ZEN

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Prototyping Tools for UX Design Tools

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INTRODUCTION

This project is the outcome of the semester-long studio project course Prototyping Tools for User Experience (UX) Design. LG Electronics was the industry sponsor for the project. Over the summer, research was conducted to understand what people they do with their phones and what they wish they would be able to do [1]. This research informed the remaining design project. It is referenced in latter parts of the document as 'summer user research. The team's task was to use the summer research, generate its own findings, synthesize themes and translate them into design concepts for the smartphone UX.

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PROCESS OVERVIEW

This project is the outcome of the semester-long studio project course Prototyping Tools for User Experience (UX) Design. LG Electronics was the industry sponsor for the project. Over the summer, research was conducted to understand what people they do with their phones and what they wish they would be able to do [1]. This research informed the remaining design project. It is referenced in latter parts of the document as 'summer user research.

Areas of Exploration → **User Needs + Aspirations** → **Brainstorming + Prioritizing** → **Designing a UX**

Phase 1: Finding Areas to Explore

In this phase, the team brainstormed UX areas that seemed interesting to explore. The team used the areas suggested by the LG UX Design team, along with the summer research and its own personal experiences to list areas of the phone that could be worked on. Different aspects of the phone were examined and the ways people used their phones were listed. Among others, they included:

- Security and privacy aspects such as dealing with passwords and the phone recognizing its user
- Emotional aspects such as the phone creating a personal bond with the user by allowing new gestures for interaction
- Contextual aspects such as adapting vibration alerts to the user's context, and providing relevant information when user is outdoors
- Social aspects such as how people connect with others in various circles
- Hardware aspects such as being able to customize the phone

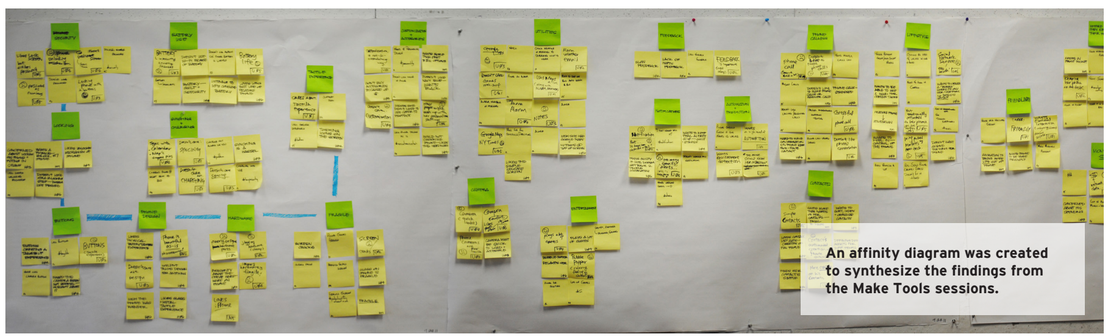
From these aspects, the team decided to target University students and young professionals who are 20-30 years old. Any of these aspects could be explored for the phone UX. The team chose not to explore core applications, information architecture or social networking aspects.

An affinity diagram was created to explore a wide range of themes and concepts.

Phase 2: Understanding User Needs + Aspirations

In order to understand users' aspirations for their current phones, design research tools called make tools were used. They allow participants to be creative and express their perceptions and needs visually. They can vary in form from visual collages to physical artifacts [2]. The team wanted to understand users' initial interaction with their phone and the contexts they found themselves in. Hence, the make tools were designed to allow users to express their emotions towards the phone and their wishes for it.
In the research, participants had to create a collage depicting how they felt about different aspects of their phone. They were given a set of phone aspects on square-shaped pieces of paper, and a set of emotions on small tabs of paper. The aspects included 'unlocking,' 'calling' and 'battery,' and emotions included 'informative,' 'happy,' and 'tension.' The participants had to create the collage by connecting and organizing the phone aspects and emotions. They were encouraged to start with aspects they were most opinionated about and free to add things as appropriate.

"Everyone's trying to make fancy apps and nice-looking bodies, but more fundamental aspects should be looked at."



An affinity diagram was created to synthesize the findings from the Make Tools sessions.

Make tool sessions were conducted with 6 participants aged 20-33 years old.

