What is HCI?

Introduzione all'usabilità nelle interfacce web

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The goal of HCI

Ingredients

- The **User**(s)
- The **Computer**(s)
- The **Task**(s) to be accomplished

Goal

- The system must support the user's **task,** with a focus on its **usability**
  - Useful
  - Usable
  - Used

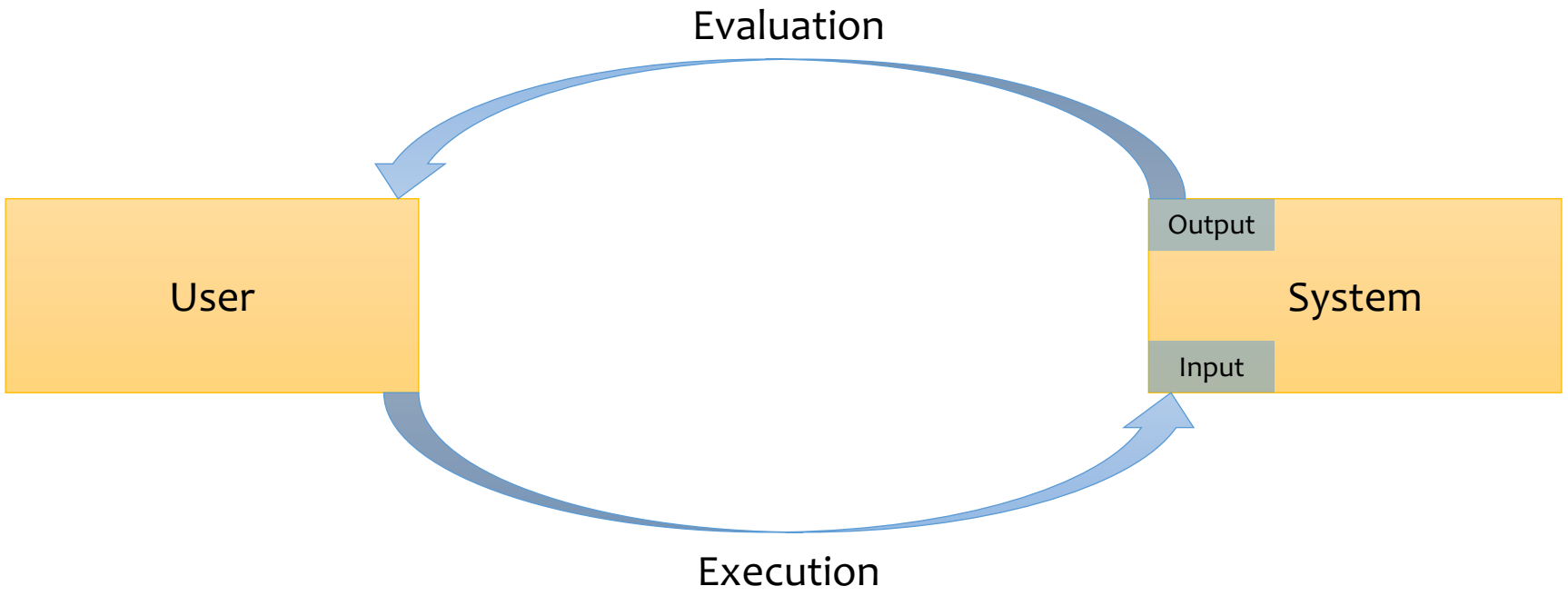
Models of interaction

A general framework to understand how User and System interact

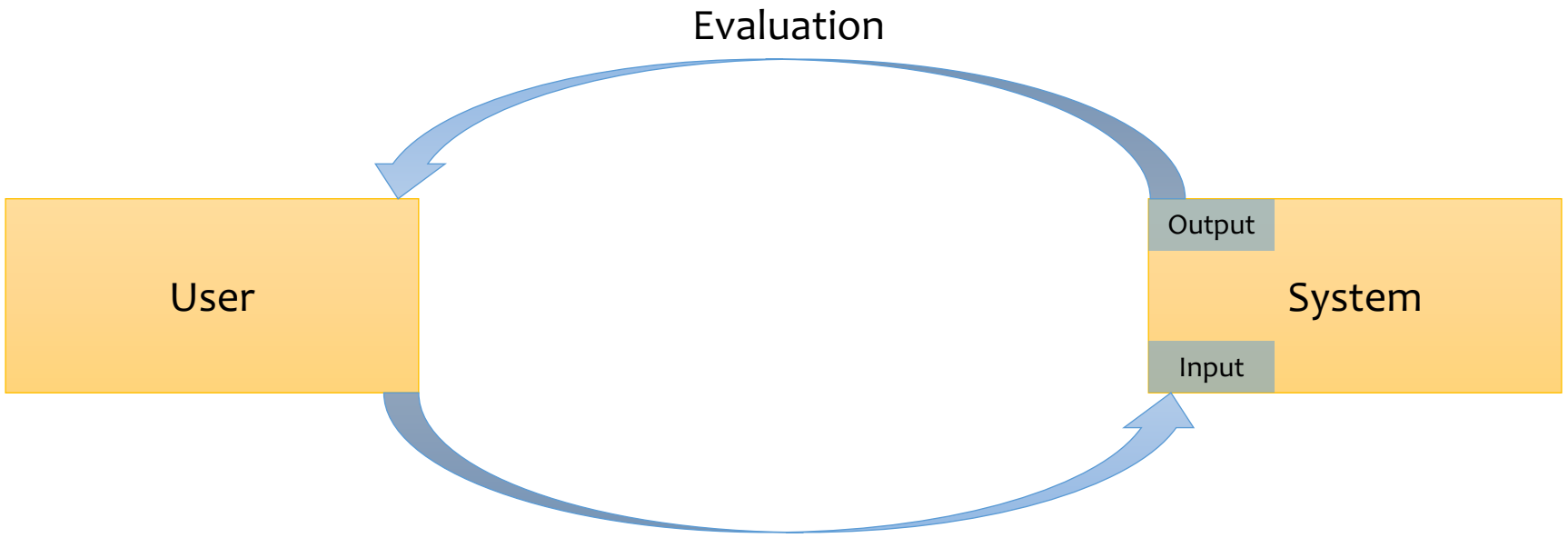
Assumptions

- The **user** wants to accomplish some **goals**, in a specific application **domain**
  - Each domain has a specific jargon, set of possible processes and goals, artifacts and building blocks, …
- **Tasks** are operations to manipulate the concepts of a domain
  - The goal is attained by performing one or more tasks
- Interaction studies the relation between User and System
  - The system possesses a **state** and "speaks" a **core language**
  - The user possesses a **state**, that includes an **understanding** of the system's state, some **intention** to perform a task, and "speaks" the **task language**

