Everyday things

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The Psychology of Everyday Things

- We use a variety of devices, instruments, computer programs, etc., everyday.
- These include:
  - - digital watches
  - - mobile phones
  - - doors
  - - dvd recorders
  - - microwaves
  - - voicemail systems
  -
- Some are easy to use others are difficult and frustrating
- to use.

Why are some objects frustrating to use

- Due to poor design:
- - they provide no clues or false clues to their operation
- - they trap the user
- - they thwart the normal process of interpretation and understanding
- **Poor Design leads to Frustration**
  - - leads to Confusion
  - - leads to Error
- On the other hand, **well-designed objects** are
  - - easy to understand
  - - easy to interpret
  - - use visible cues to their operation

Design Strategy

- •- make use of affordances
- •- make use of constraints
- •- provide a good conceptual model
- •- make things visible
- •- use a good mapping - a natural one if possible
- •- provide feedback
- •- keep the number of features, actions and controls balanced

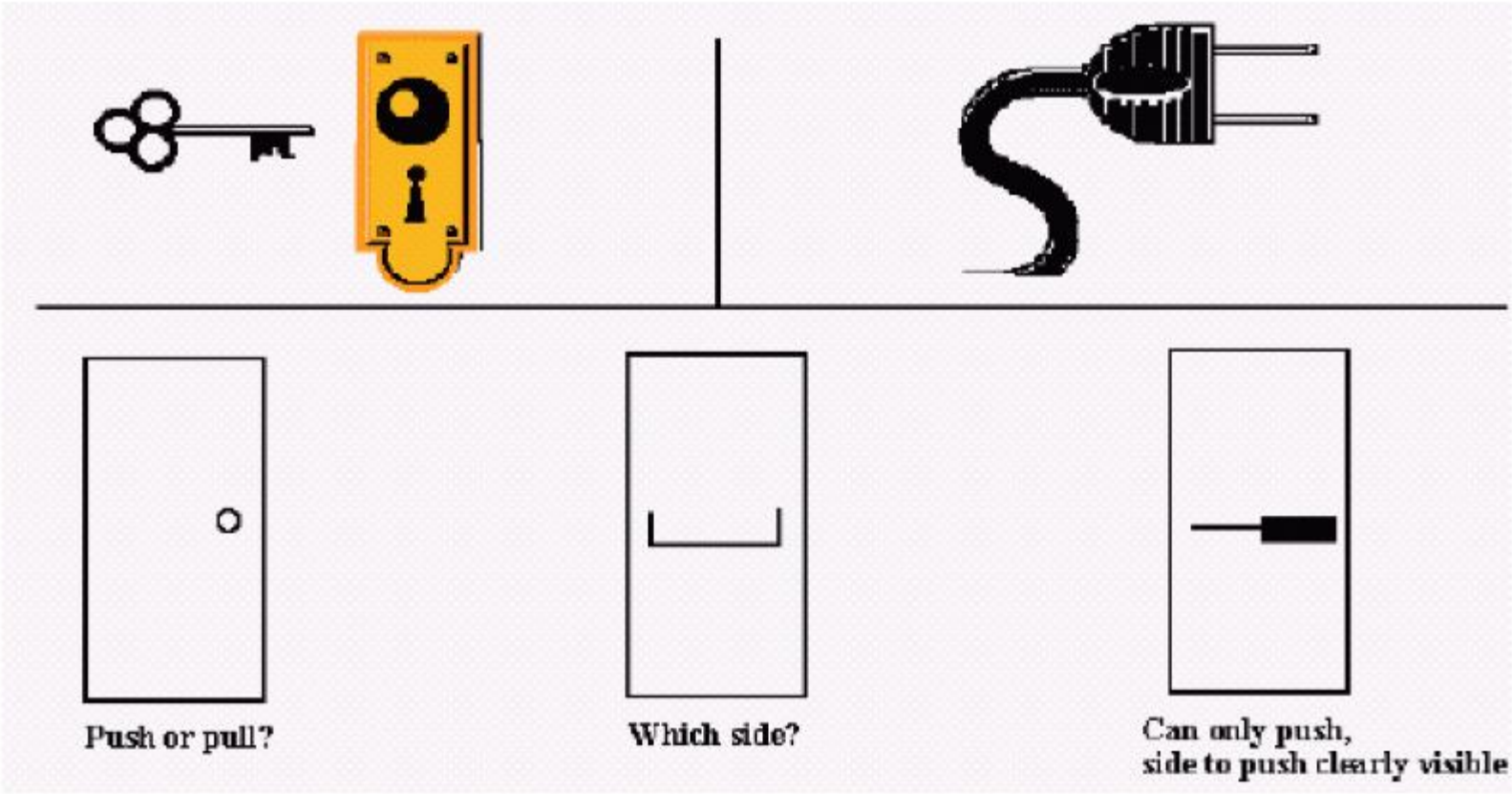
Affordance

- **Affordances** refer to the perceived and actual properties of an object, which help the user determine how to use or interact with it
- When affordances are used,
  - the user knows what to do just by looking at it
- Complex things might require some explanation, but simple things do not
- **Principle of Affordance**:
  - It should be obvious how a control is used.

Examples of good affordances

- plates on doors - push
- knobs - turn
- slots - insert
- buttons – for pushing
- chairs - for sitting
- glass - break
- paper - write on, fold

Some Examples of Visual Affordances:




YANGIN
ÇIKIŞI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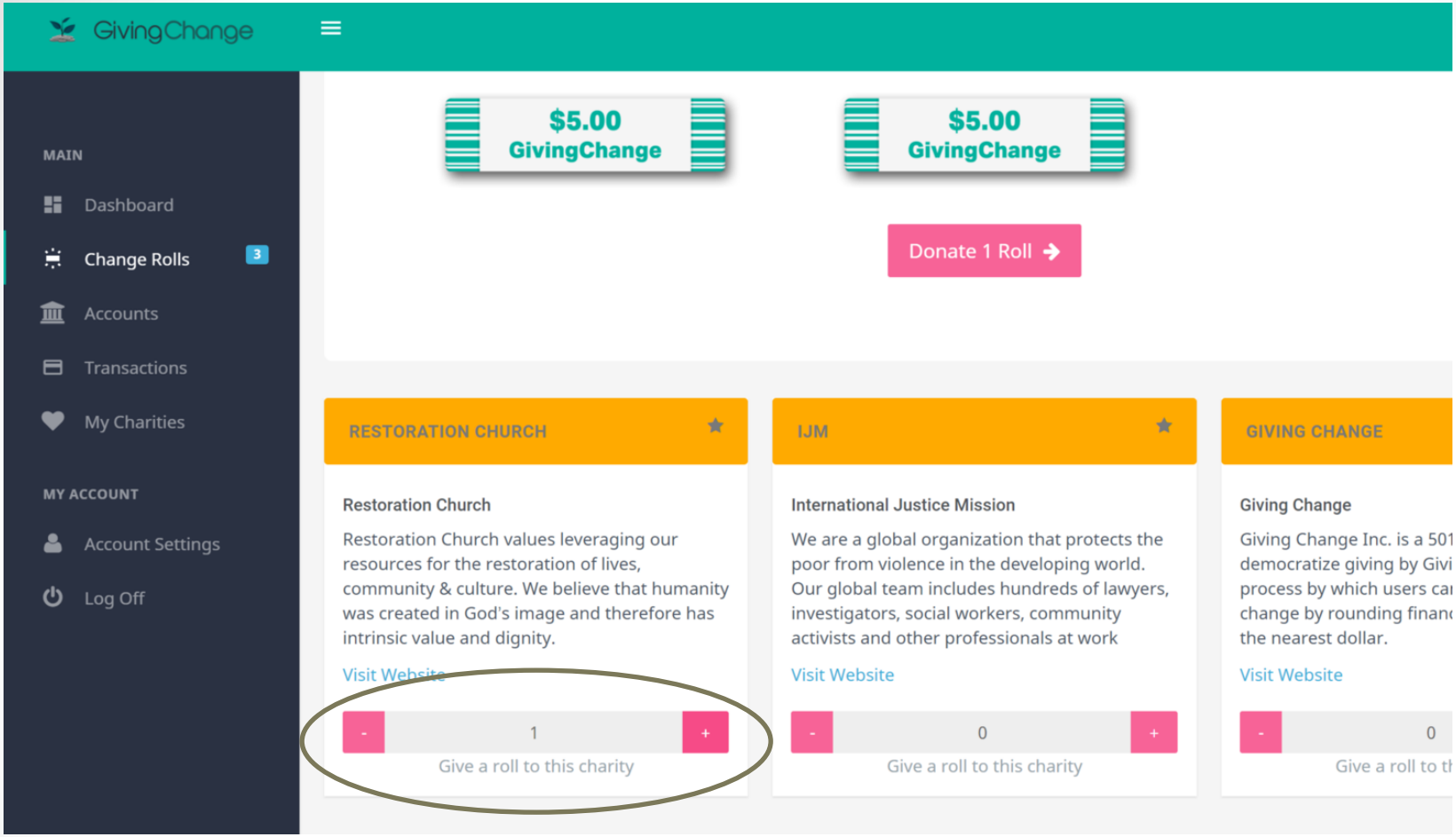
PUSH