The research was conducted individually with 6 participants aged 20-33 years old. They owned feature phones, iPhones or Android based phones. Participants were initially given time to build the collage. While doing so, they were encouraged to think aloud. The team would follow-up for any clarifications. Participants were then asked to recount major interactions with their phones in the previous day. Data was collected as collages and audio recordings and affinity diagramming was used to synthesize major themes from it [3]. Various insights were derived from the data from the make tools sessions. They included:

- Users wanted to be able to do certain tasks and view certain information easily without having to go through multiple screens
- Users wanted an emotional connection with their phone and liked tangible experiences
- Users generally liked their lock screens but complained about passwords being an additional layer to access the phone and did not like entering numeric passwords
- Users kept their phones in pockets or purses, and were concerned about calling unintentionally
- The maps application was used significantly to get directions and public transport schedules

Phase 3: Brainstorming and Prioritizing

Based on insights from the make tools research, the team decided to address users' needs for their phone to better understand their environment and intentions, and provide haptic feedback. This meant exploring ideas around automation, prediction and tactile experiences. Several ideas were brainstormed and sketched out in the form of storyboards. These were intended to help the team prioritize and vision the ideas. A key consideration was to grow design ideas that would have a high impact and possibility of being implemented. The ideas included:

- Lock screen that changed according to the situation users were in to display and remind them of relevant information at appropriate times
- Predicting when user puts the phone in their pocket and locking the screen automatically
- Understanding the 'noisiness' of the user's environment and adapting phone vibration alerts
- Recognizing which hand the phone is held in, and making it easier for the user to unlock
- Automatically adjusting the brightness of the screen based on light in the environment, both in front and behind the phone.

Brian gets ready for school and takes a look at the phone. Knowing that it's early in the moring and the location is Brian's home, the phone displays the weather information.

After getting the class assignment done, Brian takes a glance at his phone. It's 10 minutes before the class starts, and the lock-screen automatically displays the class schedule of that day.

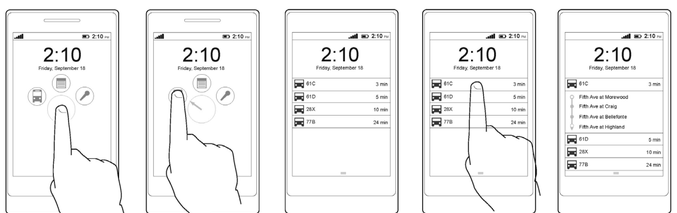
At the bus stop, Brian takes out his phone. Knowing it's at the bus stop, the phone displays bus schedule on the lock-screen.

When Brian goes to the grocery, his phone notices the change of location and displays the grocery list.

Sample storyboard sketch from intial concept development.

Phase 4: Designing a Simple, Coherent and Efficient UX

Although the ideas listed in the previous phase had automation, prediction and tactile experiences as their common themes, they had to be connected by a common thread, filtered and pursued in greater detail. The team found intents and themes common to the ideas in a bottom-up way. The core themes were found to center on enabling quick access to information, environment sensing and making it easier to achieve intents. Each idea was evaluated against these core themes to see how well it aligned with them. The team decided to pursue the ideas of easily unlocking the phone, and providing quick access to relevant information using GPS sensors.



After activating the quick menu, three icons appear around the user's finger, "transportation times", "to-do lists" and "entertainment".

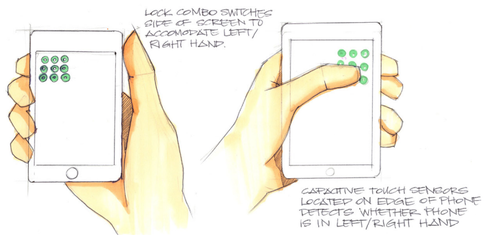
The user drags their finger to the transportation application. Once their finger lifts off the screen, the application launches.

The bus information is displayed underneath the time and date. Buses are listed closest to farthest from the user's location. v

The user can select the bus for more route information.

