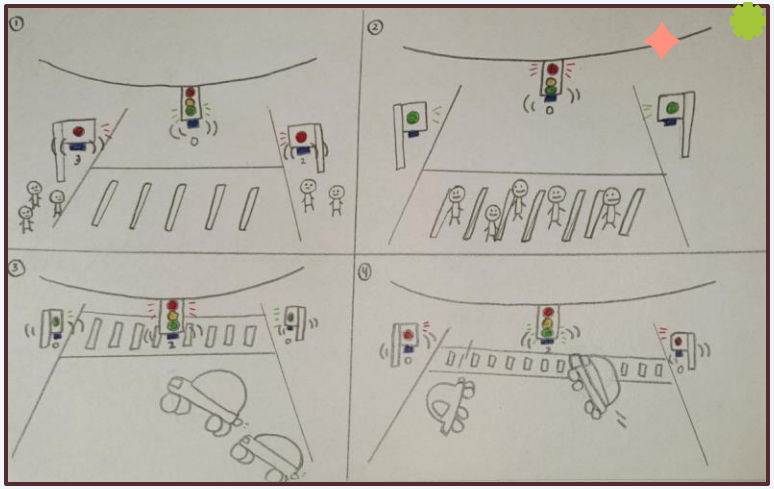
DESIGN ALTERNATIVES #3





A traffic light that can scan the group of people that may or may not be there waiting to cross the street. Based on the number of people waiting it would determine how long the light time would be.

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DESIGN CHOICE

After brainstorming our ideas from observations, user needs, and the problem statement, we decided to combine our final design solution into a single prototype. We considered three design alternatives: a crosswalk ground light, a pedestrian walk alert notification, and crowd scanning to adjust traffic signals. Our design choice is to combine these three designs into one compact device that can handle all of the functions listed above. The device will be attached onto the crosswalk signals or traffic signals, project a strong ground light regardless of weather conditions, and be able to scan pedestrians and cars to change the signals. Combining all functions ensures a smooth transition for pedestrians and drivers, enhancing efficiency in both street safety and traffic flow.

Our final design choice addresses our design problem in a few ways. The problem at Syracuse University involves street safety issues, particularly at busy intersections. Pedestrians ignoring red lights, smartphone use while crossing streets, and "mob mentality" contribute to jaywalking, accidents, and congestion. Factors like convenience, societal norms, and cultural disparities compound the problem, affecting both pedestrians and drivers. To address this, we aimed to enhance campus street safety without burdening users. Our design solution directly addresses Syracuse University's Street safety challenges by creating a crosswalk ground light, pedestrian walk alert, and crowd scanning into a single, adaptable prototype. This compact device will be seamlessly integrated into existing traffic signals and crosswalks, to reduce issues like pedestrians ignoring signals, smartphone distraction, and long traffic. It not only enhances efficiency at busy intersections but also promotes a safer environment by adjusting traffic signals based on real-time pedestrian and car data. The system's weather-resistant features and user-friendly integration aim to reduce unsafe incidents, making it a comprehensive and data-driven solution to campus street safety.

The choice of our integrated design solution stems from a thorough consideration of user research, the identified problem statement, and key user needs at Syracuse University. The problem of street safety, particularly at traffic-controlled intersections, involves issues like red light ignorance, smartphone distractions, and confusion around crosswalk signals. Through user research, we gathered insights from interviews that provided a holistic understanding of pedestrian behavior, considering influences like peer pressure, cultural norms, and smart city concepts. The design solution directly addresses user needs, including increasing awareness and compliance, minimizing smartphone distractions, enhancing signal clarity, optimizing traffic flow, and encouraging responsible behavior without inconvenience. Ground lights improve compliance by addressing red light ignorance and smartphone distractions but may have limited benefits for drivers. While enhancing pedestrian flow, they may not fully fix rush-hour traffic. Phone alerts, though useful, may be ignored due to extended wait times, as observed in our research. The adaptive adjustments in the third design tackle situational factors but overlook smartphone distractions. However, by combining the three design alternatives into a single prototype, we aim to create a user-friendly, efficient, and adaptable solution that aligns with the observations and experiences of both pedestrians and drivers. This approach ensures that our design not only addresses the core issues highlighted in the problem statement but also reflects the diverse perspectives and insights gathered through our comprehensive user research.

Our Solution:
Combination of the 3
Design Alternatives!

