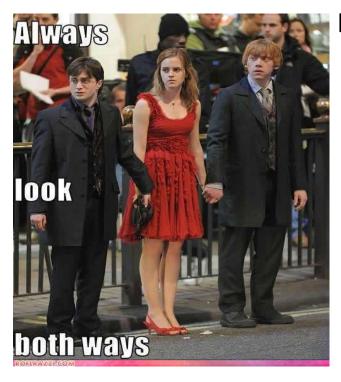
## Reducing Pedestrian Fatalities via an Interactive Game





In the following presentation, we will review steps in the interaction design process used to produce a design for a **crossingbox-mounted interactive game**, designed to discourage pedestrians from crossing against the light, by distracting them with a game that is only enabled when the red man is shown.

## Overview



- Introduction
- Gathering Requirements
- Sketching
- Prototyping and Evaluation
- Conclusions

## Introduction





Pedestrians count for **51% of traffic fatalities** in London<sup>1</sup>. Crossing a busy street can take several minutes of waiting. In today's fast-paced culture, many bored commuters are tempted to chance a crossing against the light.

This project attempts to **reduce red-light crossings** and instill a sense of **civic pride** and unity at the same time.

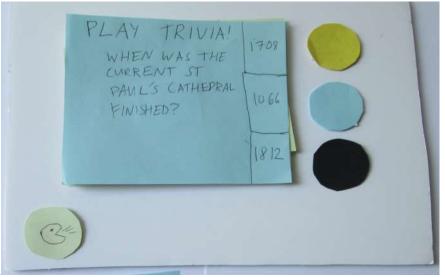
## Final System Idea



Some jaywalkers cross the street to save time, while others do it out of simple **boredom**.

This ubiquitous computing technology consists in a signalbox-mounted interactive game, which asks trivia questions related to the city of London.

Studies show that **tourists are often the first** to try out ubiquitous computing technologies so this game hopes to draw them in as it is relevant to their interests.



In addition to preventing unsafe street-crossing, the London-based subject matter of the game is designed to **foster a sense of place** and the social nature of the game is designed to encourage spontaneous conversation, and thus social interaction in the sometimesintimidating urban environment.

### Initial User Research: Aims



Who are our users?

What are their habits?

What is the context of use?

What is the social environment of use?

We attempt to triangulate our users' needs using two different methods:

### **Observation:**

The first user research method was an **open-ended observation** of a typical crossing in London, to understand qualitative information, such as basic context of use and environmental information.

### Survey:

The second user research method was a more targeted survey designed to assess and quantify habits of users and their needs. The survey included a basic idea for the project in order to gauge target-user interest.

## **Observations**





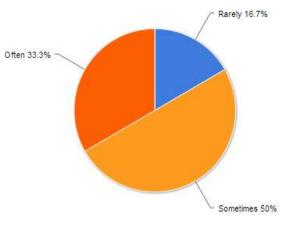
- When traffic was light, many people crossed against traffic.
- There were certain times when almost everyone crossed against traffic in a big group
- There were "crossing leaders" who other people followed
- Some people would always wait for the light
- When waiting, most people looked up the street to watch traffic
- Observed that boxes are exposed to the elements and vulnerable to vandalism

## **Results of Survey**



- All respondents under 35, 2/3 male
- All walk in Central London >once/wk
- None with disabilities, 5/6 owned smartphone
- 50% satisfied with crossings, 1 neutral, 1/3 dissatisfied
- 5/6 always or sometimes crossed against the light
- 5/6 enjoy digital games
- 5/6 would play a smartphone-compatible game
- 1/3 would be less likely to jaywalk with a game

How often do you cross the street at a crossing, but against the light? I.e. when the pedestrian symbol is red.