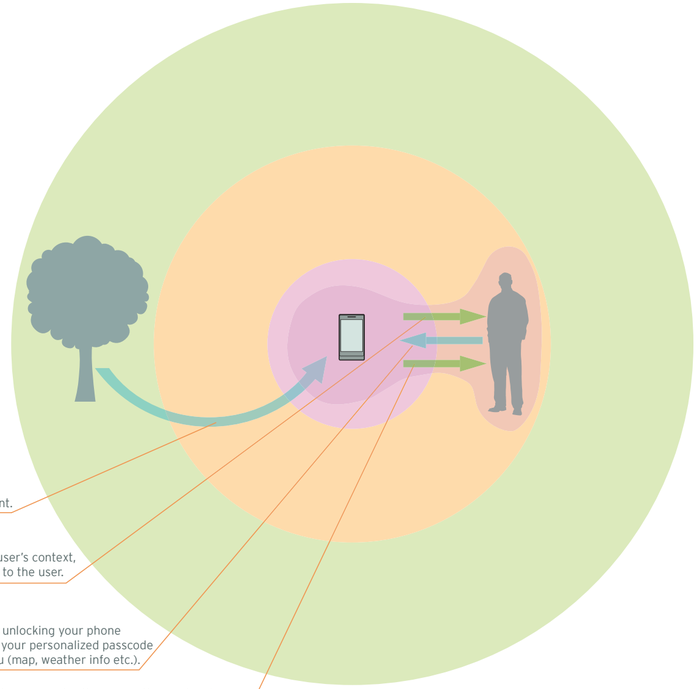
Once tapped, the feature reveals the current bus location with regard to your location.

The hollow bullet point indicates the stop where the bus is currently located. The final drop-pin on the list indicates the bus stop where the user is at.



CONCEPTUAL MODEL

Our core principle is to use a combination of sensors to understand where the user is and enable quick access to relevant information easily. We are focusing on the outer layer of interaction that revolves around the lock screen. This creates a personal bond between the user and their phone.



CONTEXTUAL INTERACTION

The phone senses changes of its environment.

Depending on the environment and the user's context, the phone provides relevant information to the user.

HAPTIC INTERACTION

The haptic input includes unlocking your phone by tapping the rhythm of your personalized passcode and accessing quick menu (map, weather info etc.).

The phone provides the user with visual and haptic feedback and guidance to the next action.

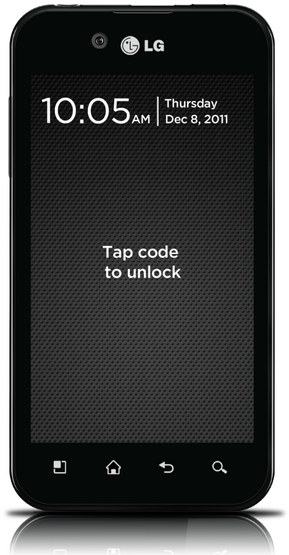
CONCEPTUALIZING ZENE

The target users are often on the move so their contexts and environments vary. The UX needed to be designed for distractions and partial attention. Interfaces should be elegant and fit in seamlessly with user lifestyle. Complexity of information on locational features should be kept minimal and require maximum navigation of up to 2 levels. If it is not possible to reduce complexity, displacing complexity to the user could be considered [4]. Any new gesture designs should require minimal learning and include subtle affordances. Locational features should be useful without being creepy. The team envisioned ZENE, a smartphone with a UX balanced between elegance and practicality. The phone's core principle is to use a combination of sensors to understand where the user is and enable easy and quick access to relevant information. At any time, the user can check out information most relevant to the location at the time through the lock screen. There would be no need to explicitly unlock the phone for this. To access applications, the user can easily unlock the phone by tapping in a secret pattern. The benefit is that the user can unlock the phone without needing to see the phone screen. The user simply presses the home button and taps in the pattern. The phone acknowledges the taps both by visual and haptic feedback. Call answering would be consistent with these interactions.

Quick Access: Information Relevant to User's Location

The team's user research revealed that users frequently used maps at bus stops to see when the next bus would arrive. Users also wanted the phone to recognize their intents and make it easier to perform certain tasks. This inspired a design that utilized the user's location to provide relevant contextual information. The benefit is that the user would not need to unlock the phone to view this information. This saves the user a few seconds while scanning the area for interesting relevant things. The information available through this would not be personal, avoiding the need to unlock.

The user can access this information by touching the central region of the screen [5]. Upon extended touch, 3 circular emerge indicating the most relevant pieces of information available at the time. The icons animate out of the area in contact and move to their positions. This directs attention towards them and hints that the finger be slid to the icons. Once the user slides to one of the options, the respective information is revealed. The maximum number of options available at any time should be 3. This is to ensure a fluid and clutter-free interaction.



After phone is woken from its idle state, the Tap code to unlock affordance is displayed.