Norman's model of interaction

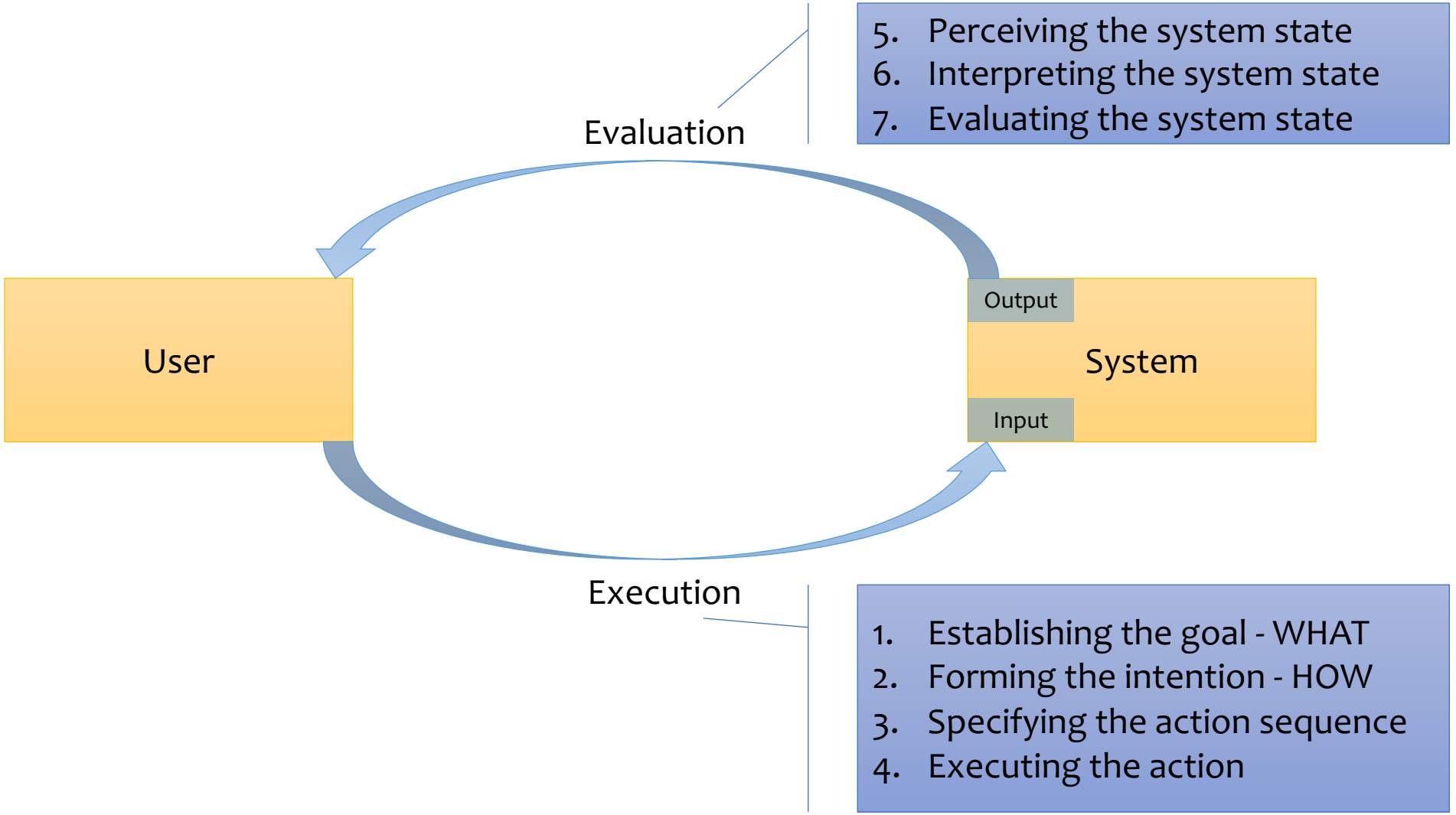


Norman's model of interaction



1. Establishing the goal - WHAT
