

PRODUCT NAME	CLASS	YEAR
Multi-Functional Communication Device: I-twist	HCI 1: Affordance Design Project	Fall 2005

PROBLEM SPACE

Team members should collaborate in the design of a physical (3D) prototype for a mobile communication device that converges phone, camera, and camcorder, with video-conferencing and image transfer capabilities. The device must speak to us with a suggestive language of form and shape, i.e., its physical affordances; hence the object should explain its own functionality, without requiring much from the user in terms of training or reading a manual.

GOALS

The device's goal is to accommodate the target audiences communication needs by providing multiple interactive communication functions that are made obvious primarily by physical affordances. The audience for the device is composed of people inclined to be "innovators" and "early adopters" of technology. Such people typically become local "experts" on the device and influence other potential users.

USABILITY GOALS

- **Efficiency** – Must be rechargeable cell technology to maximize the number of hours it can be used, with a built-in storage memory and capability to expand this with a memory card slot.
- **Effectiveness** – The device must allow the user to access all the required functionality they need anywhere at anytime. It must be portable and menus must be accessible with one hand.
- **Safety** – Operation of this device while in public spaces should not pose any safety hazard to the user or those around them. Such hazards could include distraction by sound or light.
- **Utility** – The device should be compatible with other blue tooth devices as well as standard CF memory expansion cards.
- **Useful Tools** – The user must have all the necessary tools readily available. These include:
 - Cell phone with conferencing options,
 - Digital camera with a quality 3 mega pixel plus images
 - Digital video camera with mpeg compression
 - Video phone conferencing options
- **Easy to Use** – All these tasks must be easily accessible through the menu system, easy to use with well-designed utility, and easy to understand menus. Multiple tasks must be easily achievable at one time.
- **Appealing** – The product itself must be practical but sophisticated in its look and feel. Beyond that, it must be well designed ergonomically so its appeal goes beyond looks and its functionality is appealing.

MARKET ANALYSIS

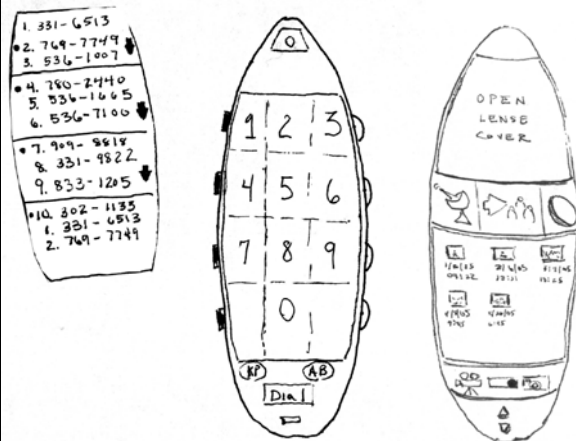
Our preliminary market analysis validated our assumptions about the device's functionality, i.e., most devices on the market were either phone driven with poor quality camera and video capabilities or camera-video driven with no phone functionality. I-twist bridges the gap between these product areas while addressing what we believe is a need in the market.

CONCEPTUAL MODEL

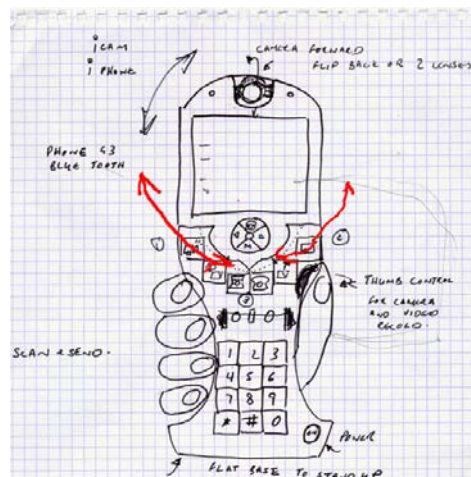
The conceptual model of this device was envisioned as a handheld device no bigger than a 6"x 3" rectangle when stored. The bottom section is designed ergonomically, being comfortably held in the middle of an adult hand. The top section containing the LCD and camera lens should be designed to twist to several different positions represented by icons and accompanied with audible feedback (clicks). Through research into existing camera, video, and phone products on the market, we were able to determine a set of preferred system requirements for the device. Interactive components of the multifunction communication device, tasks and functionality, including: 1) Communication Objective: Receive/send voice/video calls (with voice call and conferencing options), 2) Media Capture Objective: Take digital pictures and video recordings, and 3) Media Transfer Objective: Send picture and video digital recordings to connected people via email or to other devices via Bluetooth.