GivingChange
MAIN
Dashboard
Change Rolls
3
Accounts
Transactions
My Charities
MY ACCOUNT
Account Settings
Log Off
$5.00 GivingChange
$5.00 GivingChange
Donate 1 Roll
RESTORATION CHURCH
Restoration Church
Restoration Church values leveraging our resources for the restoration of lives, community & culture. We believe that humanity was created in God's image and therefore has intrinsic value and dignity.
Visit Website
1
Give a roll to this charity
IJM
International Justice Mission
We are a global organization that protects the poor from violence in the developing world. Our global team includes hundreds of lawyers, investigators, social workers, community activists and other professionals at work
Visit Website
0
Give a roll to this charity
GIVING CHANGE
Giving Change
Visit Website
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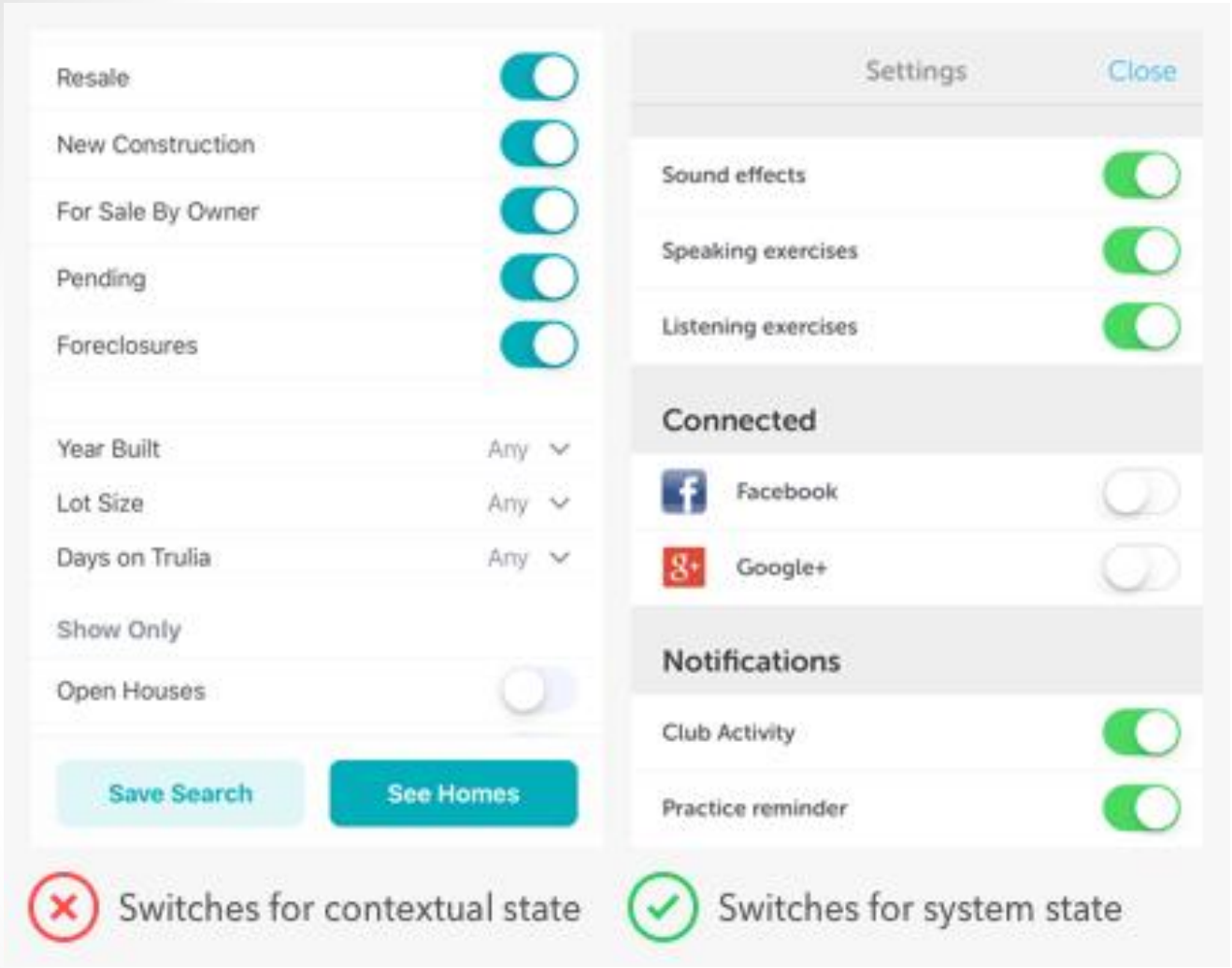
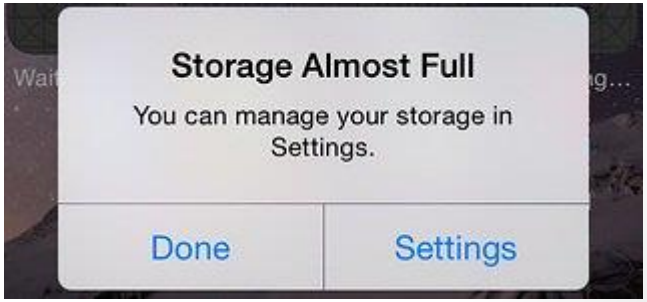
Constrains

- Constraints restrict the allowed behavior or interaction with an object
- **Physical constraints**
- The physical properties of an object constrain the possible operations:
  - the order in which parts can go together
  - the ways in which an object can be picked up, moved, manipulated
- examples : scissors, doors, drawers, zippers, etc.

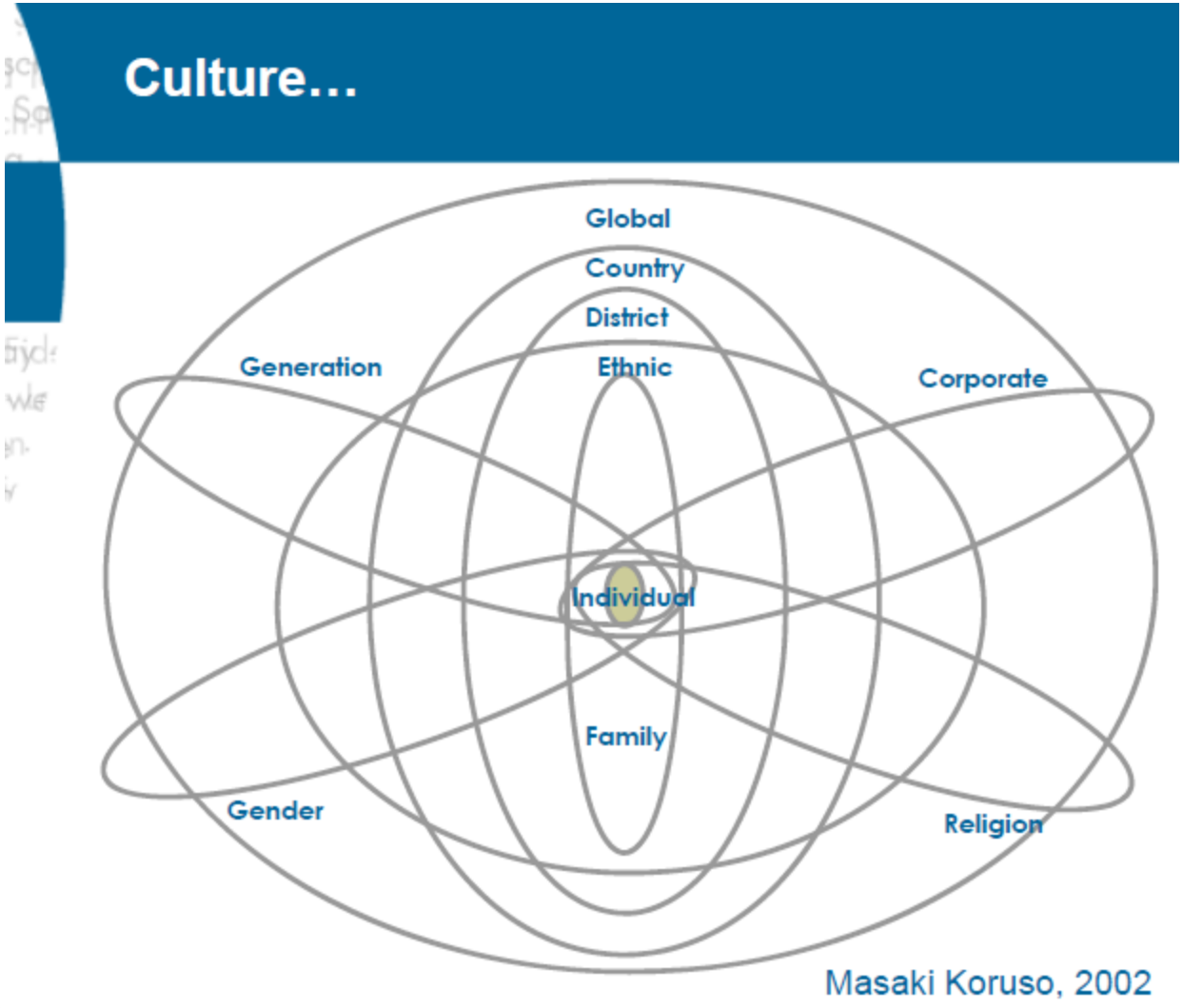

Resale
New Construction
For Sale By Owner
Pending
Foreclosures
Year Built
Any
Lot Size
Any
Days on Trulia
Any
Show Only
Open Houses
Save Search
See Homes
Settings
Close
Sound effects
Speaking exercises
Listening exercises
Connected
Facebook
Google+
Notifications
Club Activity
Practice reminder
Switches for contextual state
Switches for system state