2. Forming the intention - HOW
3. Specifying the action sequence
4. Executing the action

Norman's model of interaction



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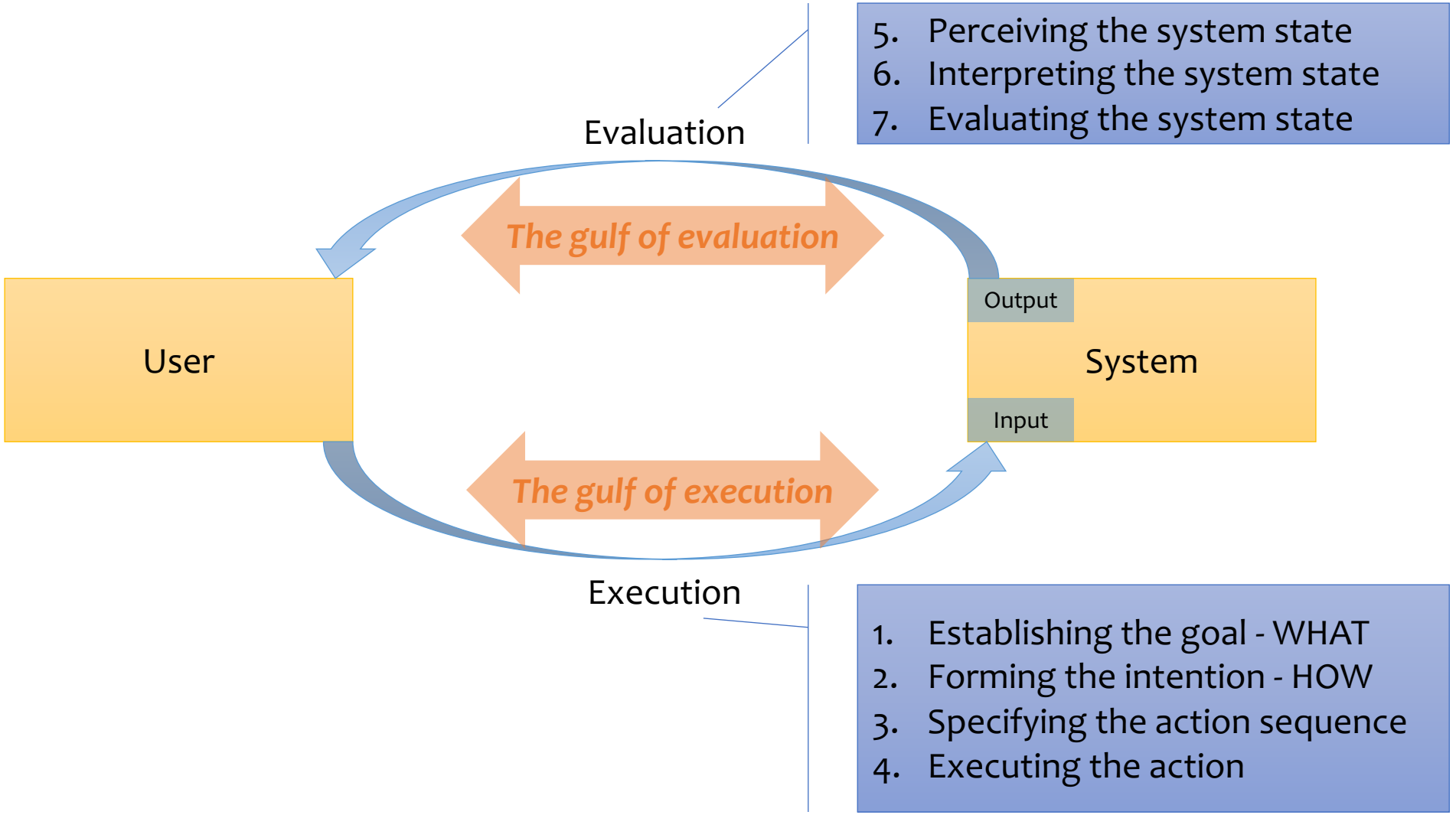
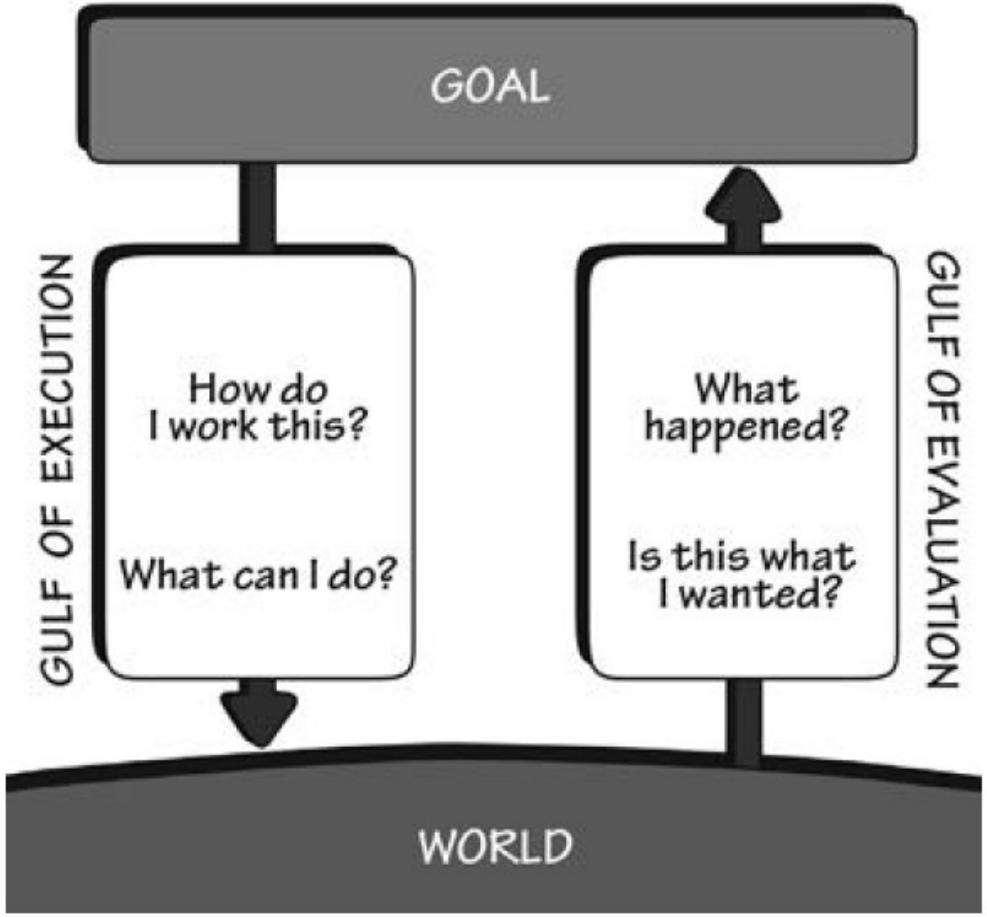
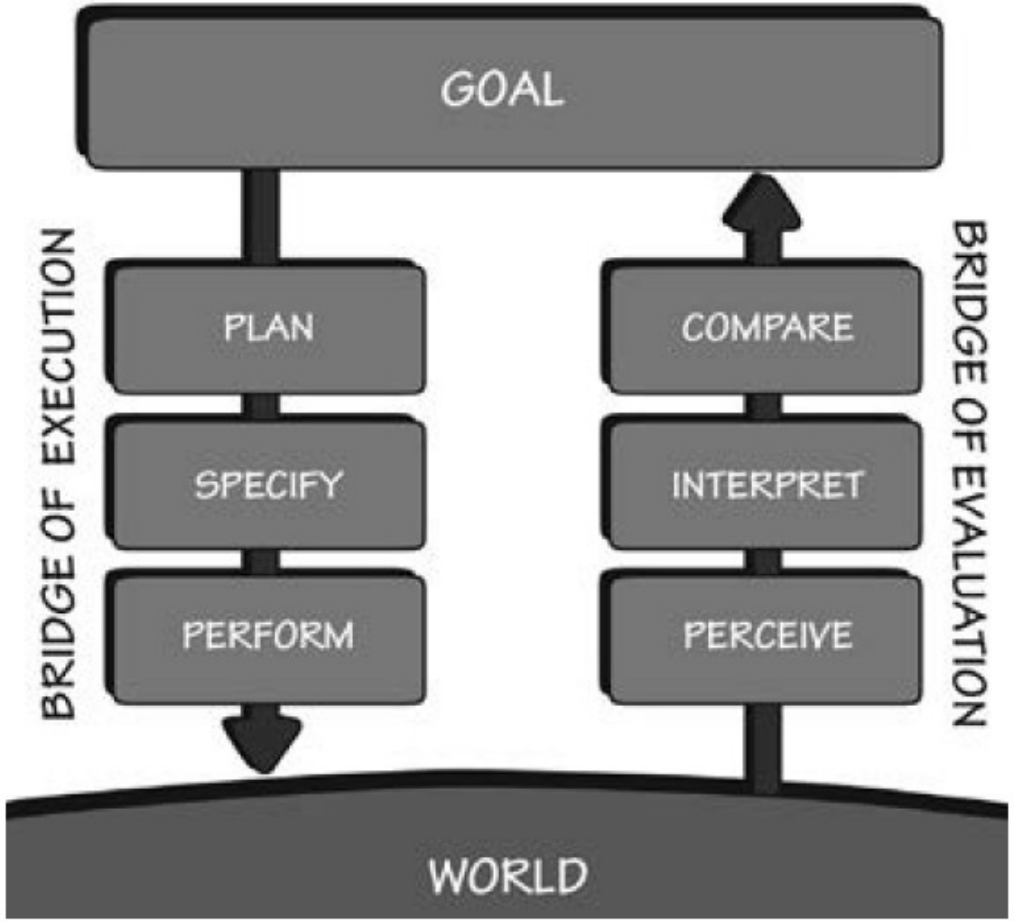


