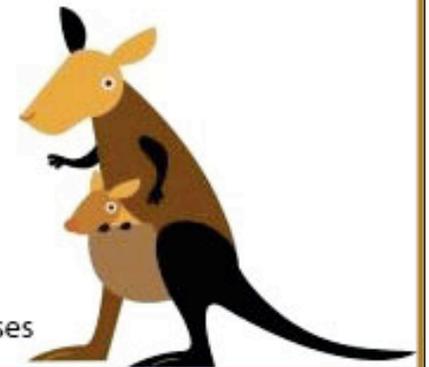# Interaction and Interface Design Prototype Presentation:
# Tracking Tax Deductible Expenses on a PDA

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# Introduction

**Our project:**

Design an interface and interaction for a tax deductible and expense tracking tool to be used on a PDA.

**Our Main Questions and Issues:**

- Paper receipt reliance
- PDA Abandonment

# Our Participants

**Michelle M** – –  Academic who needs to track receipts for reimbursable expenses, almost always professional conferences that happen no more than a few times a year.

**Toma S** – –  Carpenter who must track employer, client and personal receipts on a daily basis. He's developed a low-tech system over the past few years that he is very methodical about.

**Rick B** – –  Insurance salesman who travels frequently and entertains clients. He keeps his receipts in a manila folder but he's usually missing one when it's time to submit them at work.

**Kate Z** – –  Small business owner. She stashes her receipts on the front seat of
her car and attempts to enter them into a spreadsheet daily

**Henrik M** – –  Research scientist for a large university. He uses a Ziploc bag to hold his receipts on occasional travel for work.

"It's important to track the expenses because it saves me money. Remembering to enter the amount onto my spreadsheet can be challenging." – – K.Z.

"I prefer to use a credit card for as many expenses as possible, (thus) I am leaving an electronic trail that I can refer to later" – – H.M.

"When I organize receipts from work I generally designate some zippered compartment and throw those in there until I get home. It stresses me out a bit as I may lose them." – – M.M.

# Our Average User

## Characteristics

- Casual user, with little or no formal financial training, lower frequency of use, and less complex financial tasks to perform

- Little interest in financial systems or technology outside of accomplishing tasks

- Less likely to value financial interface, given lesser interest/ understanding

- Strong concept of Internet and other conventions/devices, sometimes to the detriment of their responses (often offered solutions, not issues)

# Brainstorming and
# Initial Ethnographic Research

We conducted brainstorming sessions as a group, conducted one conference call with our typical user, and conducted an affinity diagramming session with our participants to learn about:

- the user's process
- what matters to the user about their process
- how the prototype responds to the user's process
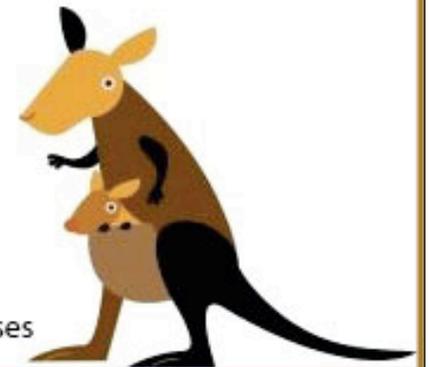
# What is the user's process?

Hands off as much as possible.

Their process was that they didn't have a process.

Forced to have a process
........and no one loved their "process."

- Folding the receipt a specific way and putting it into a special place in their wallet
- A manila folder kept in a briefcase
- Special pockets in luggage
- Front seat of the car....rely on remembering to log the receipts every day
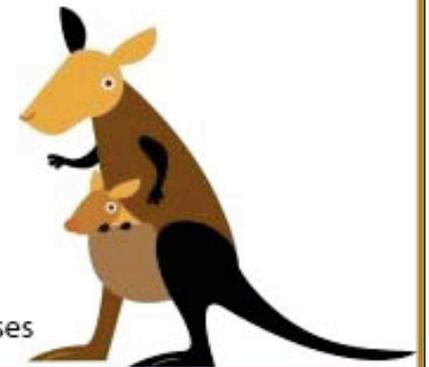
# What matters to the user about the process?

They don't like to do it but they need to, so they:

- Get receipts out of their view (speed)

- Mark the receipts or organized them in their own way (fold, envelope)

- Attempt to keep the receipts where they can be found later (in case they are audited or need to submit originals)

# How does the prototype respond to the user's process?

- Minimalist / Simple / Quick

- Responds to the users' desire to collect and store receipts as easily as possible, including "on the go"

- Advanced features that can be ignored if the user isn't interested

- Interface itself reminds users of actions that can be taken (search, edit)

# Conceptual Positioning

**Christensen (2002, 2003, 2004) and Ulwick (2005) discuss "disruptive innovations"**
- Products or services that disrupt markets, like 5.25" disk drive
- Increasingly important in crowded marketplace, with changing technology

**Disruptive innovations**
- Often do jobs worse, not better, but for a much lower price or more simply
- Target overserved customers or (best case) nonconsumers
- Eventually reshape markets from below/the low end

**Strong implications for design**
- Model can answer crucial design questions up front
- Very useful for positioning design in market/environment
    - – a key factor for success
- Can clarify users and personas
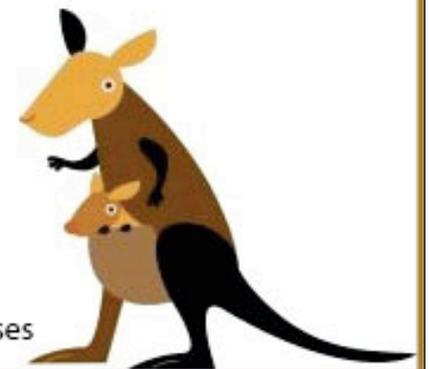
# Cognitive Load