Storage Almost Full
You can manage your storage in Settings.
Done
Settings

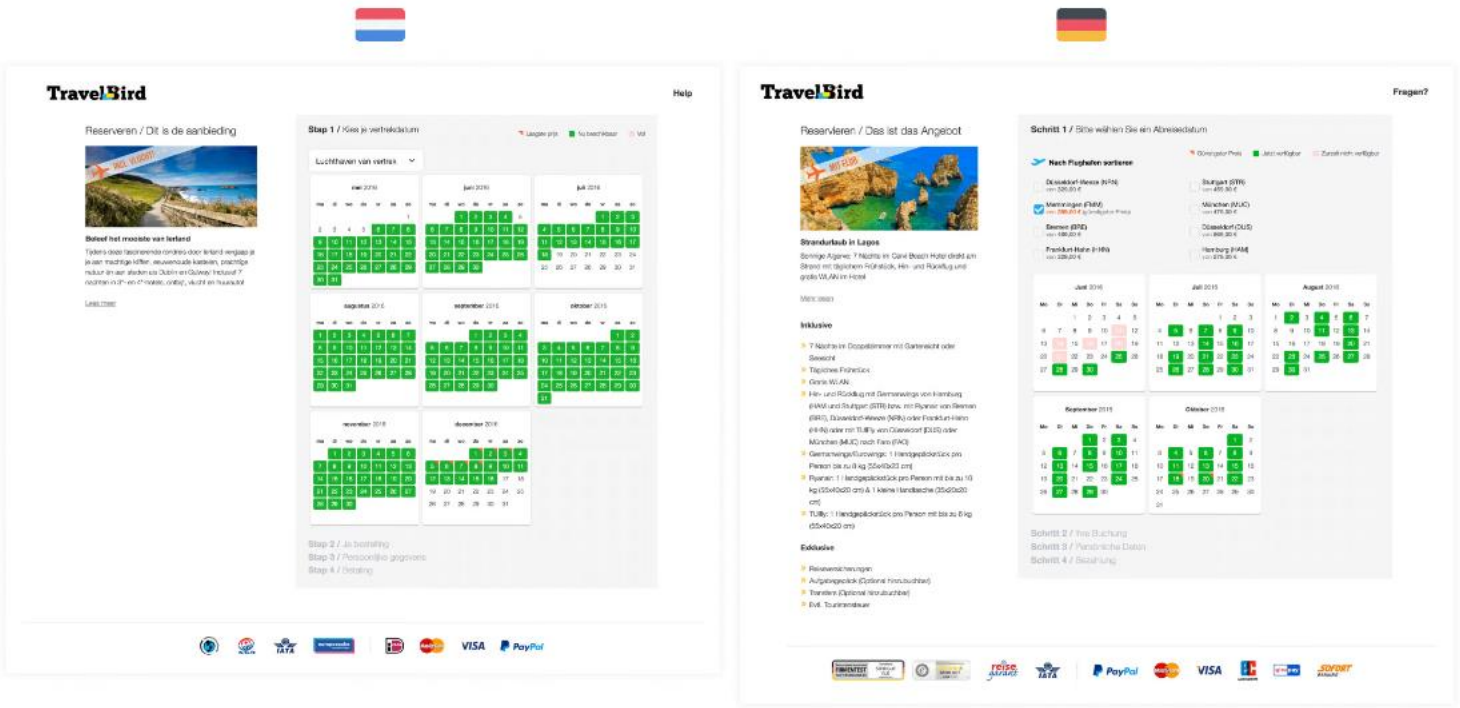
Cultural constraints

•Constraints which have evolved through artificial conventions that govern acceptable social behavior.
•These cultural conventions have to be learned, but once learned apply to a wide variety of circumstances:
•- tighten screws by turning clockwise
•- loosen screws by turning anti-clockwise
•- desktop metaphor used in GUIs

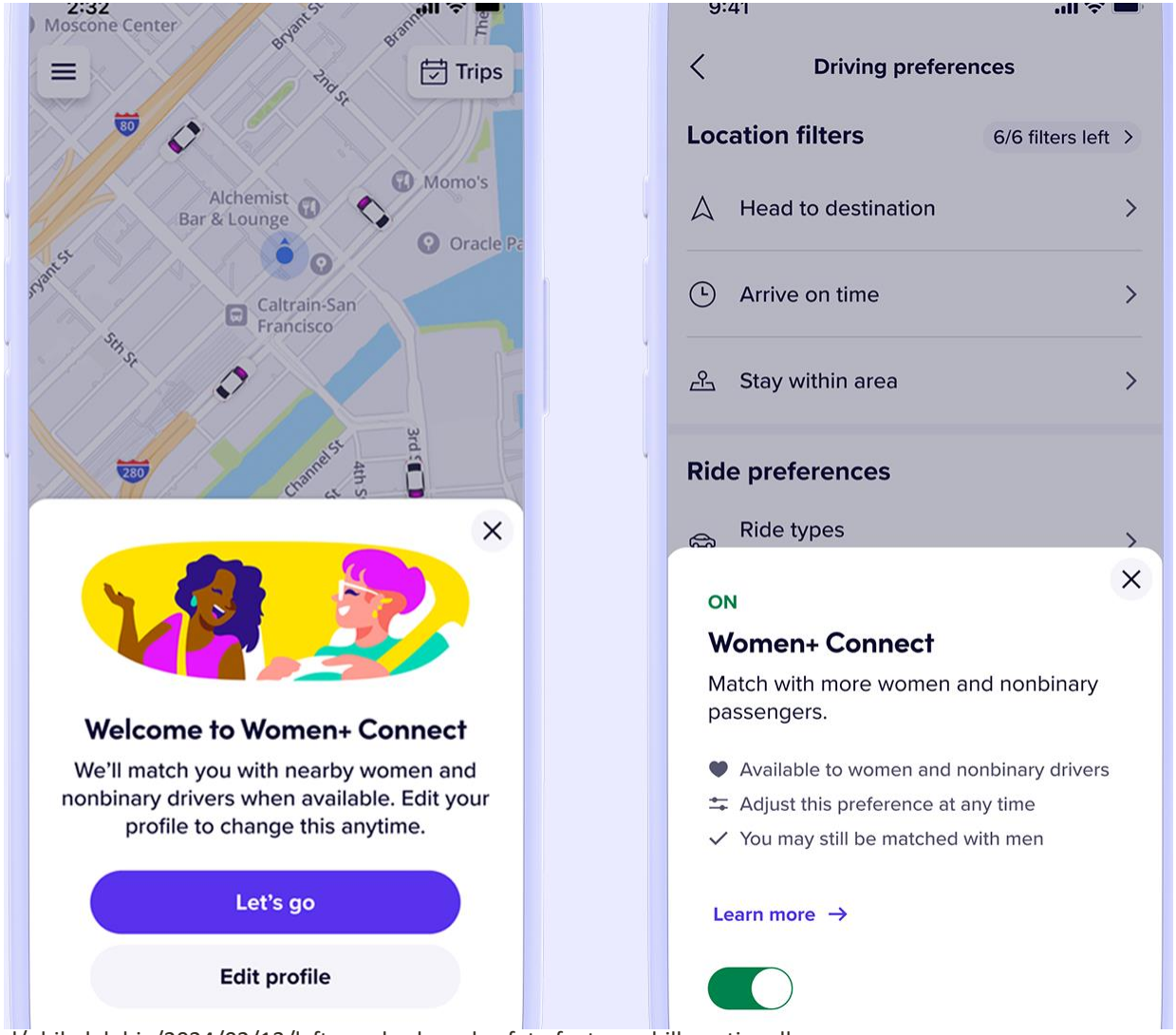
Culture Dimension



TravelBird from Netherland , Germany ux difference



Gender



https://www.axios.com/local/philadelphia/2024/02/13/lyft-gender-based-safety-feature-philly-nationally

Conceptual Model

- Conceptual models are mental models, models that people have of themselves, others, the environment and the things with which they interact.
- People form mental models
  - - from experience
  - - from training and instruction
- The mental model of a device is formed by the interpretation of its perceived actions and its visible structure.
- Upon seeing an object or a device, the user forms a mental model of how the device or object operates.
- Users use the model to simulate the operation of a device or object.

Conceptual model effect

- A good conceptual model allows users
  - - to predict the effect of their actions
  - - to understand the relationship between the controls of a device and the outcome
- A poor conceptual model
  - - forces users to operate by rote, blindly
  - - makes it difficult to determine the effects of actions
  - - makes it difficult to figure out what to do in novel situations

Conceptual model - Metaphor

- Often designers employ metaphors to help the user form a suitable mental model.
- Metaphors can be used to develop interfaces for applications.

APPLICATION AREA	METAPHOR	FAMILIAR KNOWLEDGE
Operating systems	The desktop	Office tasks
Spreadsheets	Ledger sheet	Columnar tables
Object-oriented environments	Physical world	Real-world behavior
Hypertext	Note cards	Flexible organization of structured text
Learning environments	Travel	Tours, guides, navigation
File storage	Piles	Categorizing objects in in terms of urgency, projects, etc
Multimedia environments	Rooms (each associated with a different medium/task)	Spatial structure of buildings
Computer supported cooperative work	Multi-agents	Travel agents, butlers, and other serving roles

Metaphors in physical objects

Metaphor Design in User Interfaces

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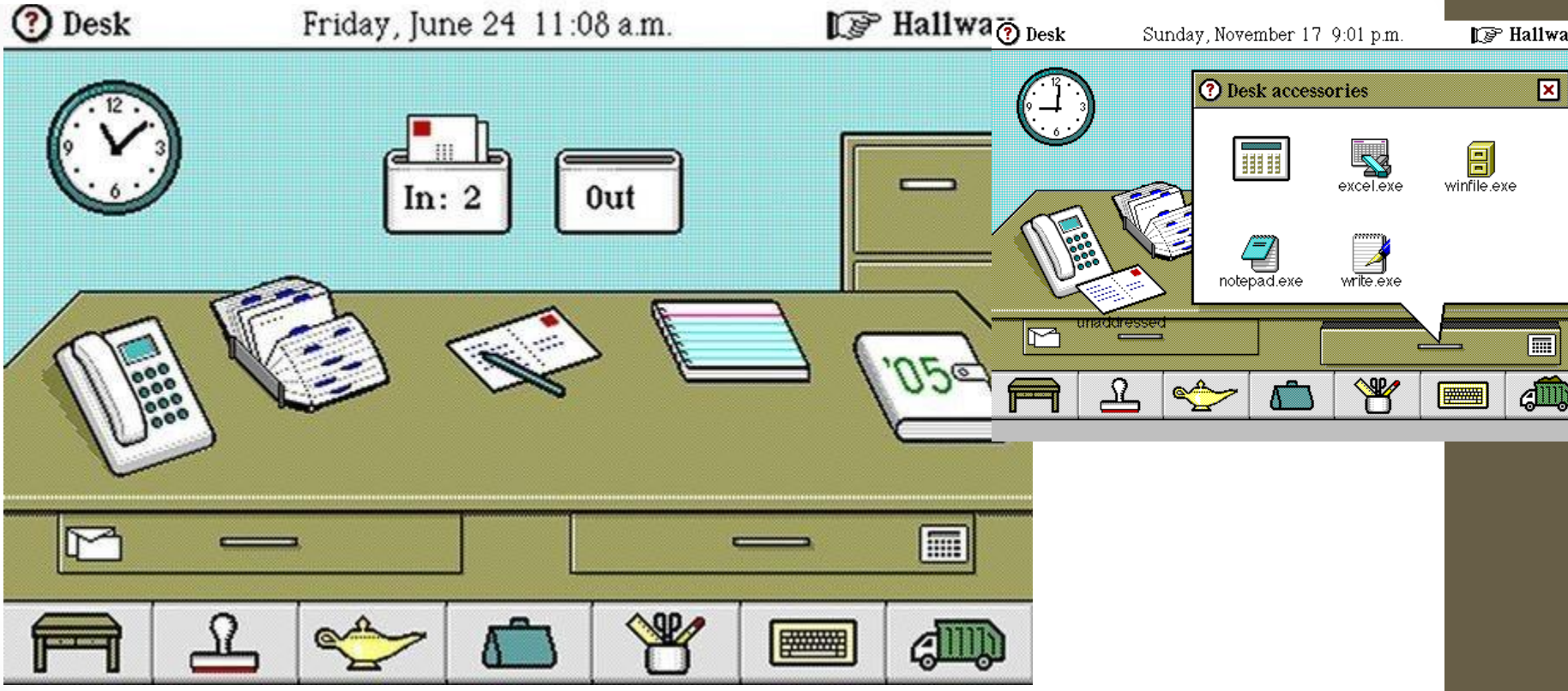