1...

User holds down finger on the center of the screen for one second. The instructions fade when finger makes contact with screen.

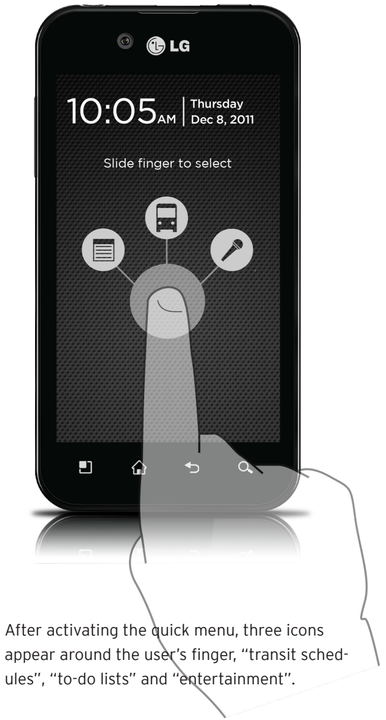
A subtle arc appears around the user's finger. Three icons appear around the user's finger, "transportation times", "to-do lists" and "entertainment".

The user slides their finger to the desired application.

Transit Information: Location-Relevant Application

In this design idea, the phone utilizes a GPS to recognize that the user is nearing a transport hub, such as a bus stop, and provide an option under quick-access that lets the user see when the next bus will stop by. The benefit is that the user can access this information without having to unlock the phone and navigating multiple screens in the relevant maps application.

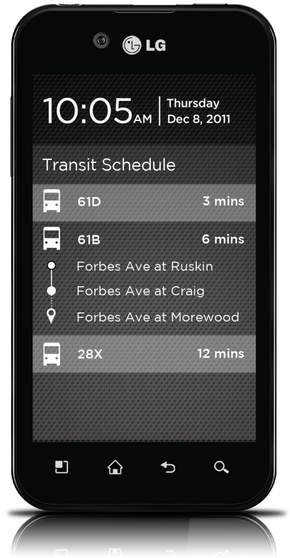
Since this is the most relevant information at the time, the user would not miss it under the quick-access options. The navigation on quick-access options should be at most 2 levels deep. Other potential applications could include location-based reminders for grocery lists or live music events happening nearby.



After activating the quick menu, three icons appear around the user's finger, "transit schedules", "to-do lists" and "entertainment".

The user drags their finger to the transportation application. Once their finger lifts off the screen, the application launches.

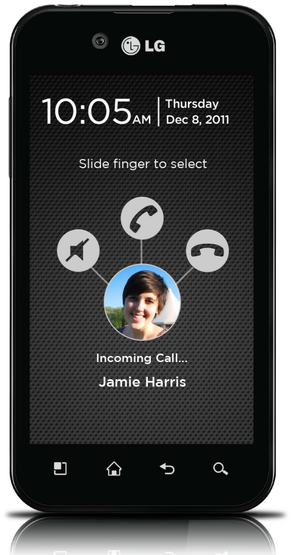
The bus information is displayed underneath the time and date. Buses are listed closest to farthest from the user's location. The user can select the bus for more route information.



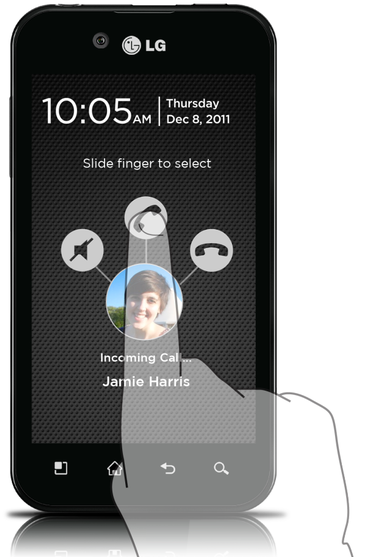
Once tapped, the feature reveals the current bus location with regard to your location.

Receiving Calls

When the user is receiving a call, the caller's picture appears in the center of the phone and 3 options emerge in the form of bubbles, similar to the revelation of the quick-access options. The user can answer the call, decline it, sending the user directly to voicemail, or ignore the call, silencing the phone. The affordances and interactions are consistent with the press-slide gesture of the quick-access menu. The user can silence the phone also by pressing the power button in case the call needs to be ignored without having to see the phone e.g. when user is in a meeting.