**User group had very high cognitive load with current "systems"**
- heavy burden on working memory
- too much "psychic RAM" (Allen 2003) tied up with tracking receipts
- high chance of "system" failure; failure likely to have critical results

**Goal: decrease cognitive load**
- likely to lead to greater user satisfaction, much less user stress
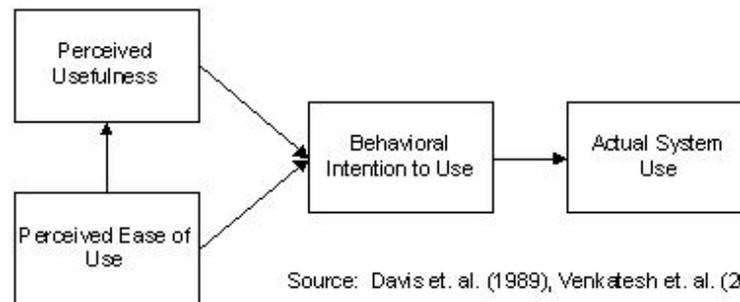- likely to increase system efficiency via use of "memory in the world" (Norman 1986)

**Goal: support user goals**
- recreate their process, only more securely and in a sustainable way
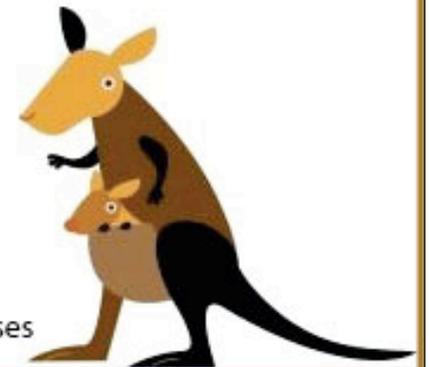
# Technology Acceptance Model (TAM)

**The technology acceptance model:**



Source: Davis et. al. (1989), Venkatesh et. al. (2003)

We needed to design a tool that would be useful to our user group and would also be easy to use.
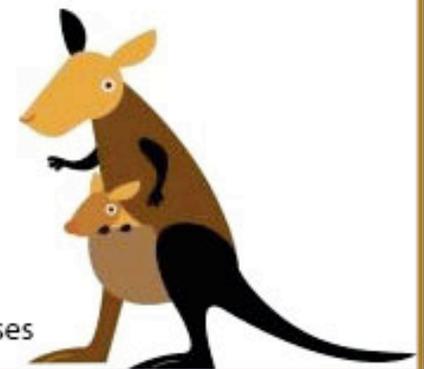
# Hassenzahl & linking emotion to cognition

Emotion and cognition cannot be analyzed separately.

Satisfy user needs within their context to create positive emotions.

**There is a common set of needs people share that can serve as a starting point for design:**

- **manipulation** (goal-achievement)
- **stimulation** (personal growth, an increase of knowledge and skills)
- **identification** (self-expression, interaction with relevant others)
- **evocation** (self-maintenance, memories)
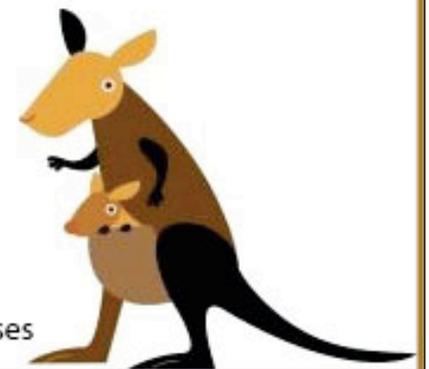
# Reflective Design

Sengers, Boehner, David, & Kaye, 2005 Critical Computing Conference

Encourage use of critical reflective practice to surface unconscious "attitudes, practices, values, and identities" to innovate in design

**Reflective Design Strategies:**

**Provide for interpretive flexibility**.
- While we've concentrated on software to track tax-exempt expenses, it is a platform for any activity that requires categorizing numbers.

**Give users license to participate**.
- User participation is essential to the design process and
- future iterations.
- Users are able to interact with the application as simply or
- as complex as desired.

# Reflective Design

**Provide dynamic feedback to users**.
- A visual cue, such as the switch from one button to three on the main screen, indicates the device contains receipts.
- Application contains memory of search usage over time and provides subtle suggestions to users based on previous search terms.

**Inspire rich feedback from users**.
- Affinity diagramming, iteration and testing strategies for future development.

**Build technology as a probe**.
- Analyze how users use taxonomies to get a better understanding of how people organize data over time.

**Invert metaphors and cross boundaries**.
- Move outside of accountant/features model; turn a complicated process into a simple one; explored our own and user metaphors – kangaroo/nanurai.

## As a starting point for our design:

- Use affinity mapping to determine and reflect upon user goals and processes; build a system that supports these.

- Create an open and flexible platform with the option to develop more complex systems.

- Simplify the interaction to its bare minimum, encourage users to be creative within the restraints.