Figure 6: General Magic's Magic Cap User Interface [Gibbs, 1994; Hill and Carleton, 19951places a desk in a room. The room is along a hallway, in a building, on a street, in a user. interface metaphor with an urban scale. Note that the garbage can has become a garbage truck in keeping with the urban reference.

https://dl.acm.org/doi/pdf/10.1145/291391.291397

سجل حضور وانصراف

الاســـــم	الوظيفة	السبت / / ٢٠١٣		الأحد / / ٢٠١٣		الاثنين / / ٢٠١٣		الثلاثاء / / ٢٠١٣		الأربعاء / / ٢٠١٣		الخميس / / ٢٠١٣	
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	A	B	C	D	E	F	G	H
1	Attendence							
2	Names	Total	Wed 2/1/17	Thu 2/2/17	Fri 2/3/17	Mon 2/6/17	Tue 2/7/17	Wed 2/8/17
3	Student1	3	1	1	1			
4	Student2	3	1	1	1			
5	Student3	3	1	1	1			
6	Student4	3	1	1	1			
7	Student5	2	1	1				
8	Student6	2	1	1				
9	Student7	3	1	1	1			
10	Student8	2		1	1			
11	Student9	2		1	1			
12	Student10	3	1	1	1			
13	Student11	2	1	1				
14	Student12	2	1	1				

Metaphor concerns

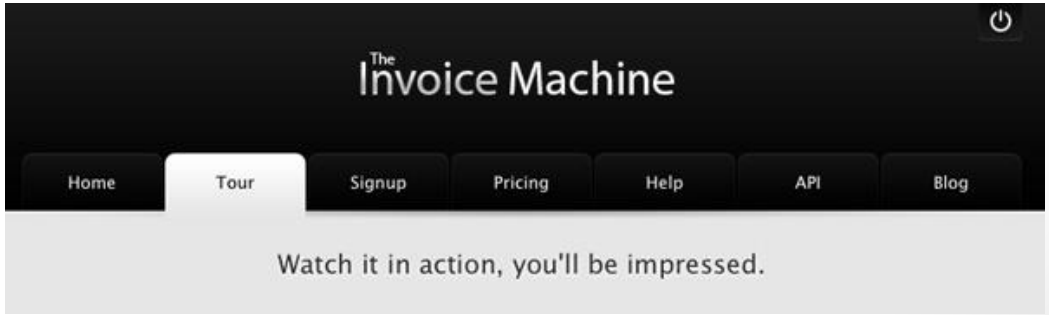
•Metaphor can also be applied through analogy even if the metaphor is not concrete in the user interface (e.g., use a word processor like a typewriter).

•When you choose a metaphor, you deliberately try to exploit the user's existing knowledge of the physical analogue.

•**But beware of:**

- •- using metaphors that do not behave as the user might anticipate
- •- using metaphors too rigidly and inefficiently
- •- using metaphors that relate to objects outside the user's experience

Library shelf



TABS

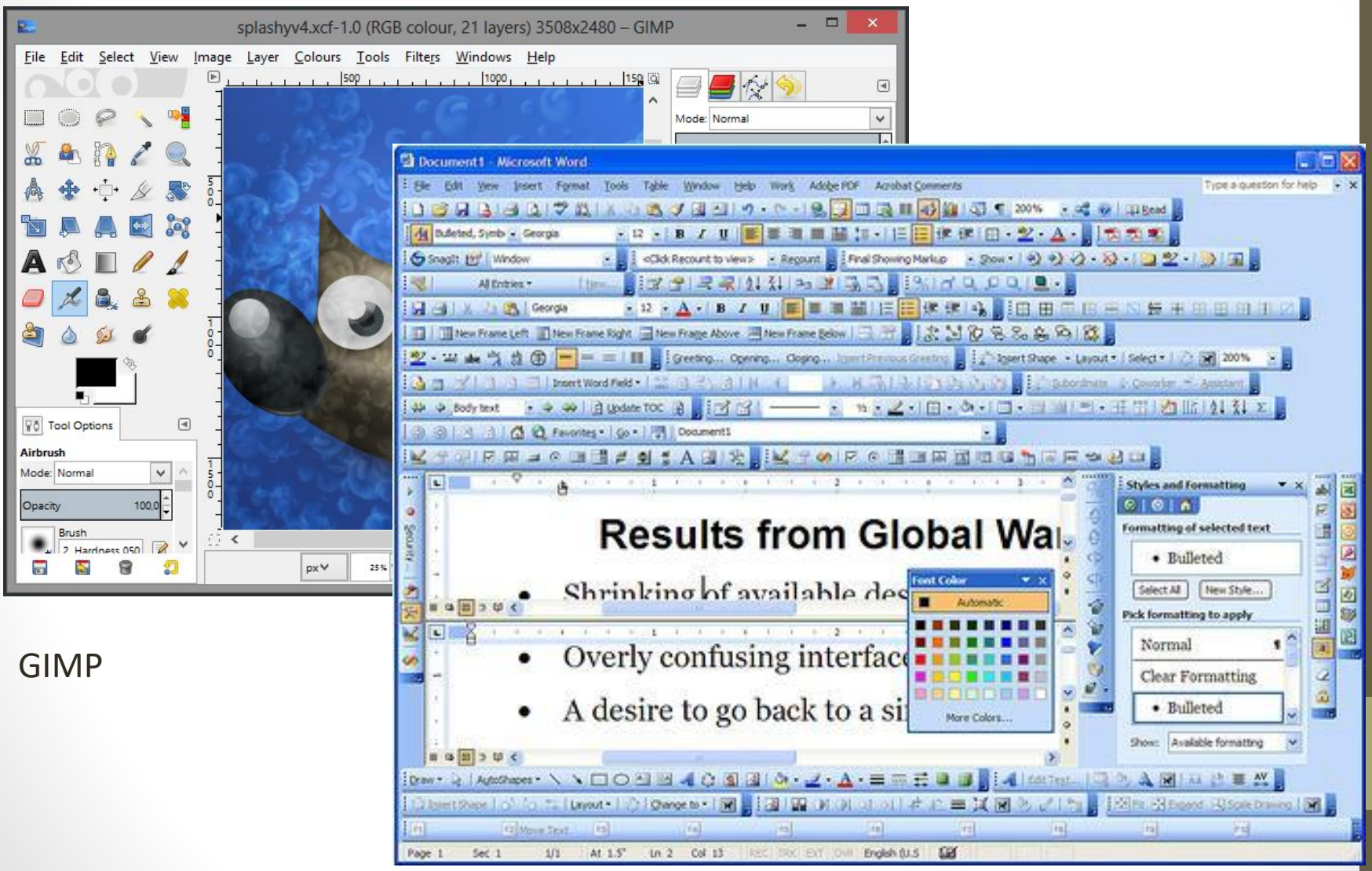
Conceptual model Visibility ½

- Visibility is an important principle of design and is used to:
  - - make the operation of a device understandable
  - - act as a reminder of what can and cannot be done
  - - make the state of the system clear
- Visibility is achieved by
  - - making the correct parts or controls visible
  - - conveying the correct message
- When the number of possible actions exceeds the number of controls, some functions become invisible, resulting in complexity.

Visibility 2/2

- Good visibility leads to objects/devices that are:
  - - easier to understand
  - - easier to use
  - - quick to learn
  - - easier to remember
- How to make things visible:
  - - employ natural signals
  - - use good mappings (see next slide)
  - - good placement of controls
- **Principle of Visibility:**
  - It should be obvious what a control is used for.

Visibility examples



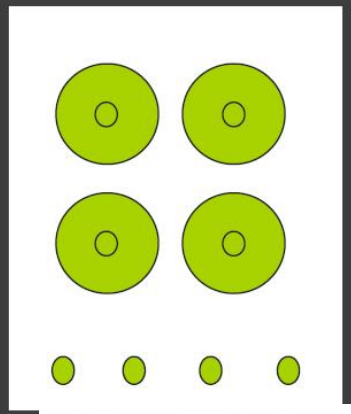
GIMP

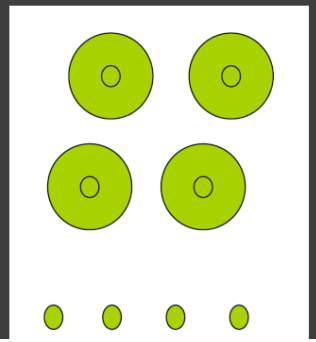
Conceptual model Mapping

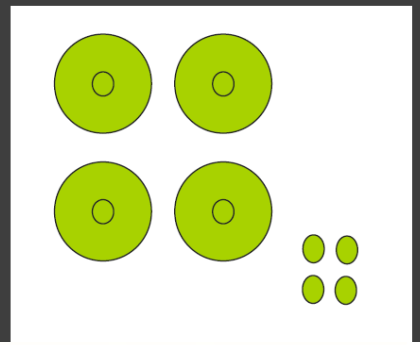
- A mapping is the relationship between two things
- In the case of HCI, a mapping is the relationship between the controls in an interface and their intended function.
- The easier a mapping is to learn and remember, the easier a device will be to use.
- Natural mappings come from
  - - spatial analogy - press up button to make elevator go up
  - - perception - louder means greater
- Some relationships do not have a natural relationship
  - e.g., pitch/hue/taste
  - does higher pitch mean more or less of something?
- A device is easy to use when there is visibility to the set of possible

actions and where the controls and displays exploit natural mappings.