# Survey Results Continued



10. When you cross against the light or where there is no crossing, why do you choose to do that? (Check all that apply)

Value	Count	Percent %
Because I'm bored	2	33.3%
Because I'm in a hurry	3	50.0%
Because it is clearly safe	3	50.0%
Because it is safe enough for me	4	66.7%
Other	1	16.7%



13. If there was a game mounted to the street light, would you use it?

### 1/3 cite boredom as a reason to jaywalk

11. What do you do while waiting at a crossing? (Check all that apply)

Value	Count	Percent %
Watch traffic to see if I can cross against the light	4	66.7%
Look at my smartphone	1	16.7%
Just wait, think my thoughts	1	16.7%
Other	0	0.0%

 2/3 try to cross against a light as a way to pass time while waiting



 2/3 expressed interest in a streetlightmounted game

## Initial User Research: Findings



#### **Findings:**

Judging by the responses to the survey, in which the majority stated they crossed against the light, and the observations in which, again, **most individuals crossed against the light**, the safety situation is serious. **1/3 of survey respondents cited boredom** as a motivation for crossing against the light. It seems there is a clear user-base for a pedestrian-crossing game.

### **Usefulness and Appropriateness of Methods:**

The **questionnaire** was extremely useful as it **quantified** public opinion. As an individual I had suspected that there was dissatisfaction with crossings in London, especially with concern to safety, but the results from the survey confirmed that strongly.

Observation was also useful, although I could see how it would be more important for more specialized environments, as I already had general experiential knowledge of London crosswalks as a pedestrian. However, even in a situation I had casually observed before, being an active observer led to insights into the project that I wouldn't have thought of in a "genius-oriented" design approach, such as that children would need to be able to reach the game.

## Requirements Drafted from Initial User Testing



### **Functional Requirements**

- Prevent people from crossing the street prematurely.
- Be engaging
- Capture and maintain users' interest in a short period of time
- Not interfere with safe street crossing
- Not dependent on smartphone

Non-functional Requirements				
Context of Use	Social Environment	Technical Environment		
Used outdoors on a busy street-would need to be:  • Durable  • Difficult to dismantle or steal  • Impermeable to weather	Able to be used by <b>one or many</b>	Compatible with crossing signals from TFL, and electrical supplies from existing signal-box.		

### Personas





George

183cm

High-powered lawyer

Competitive, tries to be the best at everything

45, male

Short on time



**Pawel** 

Primary school student
Curious
Low English
comprehension
8, male
Has copious free time
127cm



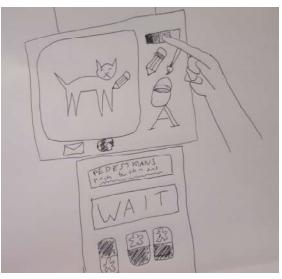
Roberta

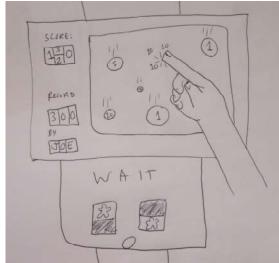
Stay-at-home Mother
Concerned about safety foremost
41, female
Usually waits for the light to cross
the street
Usually with children, wants to set
a good example
165cm

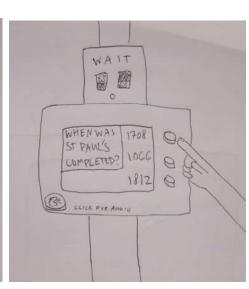
# Development of Idea: Sketching



## **Generating Ideas**







1. Drawing Pad

2. Bubble-Pop Game

3. Trivia

# Evaluating Sketches: Getting the Right Design



	Sketch Idea	Pros	Cons
	1.Drawing Pad	<ul> <li>Could upload images to repository, make art project representing city</li> <li>No language knowledge needed</li> </ul>	<ul> <li>Requires touchscreen, which may be more delicate</li> <li>Only one person can interact at a time</li> </ul>
	2. Bubble-Pop Game	No language knowledge needed	Only one person can interact at a time
ea >	3. London Trivia Game	<ul> <li>Many can play at once</li> <li>Can have audio option for those with poor vision or reading skills</li> <li>Durable: can have protected screen and physical buttons</li> <li>Educational and inspires a sense of place</li> </ul>	Depends on English