- Use affinity mapping to uncover emotional attachments to finances and personal organization, and directly address those needs in the design. (exp: creating a digital shoebox – a safe container for receipts with low cognitive load)
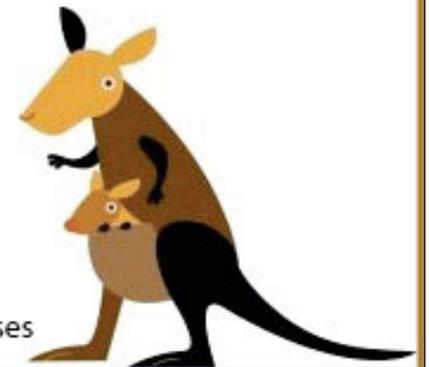
# Process Methodology

- User Interviews and Affinity Diagramming
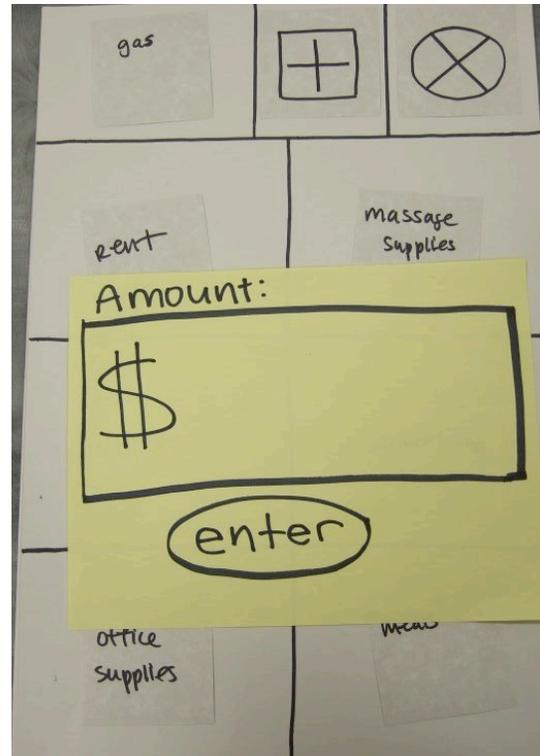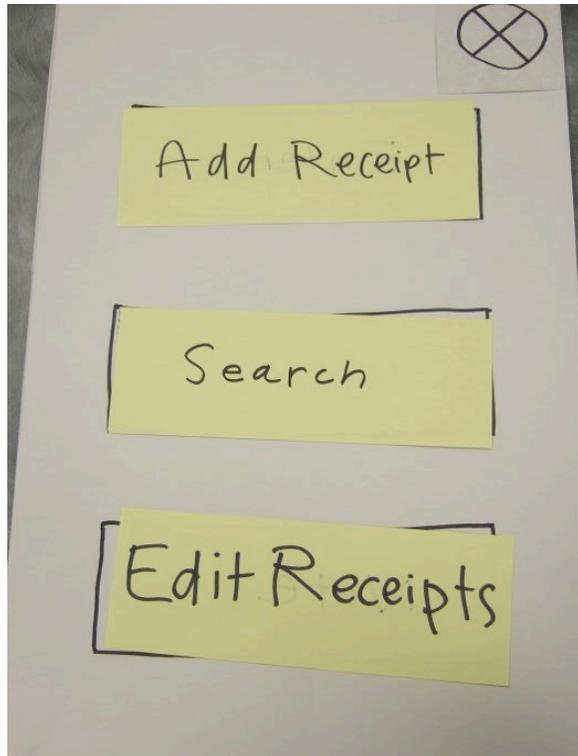  - Understand user concerns, cases, and context
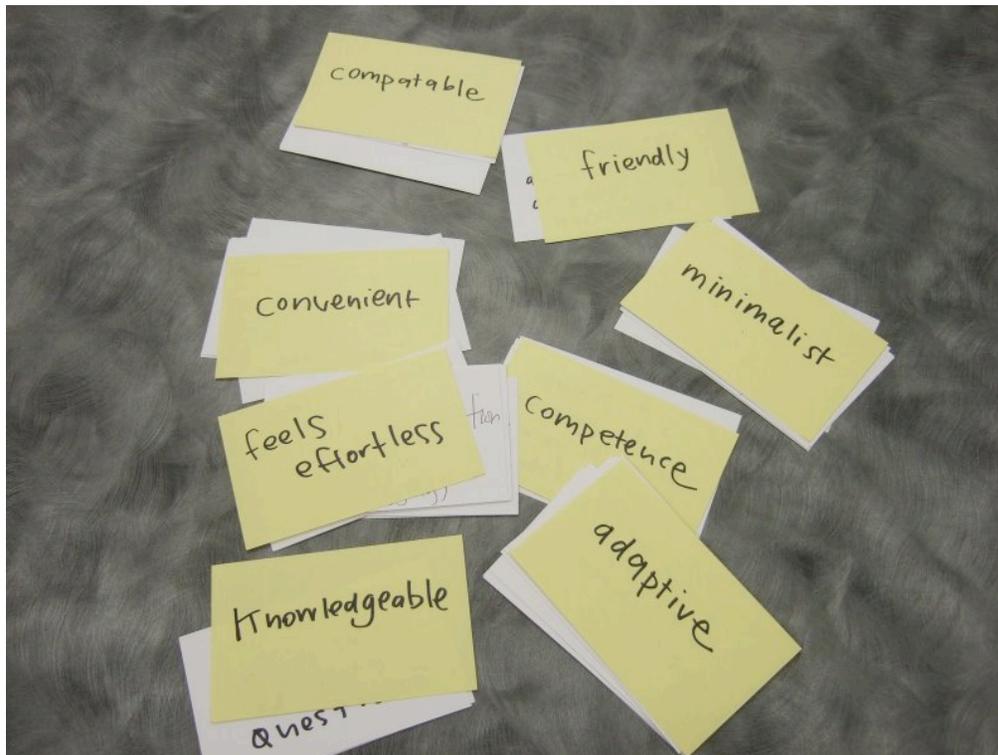
# Process Methodology