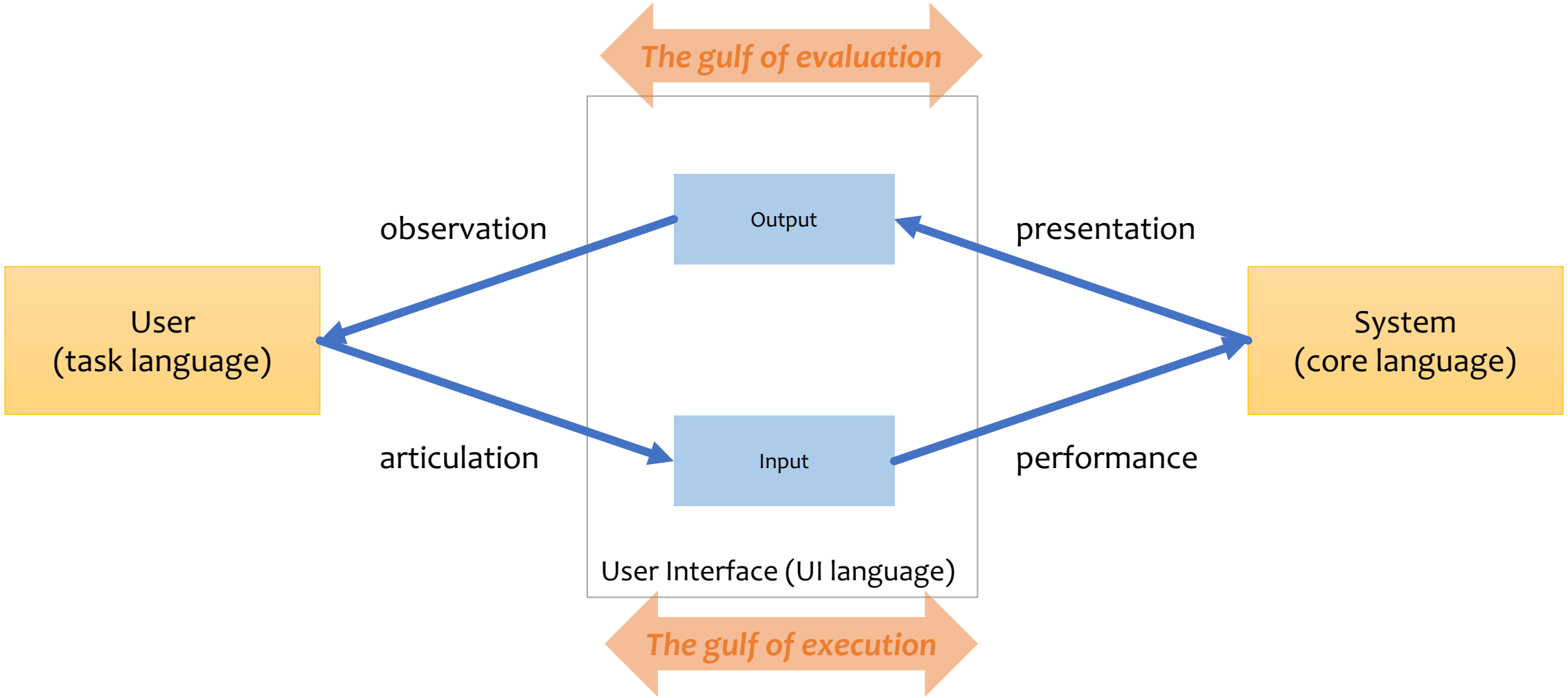
Norman's diagrams

1. **Goal** (form the goal)
2. **Plan** (the action)
3. **Specify** (an action sequence)
4. **Perform** (the action sequence)
5. **Perceive** (the state of the world)
6. **Interpret** (the perception)
7. **Compare** (the outcome with the goal)





Abowd and Beale model, with explicit UI



Human errors*
in the gulf of execution

Slip

- You have formulated the right action, but fail to execute that action correctly