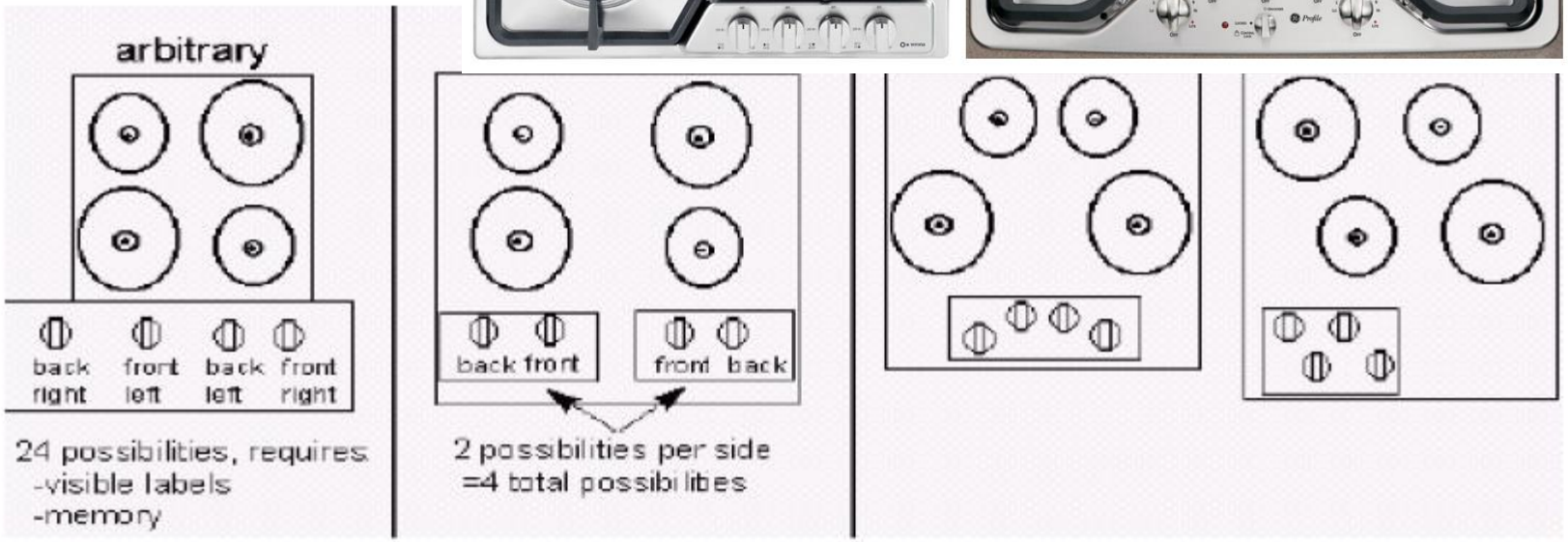
Clear mapping between control + function

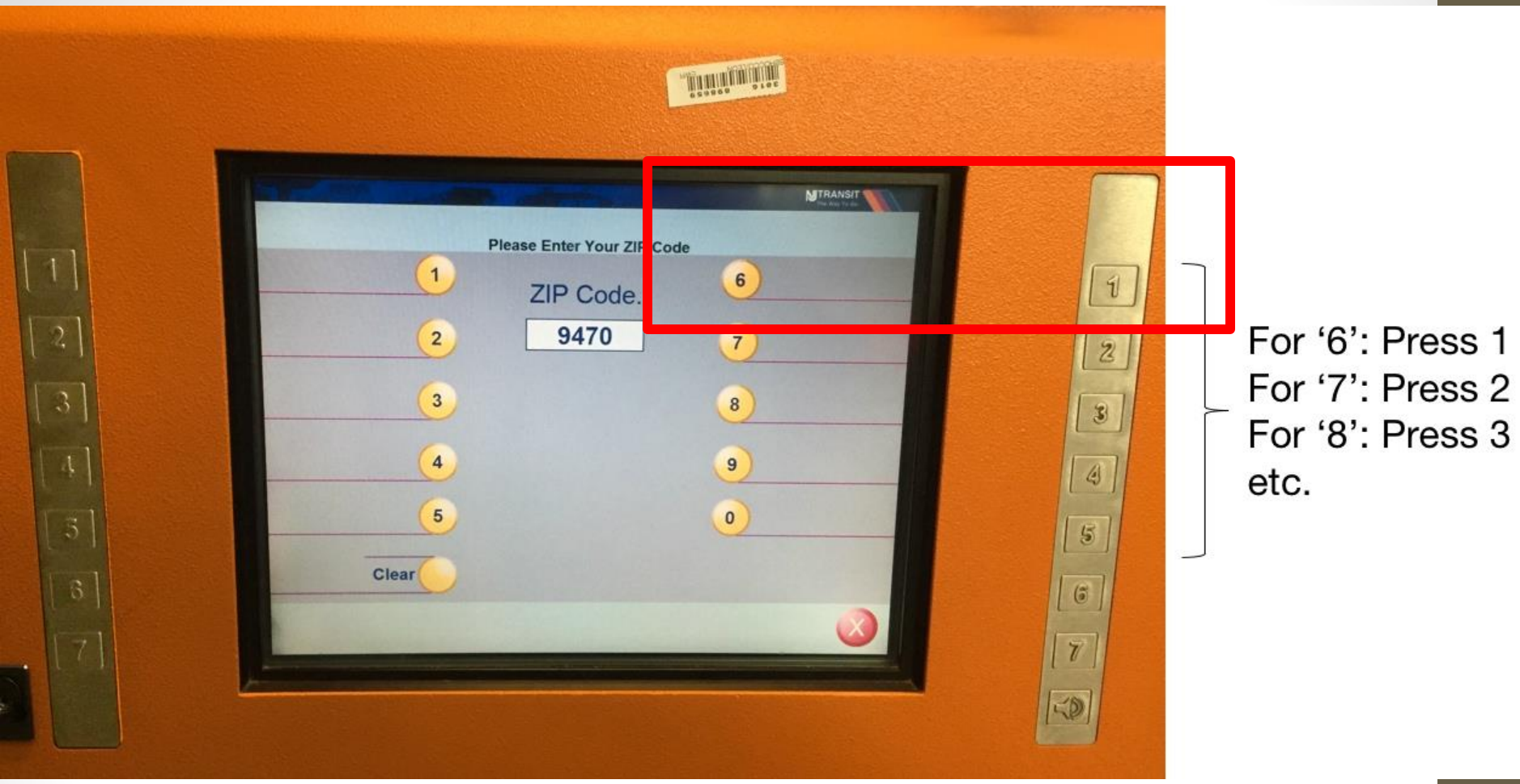






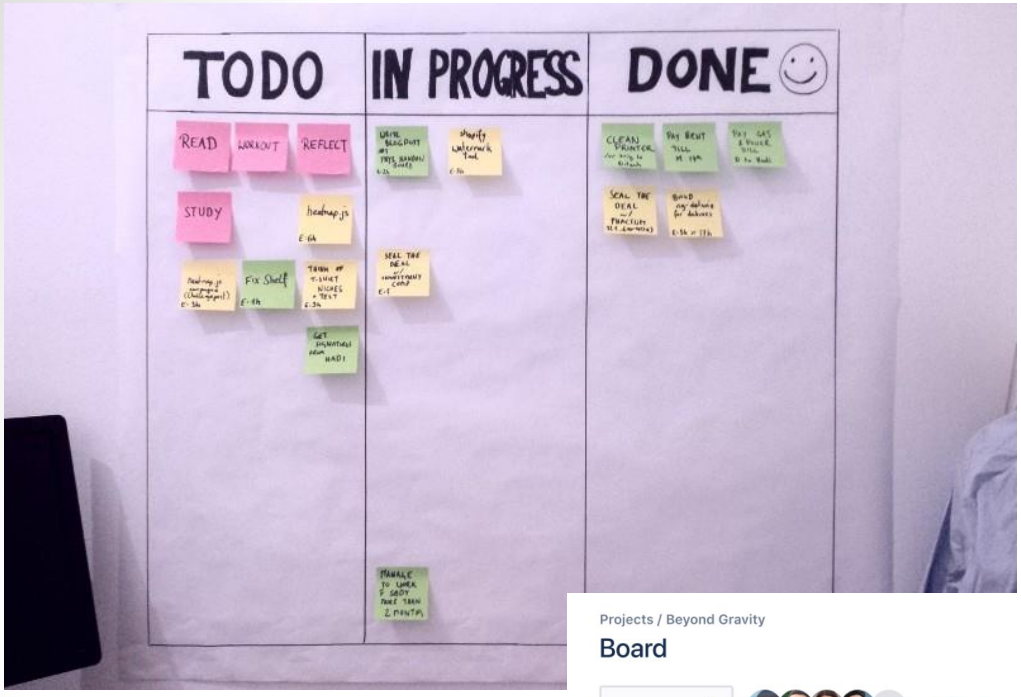
Example Mappings





An example of low stimulus–response compatibility is this train-ticket machine, in which users had to press a button labeled with a number that did not necessarily match the actual desired number (e.g., pressing the metal button labeled 1 to get 6 to appear on screen). https://www.nngroup.com/articles/natural-mappings/

Mercedes S500 Car Seat Controller



Projects / Beyond Gravity

Board

Epic

GROUP BY Choices

TO DO 12

- Implement feedback collector — NUC-205
- Bump version for new API for billing — NUC-206
- Add NPS feedback to wallboard — NUC-208
- Add analytics events to pricing page — NUC-209
- Resize the images for the upcoming campaign — NUC-210

IN PROGRESS 4

- Update T&C copy with v1.9 from the writers guild in all products that have cross country compliance — NUC-213
- Bump feedback icon version — NUC-214
- Tech spike on new stripe integration with paypal — NUC-215
- Change phone number field type to 'phone' — NUC-217

IN QA 4

- Adapt web app no new payments provider — NUC-346
- Purchasing error - edit fields — NUC-354
- Multi-dest search UI web — NUC-338

DONE 4

- Quick booking for accomodations - web — NUC-336
- Fluid booking on tablets — NUC-343
- Shoping cart purchasing error - quick fix required. — NUC-354

Provide Feedback

- Feedback is the act of sending information back to the user about what has actually happened as the result of his actions or about the state of the system.
- Feedback can be presented visually or aurally.
- Good example:
    - simple push-button phones
- Bad example:
    - complicated, multi-feature, modern telephones
- **Principle of Feedback:**
- It should be obvious when a control has been used.