- Conceptional positioning and designer affinity diagramming
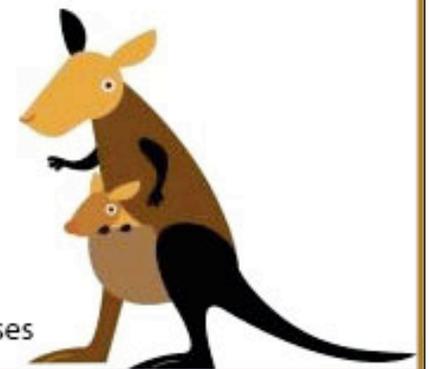  - Initial design ideas and concepts "visioning" exercise
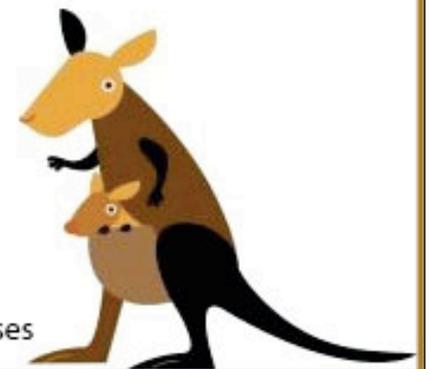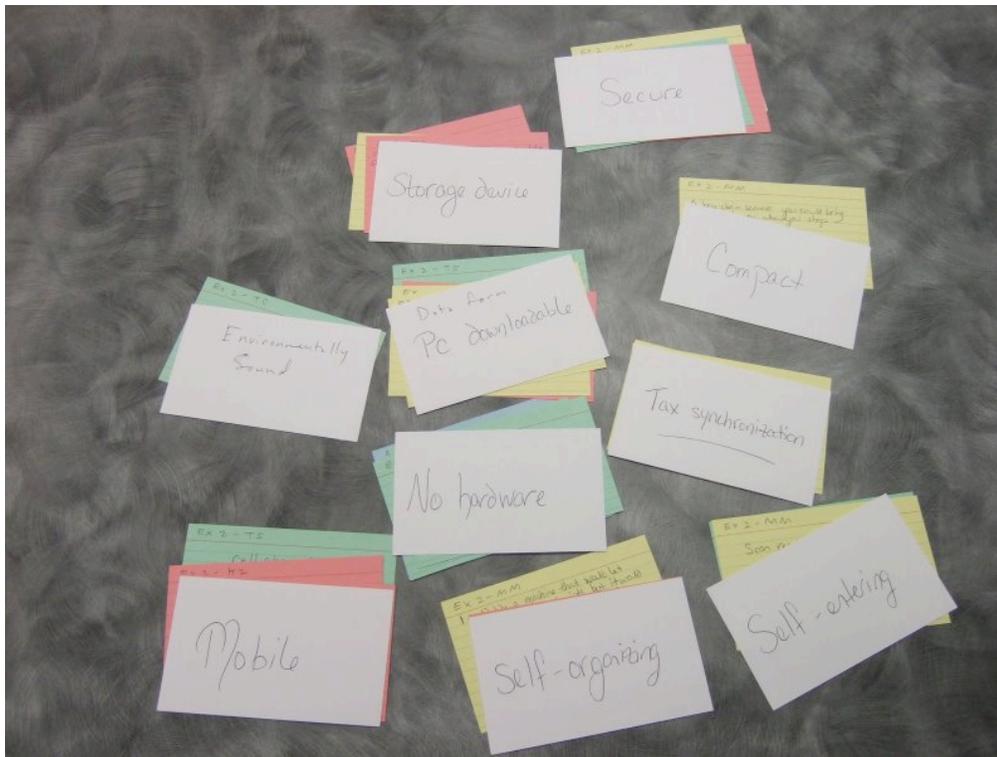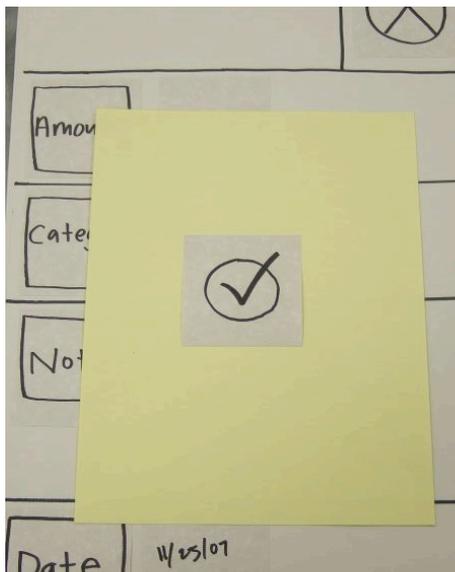
# Process Methodology

- First Prototype Testing Session
  - Tested tasks with user
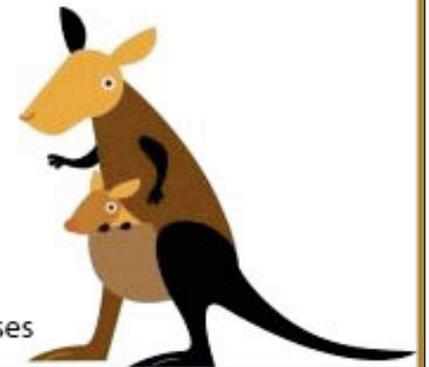
# Process Methodology

- Refining/iterating prototype
  - Reworked prototype according to user observations and feedback

- Final testing of prototype

# First Prototyping Session

We asked the participant to complete a series of tasks, including entering receipts, searching receipts and entering "notes." We tried to make it realistic by using receipts that they might have and setting up scenarios that they might be in when collecting receipts.