Chosen idea

Low-fi, throwawayable sketches helped to articulate ideas and narrow down the design from many possibilities

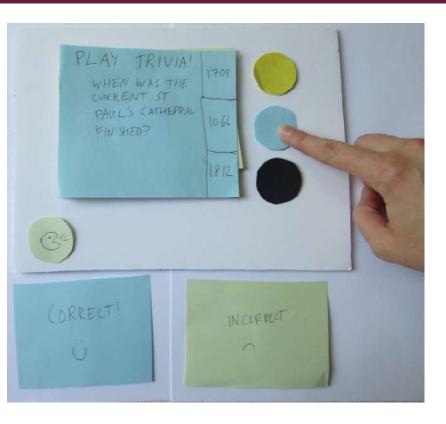
## Scenario





## **Prototype Evaluation**





- This prototype was a **low fidelity**, **paper-based prototype.** It used a foamcore base with cut paper
  buttons, and interchangeable paper with sticky backs
  to represent screens.
- The testing method was "Wizard of Oz" in order to best mimic actual functionality without possessing the technology to implement it. Users were coached to do a "think aloud" evaluation.
- It aimed to test timing. As a product designed to use a short amount of time, it needs to fit that time appropriately and provide a satisfying experience in a short time.
- I also hoped to gain feedback on **general usability** and engagement.

# Prototype Evaluation Results



The Wizard of Oz method was really useful as it allowed me to really test the idea rather than get bogged down in implementation problems.

Think aloud was pretty useful, although I did have to fight the urge to explain the project at times, to see if the user could work it out on their own.

Positive Findings				
Affordance	Timing (the tested parameter)	Engagement		
Could discern that speech button would read questions out loud	There was sufficient time for the average user to answer several questions and have a satisfying game experience before light change	High enjoyment level observed		

## Prototype Evaluation: Issues



#### Issue:

**Feedback Desired:**Prototype was designed to be continuous, until interrupted by light change. Users wanted a defined time of use, with a countdown and a defined ending with a score.

Recommendations: Give the users what they want! Communicate with crossing system to provide a countdown until the light will change. Then stop the game 10 seconds before this and display a celebratory screen with score and time listed. This could also display a countdown until the light would change so that the user would be fully prepared to safely cross the street when the light was green.

#### Issue:

#### Social Interaction:

Mostly used on an individual basis

#### **Recommendations:**

Based on the "crossing leader" situation seen in the observation during requirements gathering, it is likely a real-world situation would often encourage social use of the game in the presence of a strong leader. The **display could be made** larger so that many people could see it; indeed, could not avoid seeing it: that would make it more clear that it is a group activity.

#### Issue:

#### Affordance:

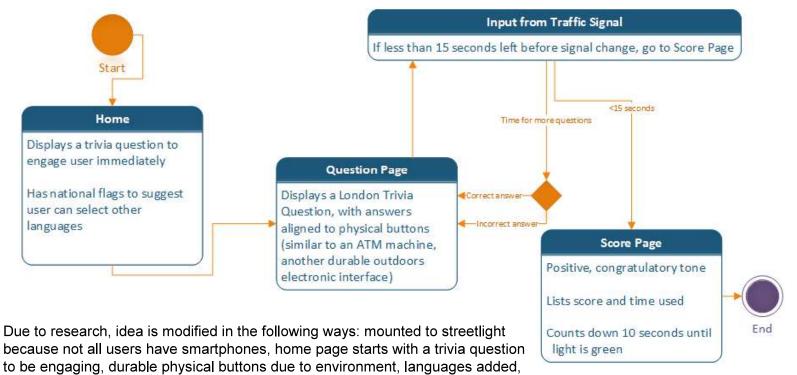
Tried to touch the screen at first but quickly learned they needed to touch the physical buttons

**Recommendations:** None, this is acceptable

## Final Product Idea: State Transition Diagram

score page and countdown added





## Conclusions and Next Steps



Creative use of **ubiquitous computing presents a unique opportunity** to create unity through shared experience within the urban environment and spark dialogue among neighbours.