Manage Complexity

- Today's devices and computer systems are commonly developed with many, many, features.

- However, the increase in controls and features makes it more difficult
    - **to make all the controls visible**
- which makes it harder for the user to
- - understand the device
- - learn how to use it, and
- - memorize functions
- Keep the number of features, actions and controls balanced.

Norman's Errors

Norman's thoughts about Errors

If an error is possible, someone will make it.

Designers should

- assume all possible errors will occur
- minimize the chance of errors
- minimize the effects of errors when they do occur
- make it easy for users to detect errors
- make it possible to reverse the effects of an error

Facts about design

- People will make errors
- Complex devices and software will always require some instruction.
- Someone using them without reading the manual (very common among computer users) should be expected to make errors and to be confused.
- As designers, we should design for error by:
- - minimizing the possibility for error
- - making errors as “cost-free” as possible

Norman's Model of Action

"The basic idea is simple. To get something done, you have to start with some notion of what is wanted—the goal that is to be achieved. Then, you have to do something to the world, that is, take action to move yourself or manipulate someone or something. Finally, you check to see that your goal was made. So there are four different things to consider: the goal, what is done to the world, the world itself, and the check of the world. The action itself has two major aspects: doing something and checking. Call these execution and evaluation."

[Norman]

Norman's Seven Stages of Action

1. Forming the Goal

Something to be achieved. Can be stated in a very imprecise way; e.g., "make a nice meal".

EXECUTION

2. Forming the Intention

Goals must be transformed into intentions, i.e., specific statements of what has to be done to satisfy the goal; e.g., "Make a chicken casserole using a can of prepared sauce."

3. Specifying an Action Sequence

What is to be done to the World. The precise sequence of operators that must be performed to effect the intention; e.g., "Defrost frozen chicken, open can, …"

4. Executing an Action

Actually doing something. Putting the action sequence into effect on the world; e.g., actually opening the can.

EVALUATION

5. Perceiving the State of the World

Perceiving what has actually happened; e.g., the experience of smell, taste and look of the prepared meal.

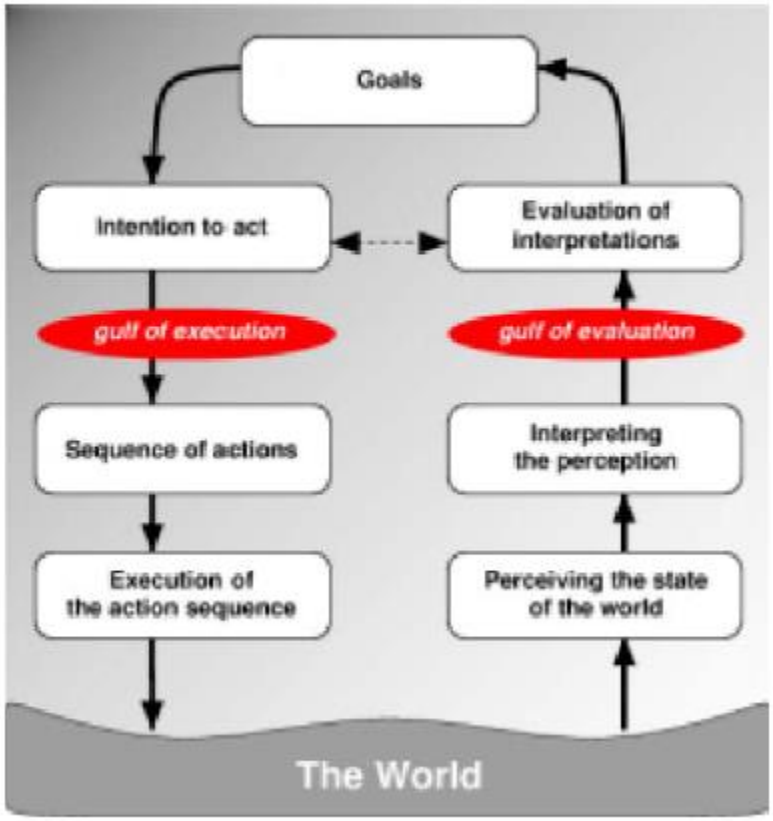
6. Interpreting the State of the World

Trying to make sense of the perceptions available; e.g., Putting those perceptions together to present the sensory experience of a chicken casserole.

7. Evaluating the Outcome

Comparing what happened with what was wanted; e.g., did the chicken casserole match up to the requirement of 'a nice meal'?

The Stages of User Activities When Performing a Task



Limitation of Normans Model

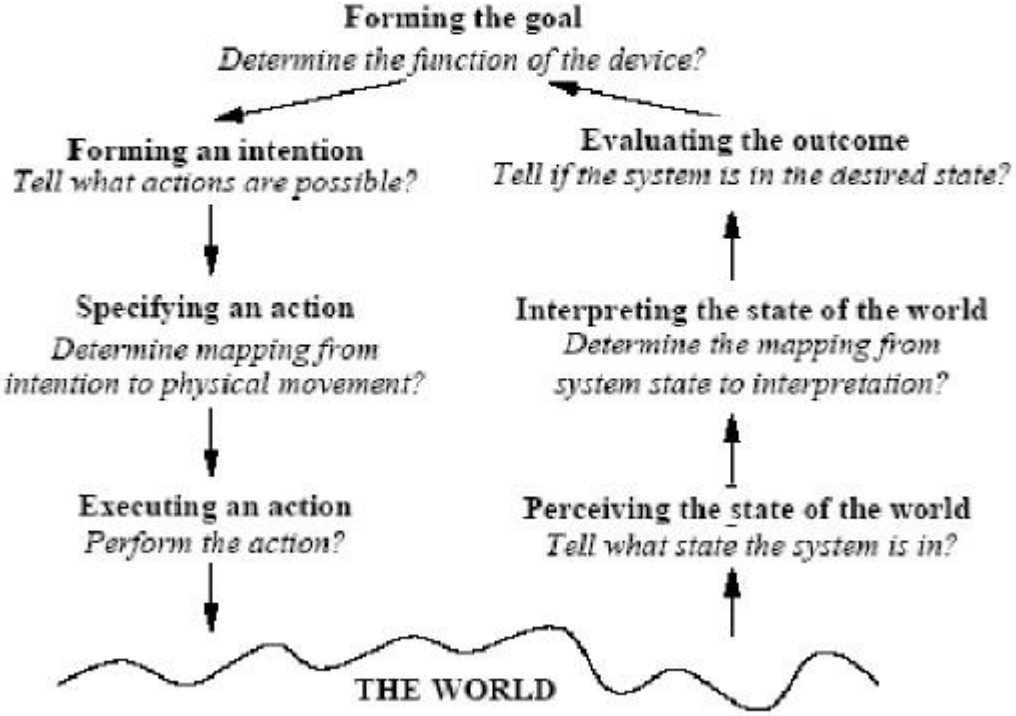
- Stages are not discrete entities.
- Not all stages are required for every goal.
- Most goals are not satisfied by a single action.
- Numerous sequences.
- May span seconds or minutes or hours or days.
- Continuous feedback
  - - results may spawn other goals and other actions
  - - goals lead to sub-goals
  - - intentions lead to sub-intentions
- In a large activity, intermediate goals can be forgotten, discarded or reformulated.

Opportunistic Actions

- Humans do not plan everything.
- We are spontaneous.
- Goals are often ill-formed and vague.
- We respond to events in the world.
- We are **data-driven**: as events in the world around us unfold, we introduce new goals, which lead to new actions, as **opportunity** allows us.

The Seven Stages as a Design Aid

- Questions we can ask to ensure the gulfs are "bridged":
  How easily can the user ...



Design principles 1/2

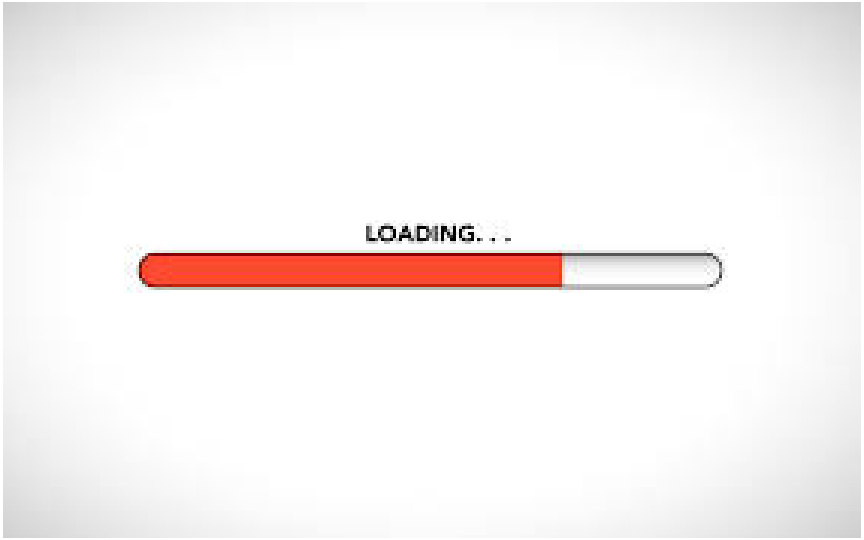
- Provide a **good conceptual model**
  - - Coherent system image.
  - - Consistency in presentation of operations and results.
  - - Metaphor?
- Make things **visible**
  - - Is the state of the system easily visible.
  - - Can alternative actions be easily found.
- Use controls with good (perceptual) **affordances**
  - - Is it clear how the controls can be used?