**What we learned:**
1. We needed to add a date field.
2. The label "Enter" was not intuitive. Changed to "Add Receipt"
3. There was confusion between "New" and "+" on the categories page. Possibly remove the "+" button.
4. Participant wanted to be able to add more than one note and wanted to do so sequentially without leaving the interface.
5. Participant wanted to be able to make a new category from the initial interface.
6. Assumed no search was available because she hadn't entered anything yet but a search option was available on the main interface.

# Second Prototyping Session

Again, we asked the participant to complete a series of tasks, including entering receipts, searching receipts and entering "notes" while using receipts they might have and setting up scenarios they might find themselves in.

**What we learned:**
1. We needed to add a "done" button to the new category frame.
2. How does the user get a running total off all categories?
3. How does the user tell what tags are supported? Is experimentation suitably stress free/low impact?
4. How do you track a large number of receipts?  Auto prompts to label?
5. Confirmed that we need to remove "+"
6. Need to work out how the tag memory operates; frequency, specificity, suggestion function.
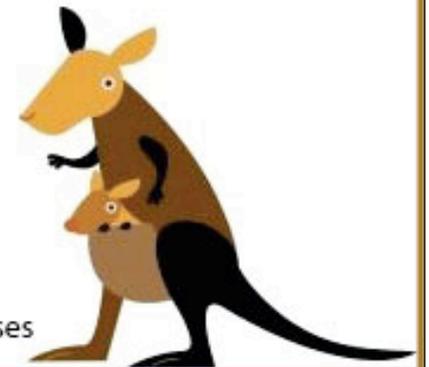
# Final Prototype

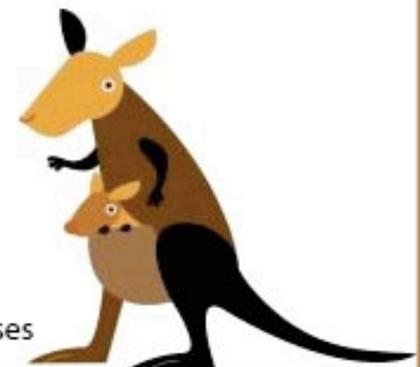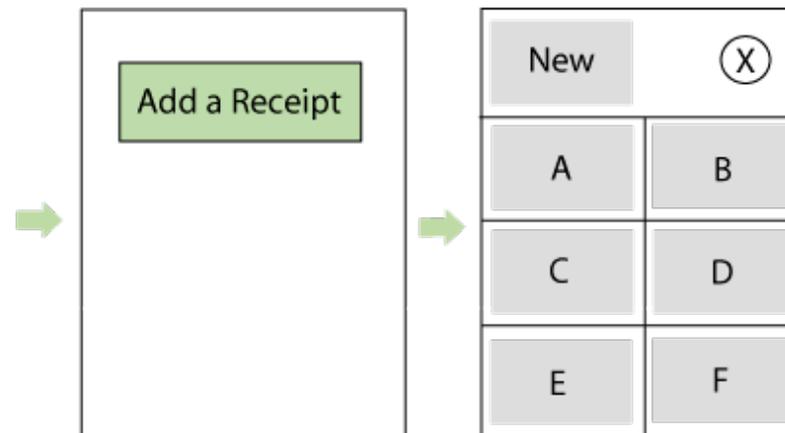**How did our prototype improve through participatory design?**

- From ethnographic research with participants we gained a greater understanding of our participants' relationship with paper receipts and how they approach organizing them

- User behavior directly influenced task flows (choosing a receipt category first made interface much more usable)