A **user-centered design approach** was at times difficult to arrange in that it required convincing others to spend their time working with you, but it provided invaluable guidance as far as **establishing** actual **requirements** and improving the design **iteratively**.

Smartphone dependence was not included in this project as user research revealed 1/6 of users may not have a smartphone; however, this game provides rich possibilities for **extension** when combined with **mobile computing**. Users could associate their games with a profile, share their high scores on **social media** and classified by **geography**, so that someone could be the "mayor" of Hampstead Road and Euston Road crossing, for example.

There could be a **separation between novice user and expert user**, in that there could be hidden "Easter eggs"; for example, scores could be tracked on a certain historical path, such that the game would essentially guide you on a tour of the city. This would allow high engagement with the game and the city, as well as not interfering with basic use of the game.



The following are supplementary information, research, sketches and notes and a references section

## References



- 1. Parnell-Hopkinson, Beth. (2013, November 15). Won't Somebody Think Of The Pedestrians? [Web log post]. Retrieved from http://londonist.com/2013/11/wont-somebody-think-of-the-pedestrians.php
- 2. Sharp, Helen, Yvonne Rogers and Jenny Preece. *Interaction Design:* Beyond Human-Computer Interaction. Chichester: John Wiley & Sons Ltd, 2007. Book.

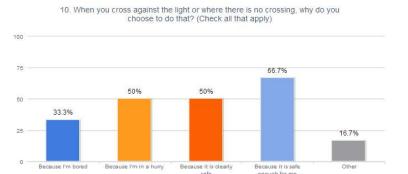
## Full Text of Survey

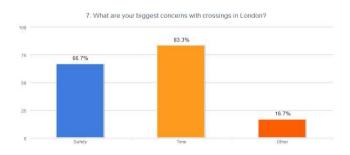


- 1. What is your age?
- 2. What is your gender?
- 3. How often do you walk in Central London?
- 4. Do you have a disability that affects your ability to cross the street?
- 5. Do you own a smartphone (mobile phone with internet access)?
- 6. How satisfied are you with pedestrian crossings in London?
- 7. What are your biggest concerns with crossings in London?
- 8. How often do you cross where there is no crossing?
- 9. How often do you cross the street at a crossing, but against the light? I.e. when the pedestrian symbol is red.
- 10. When you cross against the light or where there is no crossing, why do you choose to do that? (Check all that apply)
- 11. What do you do while waiting at a crossing? (Check all that apply)
- 12. Do you enjoy playing digital games such as mobile, video, or computer games?
- 13. If there was a game mounted to the street light, would you use it?
- 14. If there was a game that co-ordinated with your smartphone, would you use it?
- 15. If you had a game to play would you be less likely to jaywalk?
- 16. Please use this space for any additional comments or suggestions, thank you.

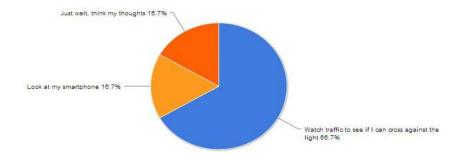
# Selected Additional Results from Survey







11. What do you do while waiting at a crossing? (Check all that apply)



### Pedestrian Survey Responses: Comments and "Other" Responses Explained



- 7. What are your biggest concerns with crossings in London?
- ID2: Other: Drivers are very aggressive when stopping. They reduce their speed just before the stop.
- 10. When you cross against the light or where there is no crossing, why do you choose to do that? (Check all that apply)
- ID2: Other: no cars.
- 14. If there was a game that co-ordinated with your smartphone, would you use it?
- ID2: Comments: It depends on what it does.
- 15. If you had a game to play would you be less likely to jaywalk?
- ID2: Comments: It depends on how the game work or is mounted.
- 16. Please use this space for any additional comments or suggestions, thank you.
- ID2: Comments: What if the game also makes people to cross the street without watching.
- ID4: Comments: awesome, they did that in a city in Germany! super successful!