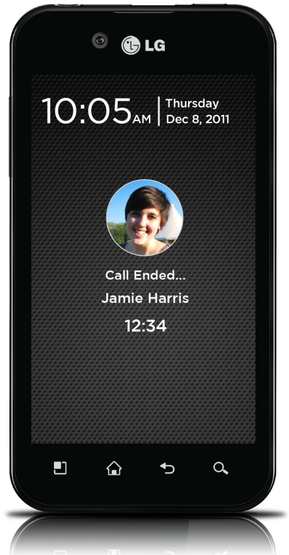


An incoming call is displayed on the lock screen. Three options are presented:
silence, answer and decline (left to right).



The user slides their finger from the center to the top Answer icon to accept the call.

The user can end the call by tapping the "End Call" button.

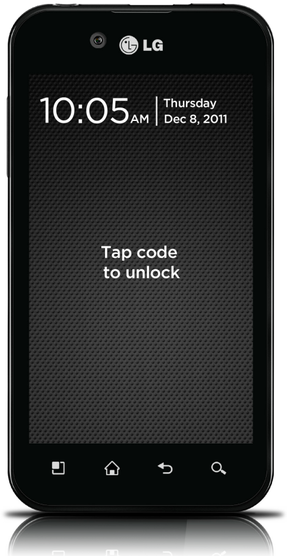


After the user taps on End Call to hang up the phone, the call history is displayed before returning to the lock state.

Tap to Unlock Your Phone

To access core applications, the phone can be unlocked easily by tapping in a rhythmic pattern on the screen. The user can set a secret pattern with a minimum of 5 taps and varying interval lengths between them. The phone recognizes the pattern based on the length of time between each contact with the screen. While the user is tapping in the pattern, the phone responds with light vibrations and visual ripples to acknowledge the taps. This eliminates the need to enter numeric passwords, which can be difficult to enter in a distracting environment, or drawing patterns, which can be traced by observing finger smudges on the screen. Through tap unlock, the phone can be unlocked easily with either hand in noisy environments where users are paying partial attention. In crowded areas like subways, the phone can be unlocked without having to look at it. This helps alleviate privacy concerns. Current smartphones are either (i) easy to use but not very secure, (ii) secure but hard to use, or (iii) moderately easy to use and moderately secure. Tap unlock is designed to be easy to use and moderately secure.

User presses home or lock button to initiate the unlock procedure. The phone wakes up from its idle state.



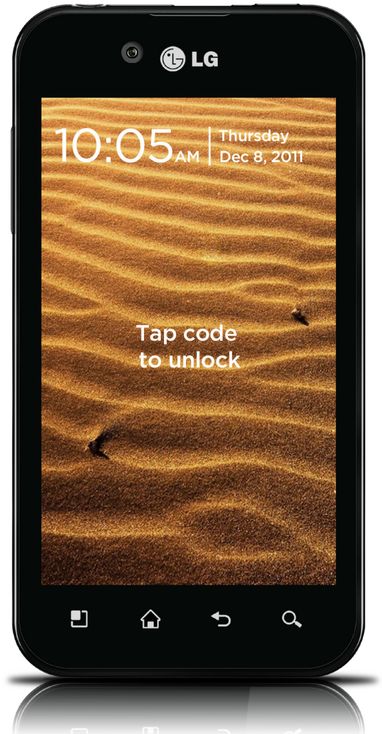
The lock screen shows up. The instructional message indicates that users should begin tapping their passcode on the screen.

The user taps the code on the screen. A ripple effect pulses out from the point of contact. After user taps the correct combination, the lock screen quickly fades away and reveals the home screen underneath it.

The home screen is completely revealed and displayed.

ENVISIONING ZENE FOR THE FUTURE

The world is getting noisier with huge amounts of information available wherever you go. This is overwhelming and reduces people's efficiency, as they have to deal with things that are irrelevant to them. We envision a future where information presents itself when it is relevant to the user. This will increase people's efficiency relieving them from having to deal with irrelevant information. We are at a stage where sensors are becoming accurate enough to allow interesting applications on mobile devices. For example, they are now accurate enough to predict whether a user is busy or not [6]. Hence, we see sensors becoming increasingly important in actively understanding the user's context and making it easier to do things. Technology should disappear into the background and fit into people's lives well enough that they are unaware of even using it [7].



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