- Doing paper prototypes really brings home the importance of focused, minimalist task flows
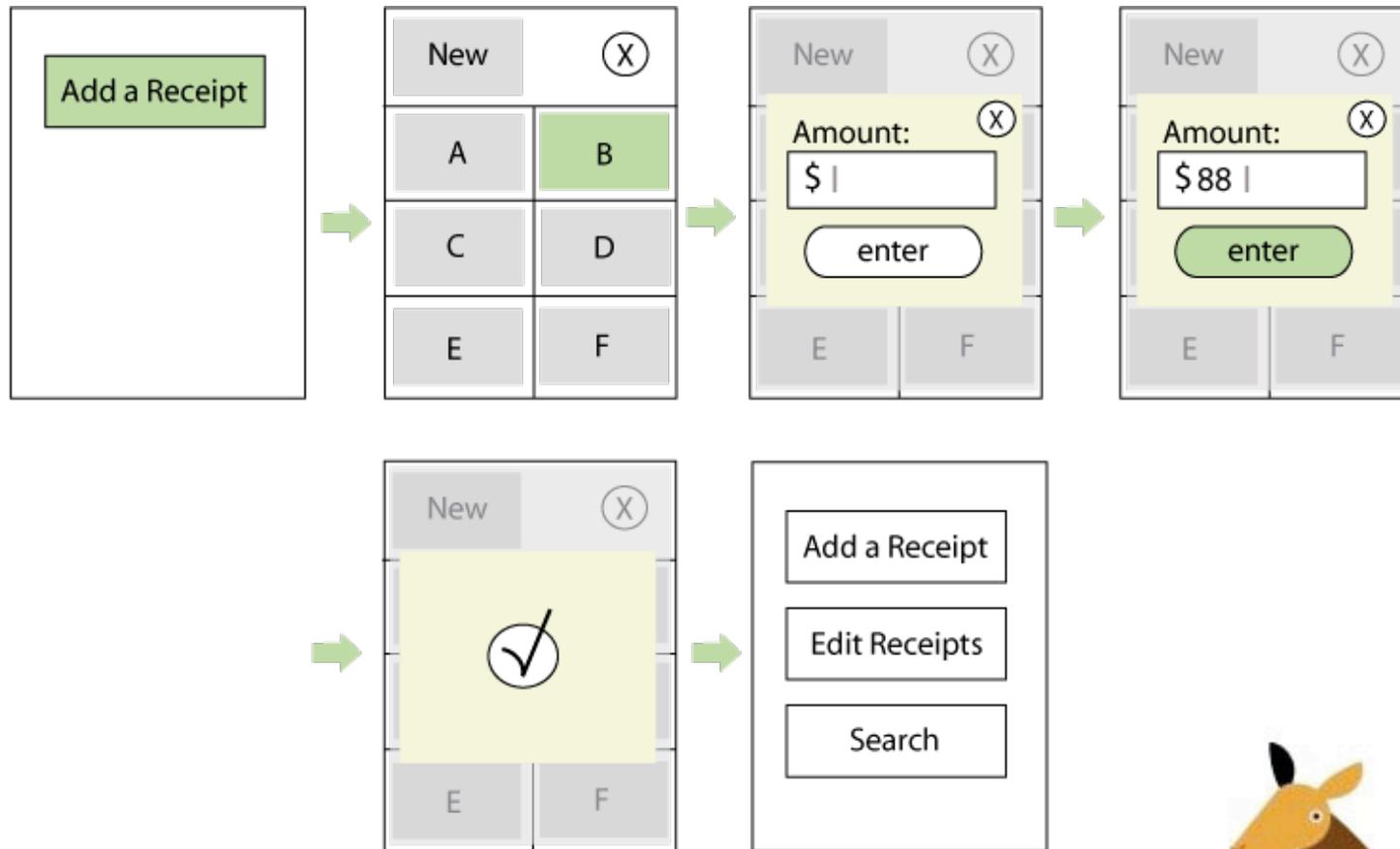
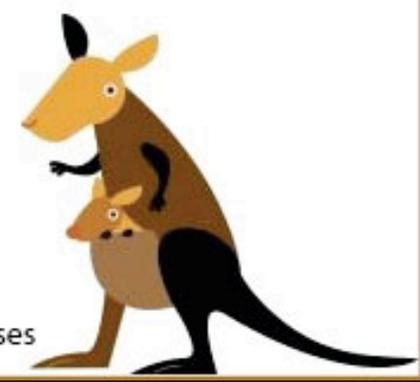- It's only obvious to you
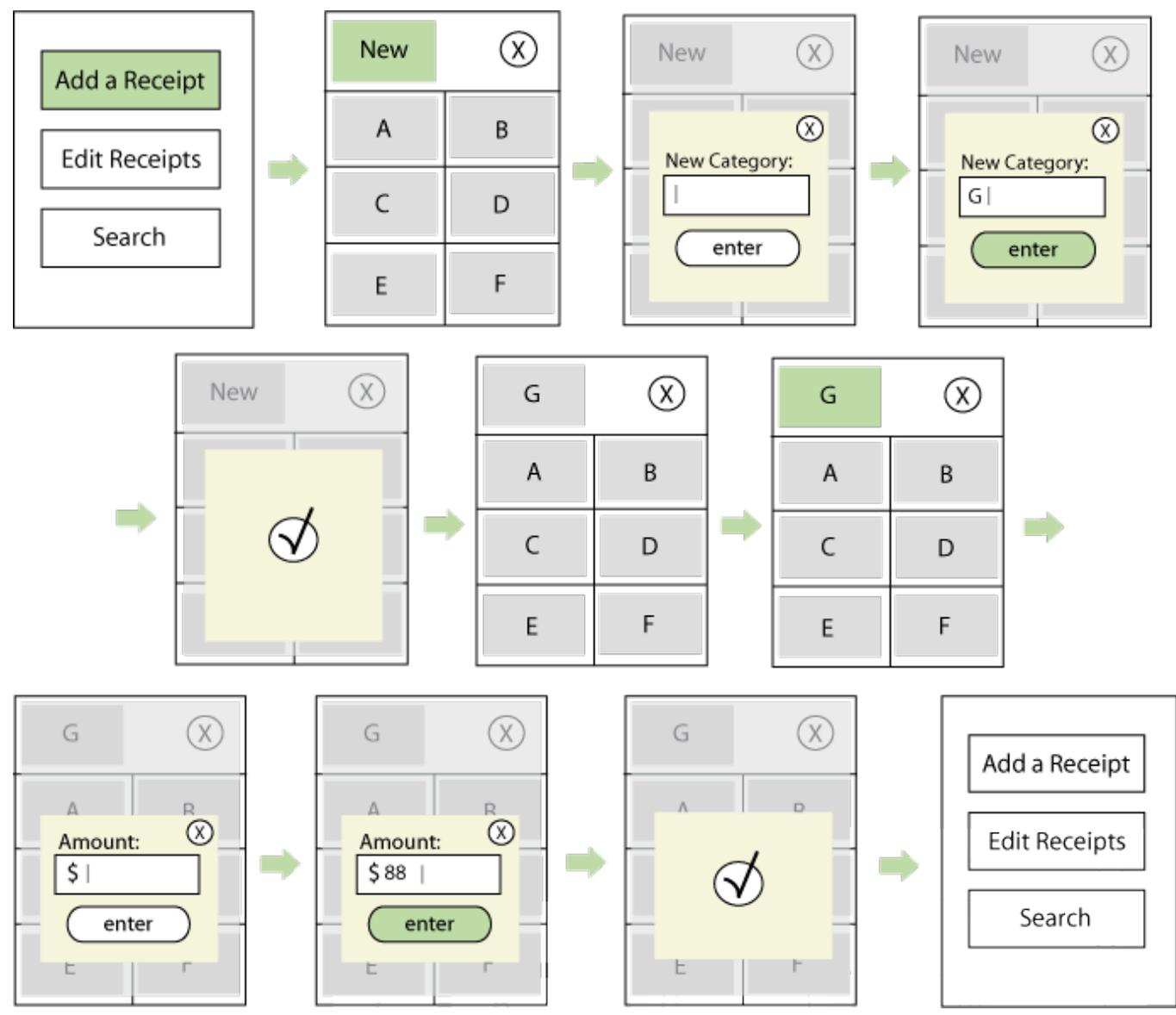
# The Web Interface
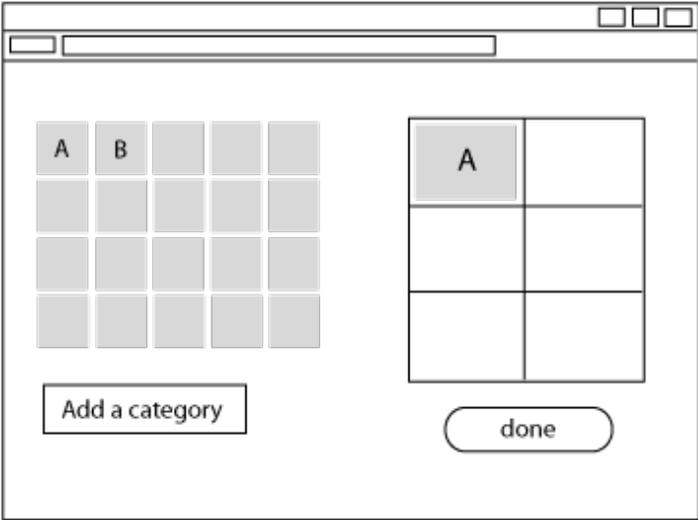
The user can choose up to six categories at any time through the