  - E.g., click the wrong icon, or double-click too slow, …
- May be corrected by a better interface (spacing, layout, highlights, …)

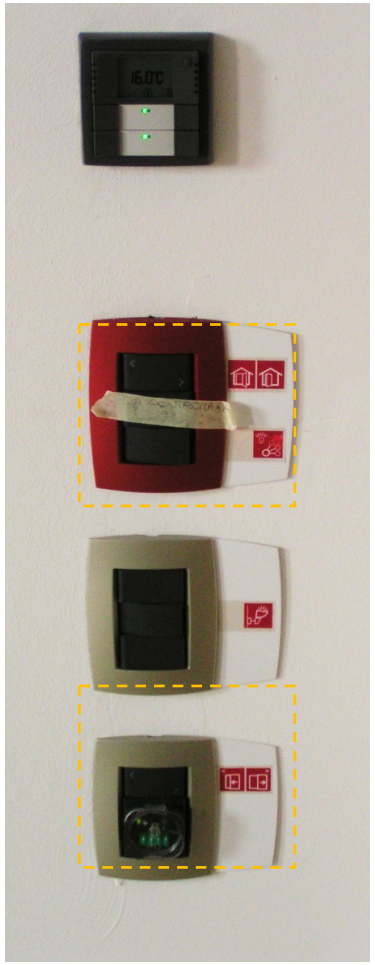
Mistake

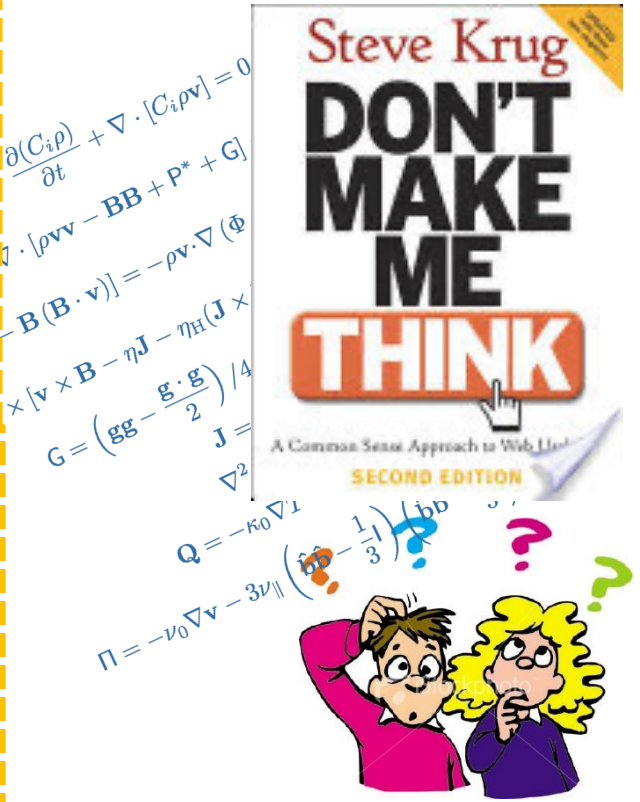
- You don’t know the system well and you may not formulate the right goal
  - E.g., click 🔎 for Zoom, but it means Search
- The user’s mental model of the system’s state is not correct
- Requires more radical redesign, or additional training