PROTOTYPE #1 (PAPER)

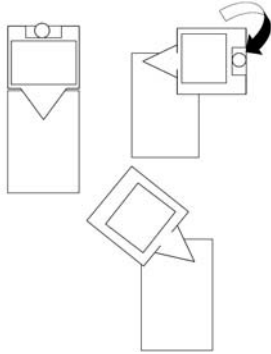
Based on the assigned functionality and feedback from questionnaires, each team member designed their own version of the device prototypes.



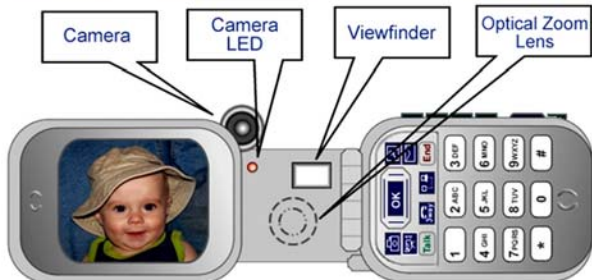
PROTOTYPE #2 (PAPER)



Prototypes #1 (Clay)



Prototypes #2 (Clay)



COGNITIVE WALKTHROUGH

The following describes each of the walkthrough steps in more detail along with the key affordances. **Scenario-** You have just arrived at the top of the Empire State Building in New York. You want to take a picture and a short video before calling a friend and later sending them a digital image.

1. Voice Call (One-to-One)
2. Voice Call (One-to-Many)
3. Video Call (One-to-One)
4. Camera.
5. Video Capture
6. Image transfer via e-mail
7. Image transfer via blue tooth
8. Video Transfer via e-mail
9. Click the thumb button to send images.
10. Video Transfer via blue tooth

DESIGN VALIDATION / USABILITY TESTS

Pre-Test Questionnaire: Our survey included 11 people (5 males and 6 females). Their ages tended toward 35-45 as indicated in the chart: Evaluators represented their own confidence in operating the I-Twist with a generally middle-of-the-road grade. Although the tasks/functions of the I-Twist were not always immediately obvious to everyone, moving between them was clear and easy once shown. We attribute some of this to the evaluator's brief exposure to the I-Twist (approximately 20 minutes) as well as the inherent limitations to truly evaluating functionality on a clay prototype.

Post-Presentation Discussion

- We had the opportunity to present our product to the our HCI/d class peers and 6 invited guests from the IT and usability industries. As expected feedback was consistent with many of our assumptions and market research results. Although our test and survey groups were too small to make accurate predictions on market trends, the users we initially polled and peer evaluators gave us a good reading on the direction this product might take as far as target market needs. Additional feedback from the log testing and walkthroughs also helped us refine the product further.
- The advantage of our product was its unique high-tech look and feel (that appeals to an early adopting group of users) combined with physical affordances that appealed to a wide range of markets (including the retiring baby boomers who like simple, proven technology that they can rely on). Many users were familiar with the features we presented and were excited to give feedback on a product that uniquely combined these features in a way that they would enjoy (if actually available on the market).
- A disadvantage of our product is that it may not be different enough from existing products to differentiate it as new and that it probably would not appeal to the trend-setting business users. It would therefore be in direct competition with all the cell phones that now offer poor-quality camera and video options. However, the ipod-style navigation button, strong icon-driven menus, and twist operation is a radical shift from existing phone and camera navigation options currently available.