web component. The categories can be changed at anytime through the web. There is the ability to choose from pre-defined categories or write your own. The chose categories appear after selecting "Add a Receipt" on the main handheld screen.
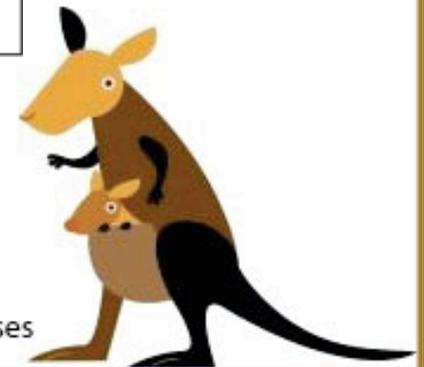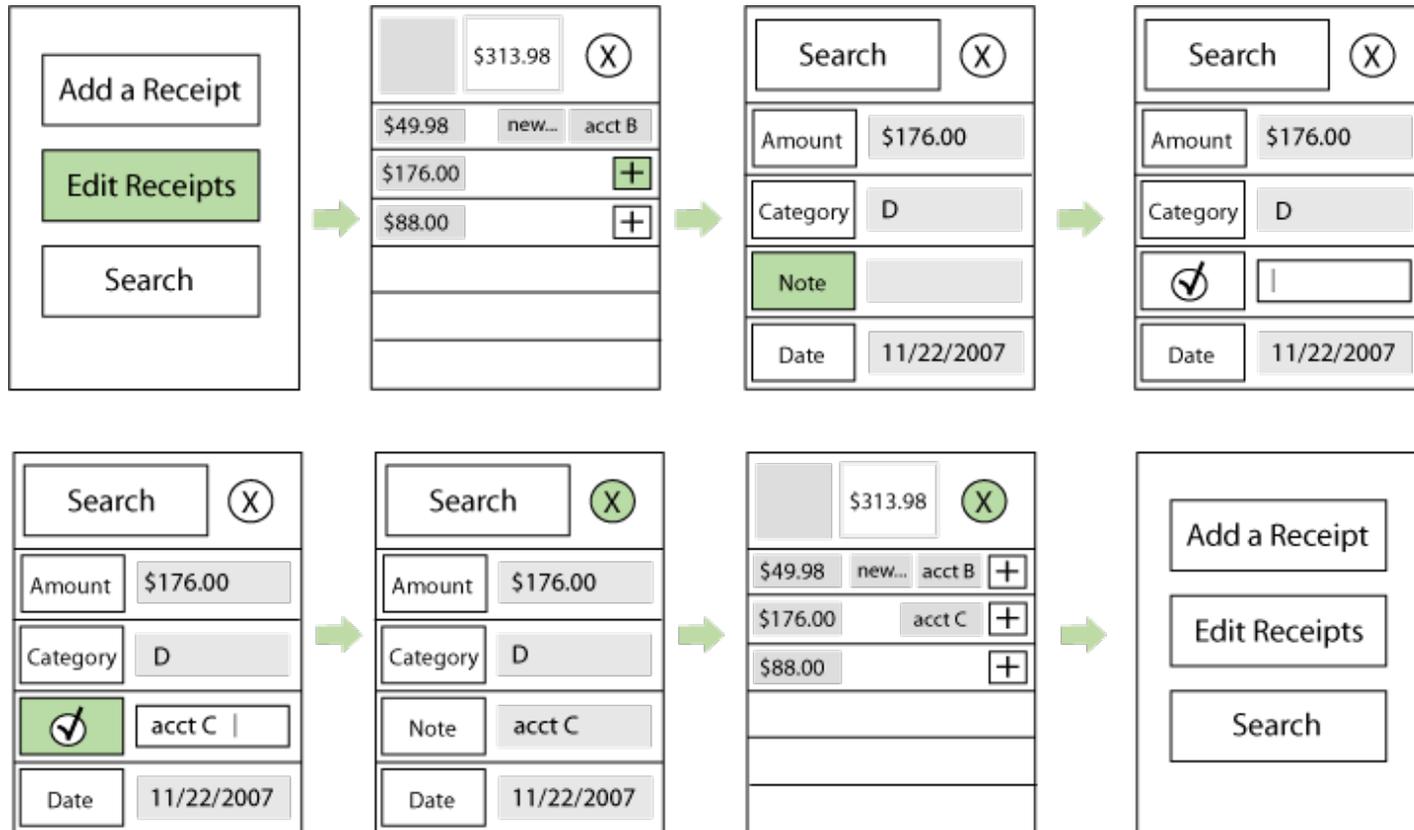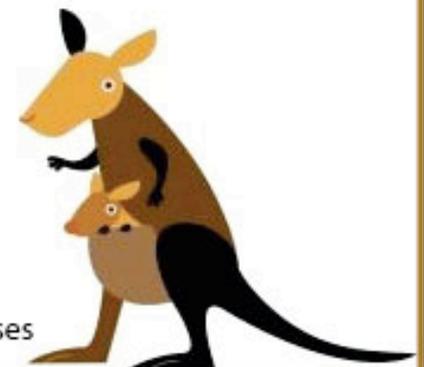
A   B