* About Human errors

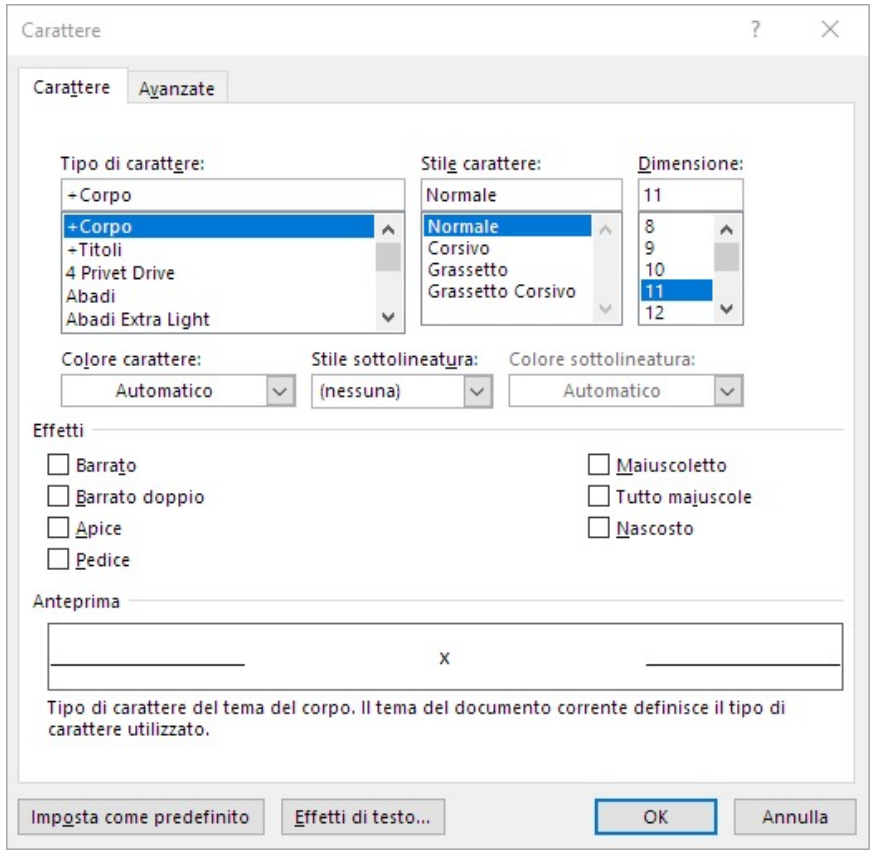
- Human errors should **never** be considered as faults of the user
- Rather, «they are usually a result of bad design» (Norman)
- Humans tend to be imprecise, distracted, not-omniscient
  - System design should anticipate this human behavior
  - Minimize the chance of inappropriate actions (evaluation)
  - Maximize the possibility of discovering and repairing an inappropriate action (execution)
  - Enable users to understand the state of the system and build an appropriate model