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OUR PROTOTYPE

Design Focus:

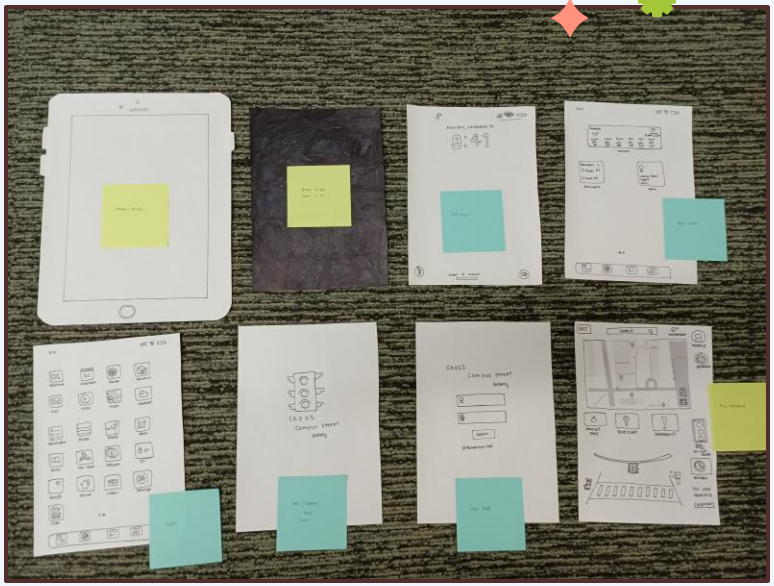
- Centered paper prototype on phone app interface.
- Addresses user needs of minimizing disruptions to pedestrians.

Rationale for Phone App Interface:

- Recognized convenience and time efficiency as crucial for campus street safety.
- Smartphone interface ensures a user-friendly experience.

User Interaction and Experience:

- Aims to enhance user experience.
- Allows pedestrians to receive notifications, stay informed about signal changes, and navigate intersections seamlessly.



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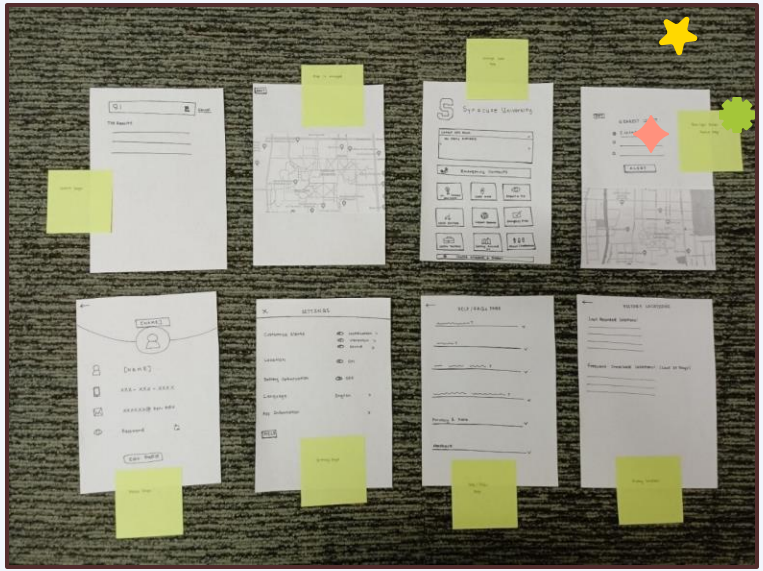
OUR PROTOTYPE CONT.

Functions of the Device:

- Various functions include crosswalk ground lights and crowd scanning.
- Traffic signal adjustments based on crowd scanning data.

Prototype Choice:

- Phone app interface selected for paper prototype.
- Chosen for direct interaction with the user for testing purposes.