Design principle 2/2

- Use a **good mapping** - a natural one, if possible, showing relationships between
  - - actions and results
  - - controls and their effects
  - - system state and what is visible
- Provide **feedback**
  - - Continuous feedback of results and actions

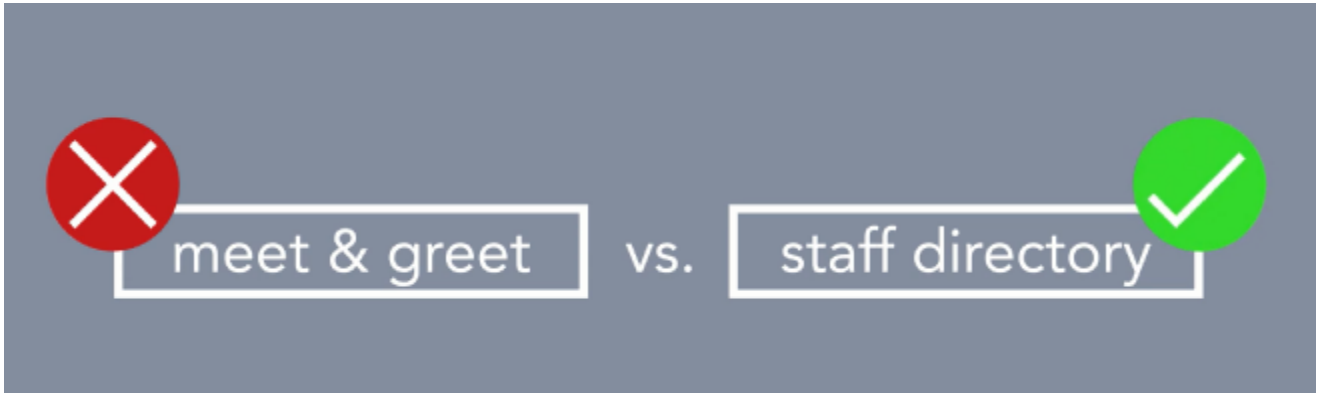
10 Usability Heuristics for User Interface Design

- 1**#1: Visibility of system status**
- The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.



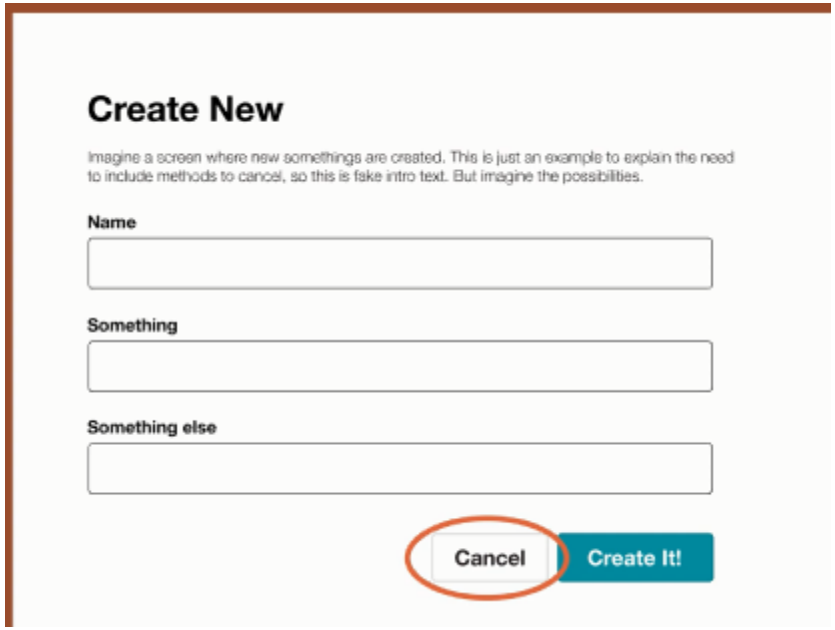
2 Match between system and the real world

- The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.



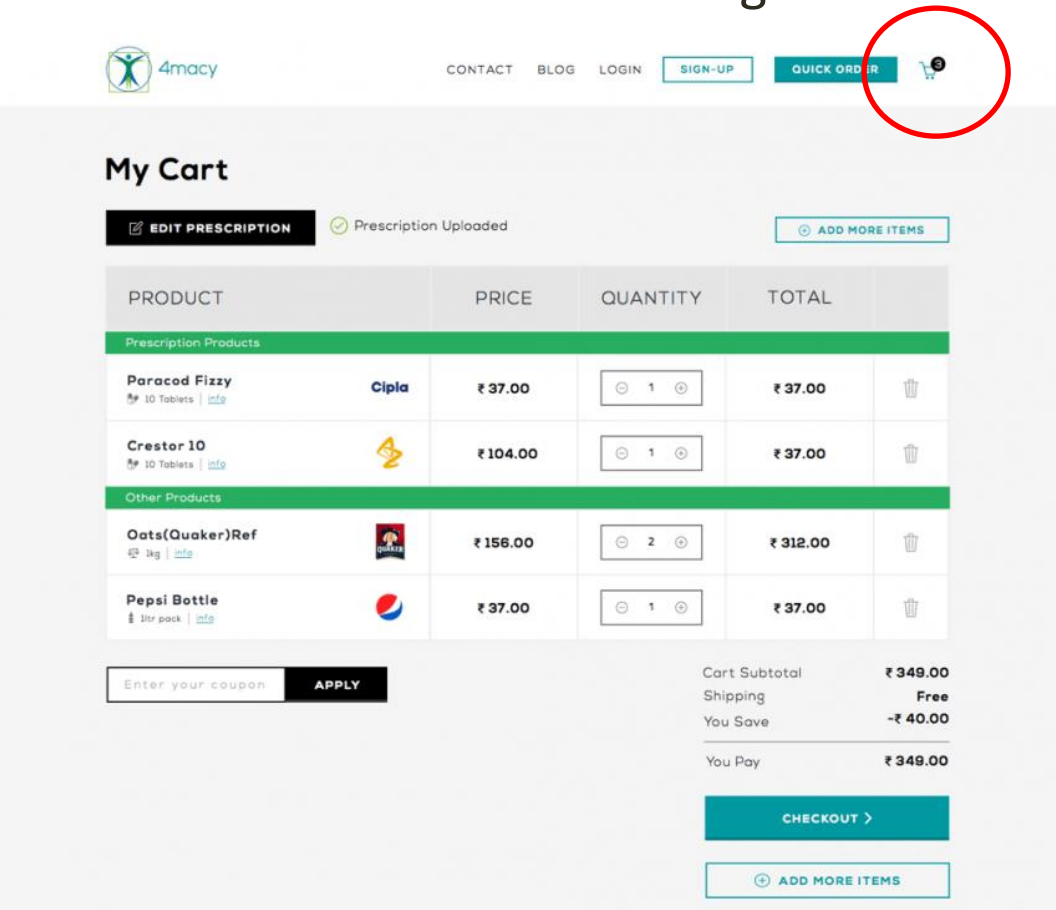
3 User control and freedom

- Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.



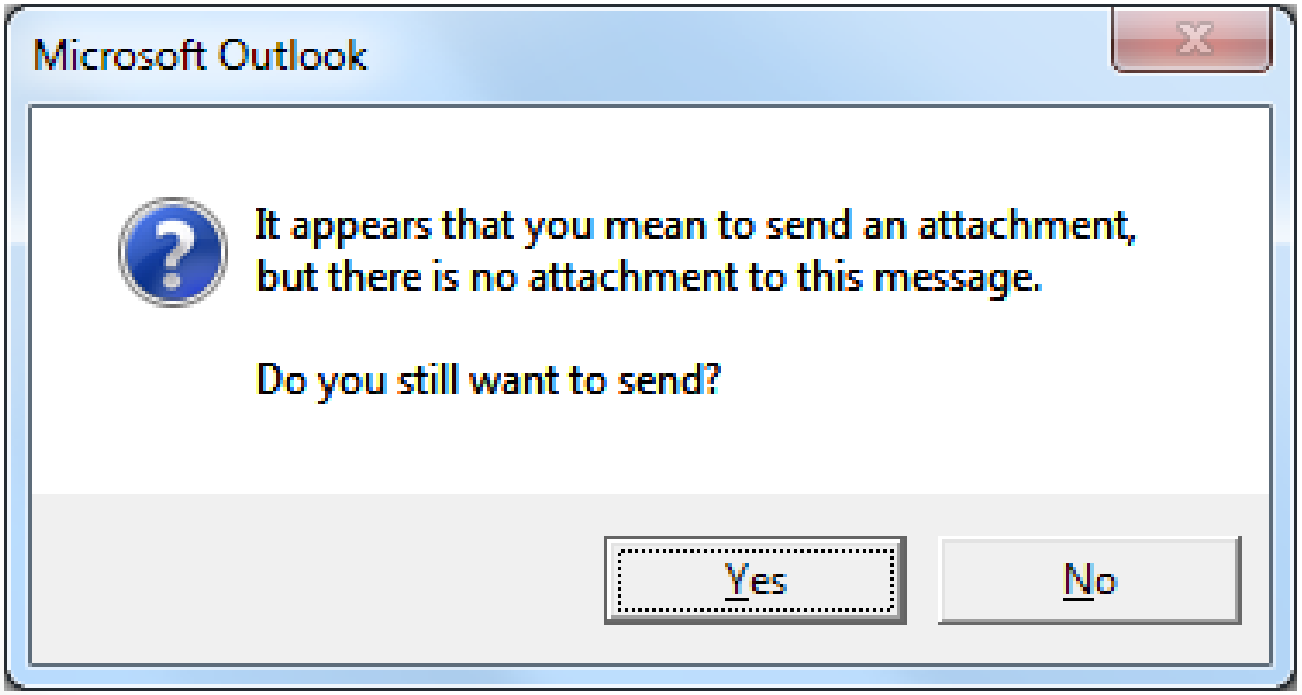
4 Consistency and standards

- Users should not have to wonder whether different words, situations, or actions mean the same thing.