A

Add a category

done

Add a Receipt

| New | X |
|-----|---|
| A | B |
| C | D |
| E | F |

# Adding a Receipt

Add a Receipt

| New | X |
|-----|---|
| A | **B** |
| C | D |
| E | F |

**New** X

Amount: X

$ |

enter

E F

**New** X

Amount: X

$ 88 |

enter

E F

**New** X

✓

E F
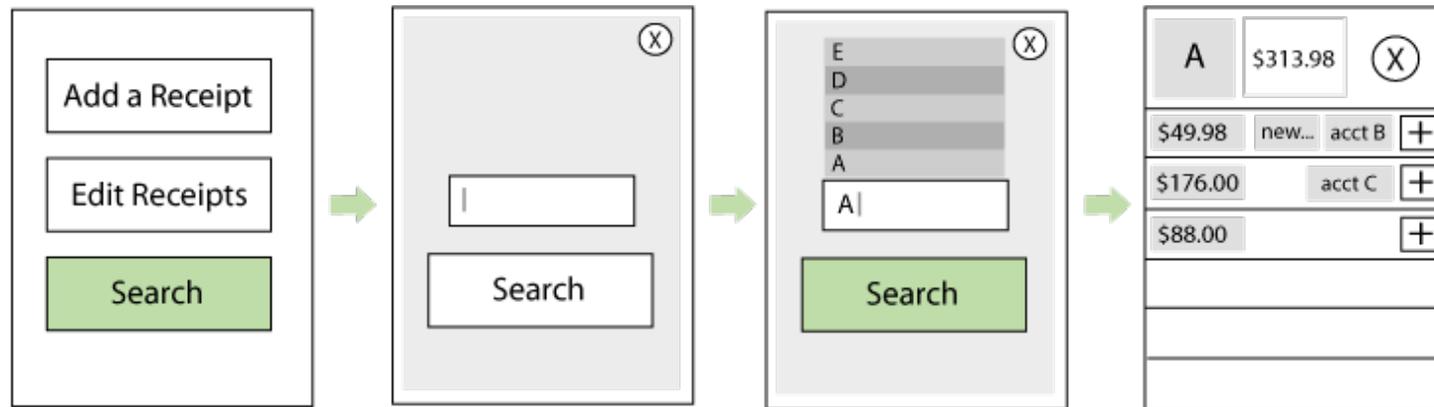
Add a Receipt

Edit Receipts

Search

Add a New Category and Receipt

# Edit a Receipt

# Search

# Future Iterations

**First Principle: The Simplicity Is Most Useful**
- Adding functions may ruin interface--as well as product's competitive niche
- Detroit and the "big little car" response to Japan
- Any new features must fight to get aboard

**Kangaroo**
- Physical–electronic interface
- Base unit is housed in slimline skin/sleeve with accordion "pocket" on back store small, valuable items such as stamps, business cards, or receipts more secure, sustainable version of user "shoebox" model

**The Site**
- Enable user–generated applications/widgets for free download
- Encourage user discussion of tags, organizing schemes
- Analyze user labels (with permission) and usage to drive new products

# Questions?