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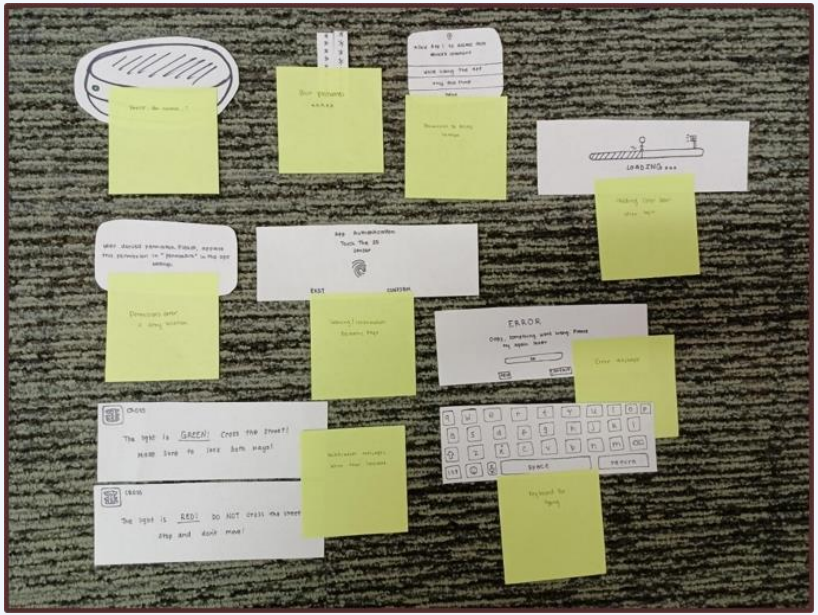
OUR PROTOTYPE CONT.

Observation and Testing:

- Paper prototype creation facilitates observation of user interaction.
- Focus on one part of the design solution to refine and improve user experience.

Overall Goal:

- Design solution addresses identified street safety challenges.
- Balances functionality with user-friendly interaction for effective navigation.



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VIDEO DEMO OF OUR PROTOTYPE

Short clip of how our paper prototype works

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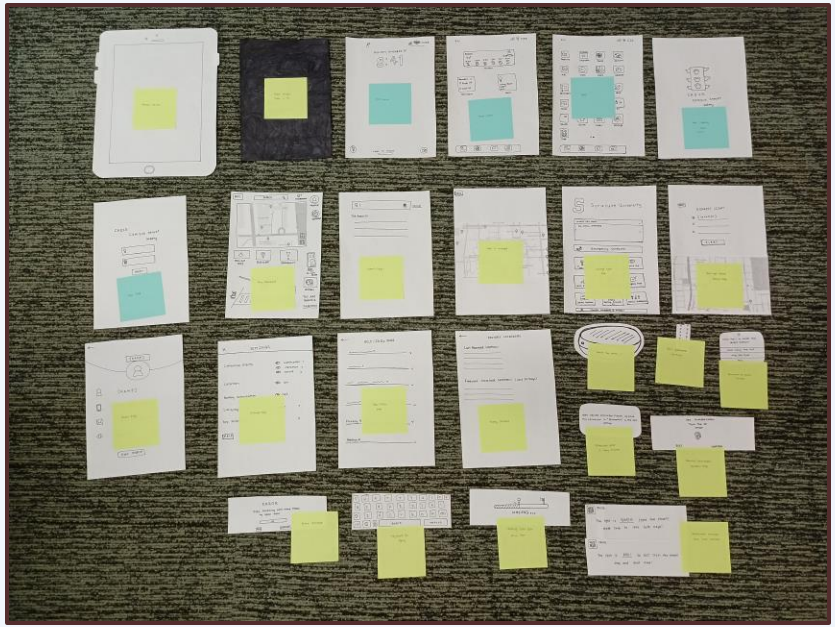
EVALUATION OF PROTOTYPE

- Planning
- Organizing
- Users Steps
- Printing out images such as a map saved up a lot of time rather than drawing it all out
- Time consuming and required a great deal of specific and detailed work



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CONCLUSIONS

OUR KEY TAKEAWAYS

- **Heuristic Evaluation**
  - Repetitiveness of the prompts which lead to a redundancy that personally affected the team member's experience
- **Cognitive Walkthrough**
  - As few steps as possible for the user to get notification about crosswalks
- **Prototype**
  - Forced us to focus on specific tasks
  - Low-fidelity prototype; design our solution quickly, make changes, focus on the bigger picture, and no technical skills are needed

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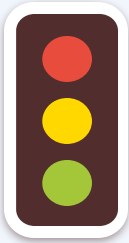
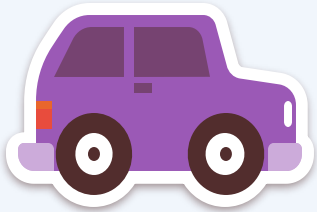
HOW OUR DESIGN WILL EVOLVE OVER TIME

- Better Materials
  - Construct the prototype and the resolution is the level of detail, sophistication, and accuracy of the prototype
- Mid-fidelity to high-fidelity prototype for our design solution
- Device for Crosswalk Signs
- Redesign of Crosswalks
- Sensors Attached to Traffic Lights





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THANKS!

QUESTIONS?

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