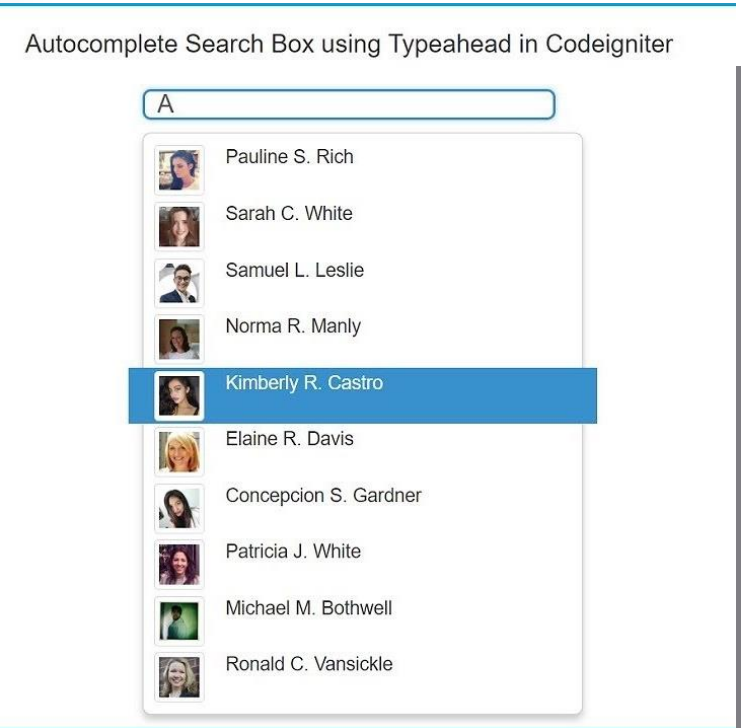
5 Error prevention

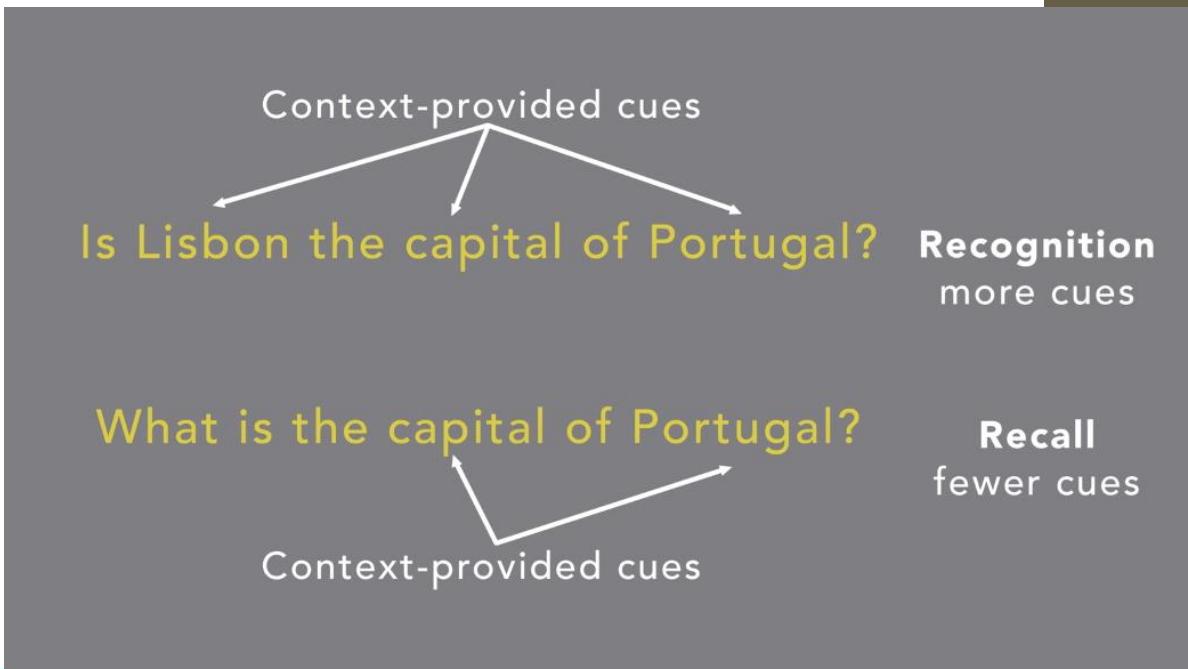
- Even better than good error messages is a careful design which prevents a problem from occurring in the first place. Either eliminate error-prone conditions or check for them and present users with a confirmation option before they commit to the action.



6 Recognition rather than recall

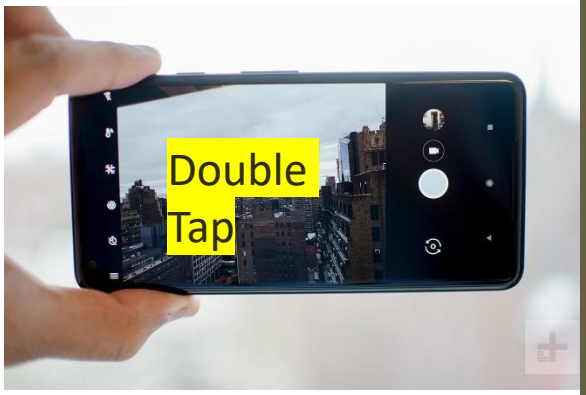
- Minimize the user's memory load by making objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.





7 Flexibility and efficiency of use

- Accelerators — unseen by the novice user — may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.
- Menu -> copy
- Highlight and copy
- Just use Copy paste



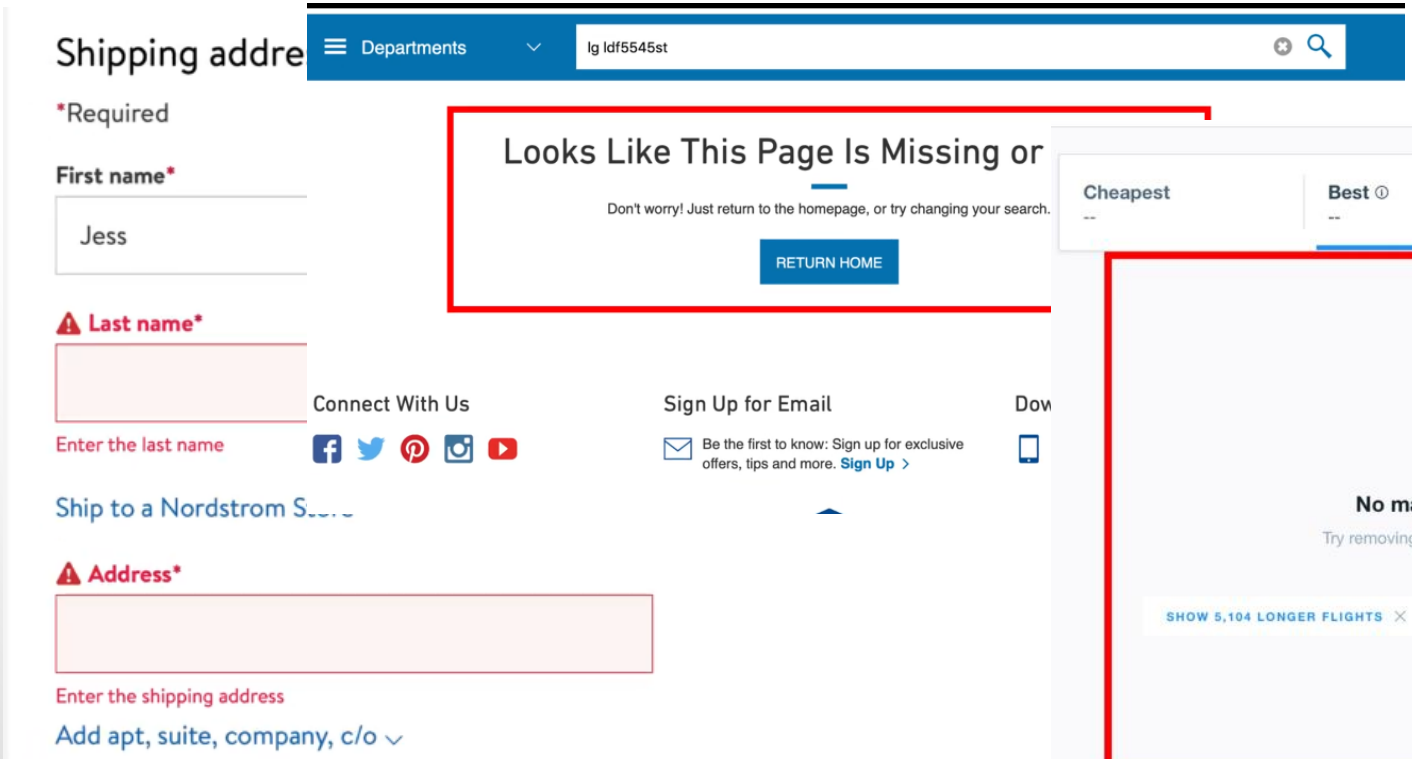
- Flexibility make it more efficient for each user.
- Don’t also overdose users by many choices at learning.

8 Aesthetic and minimalist design

- Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.
- Signal to noise ratio (Text, animation) it must be high.
- Don’t show too many visual elements because the tool do

9 Help users recognize, diagnose, and recover from errors

- Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.



10 Help and documentation

- Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.