Example (articulation): find the right switch

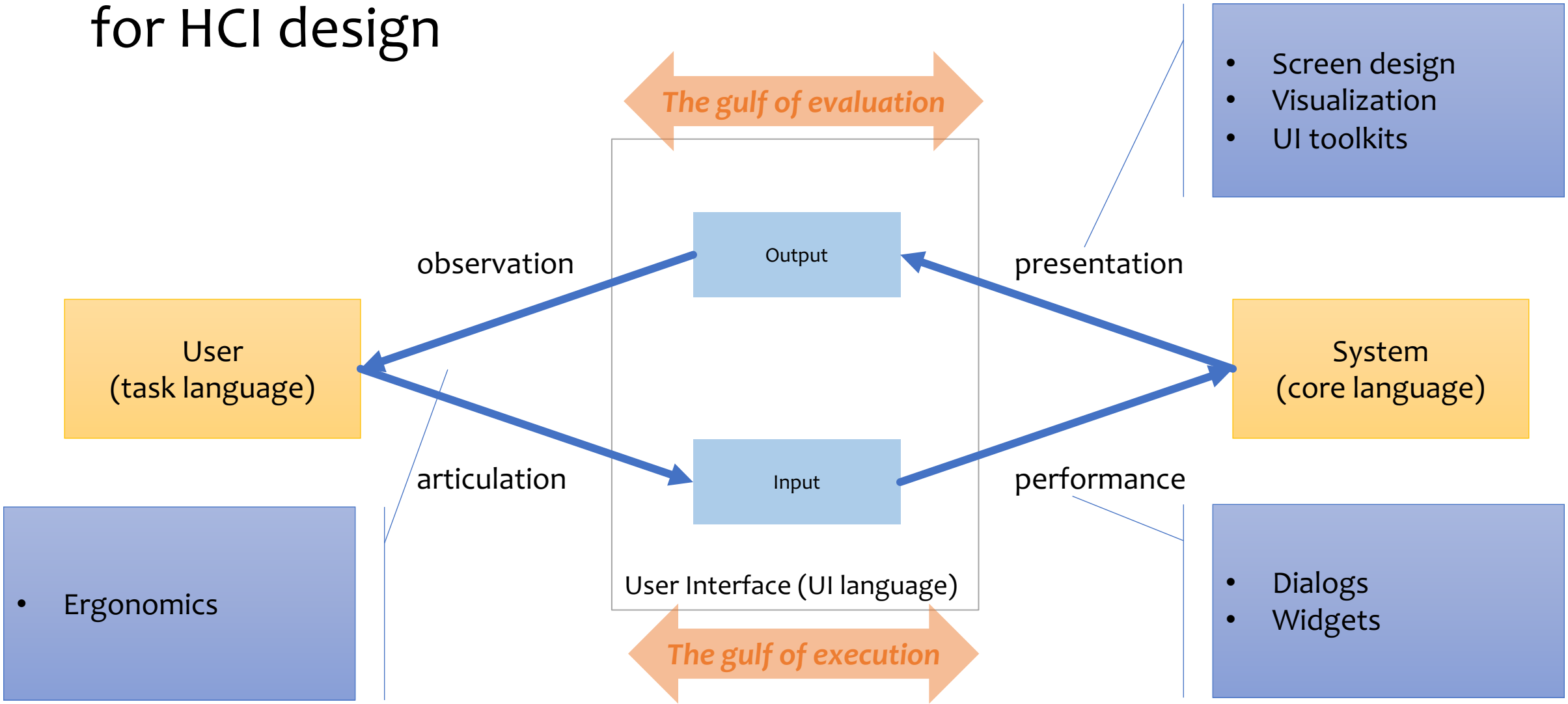




Example (presentation): what are the allowed combinations?



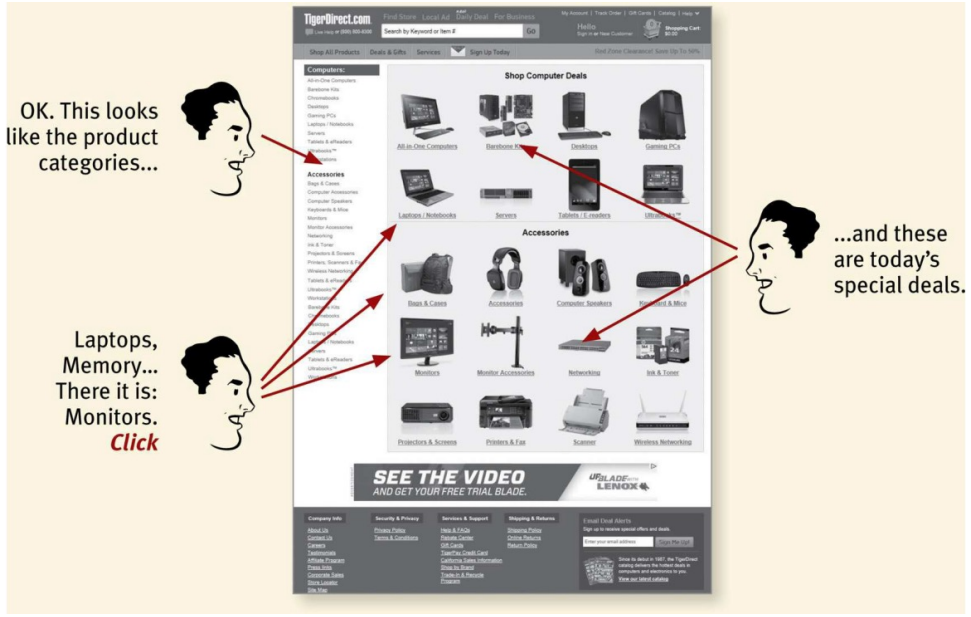
Tools, Techniques and Environments for HCI design

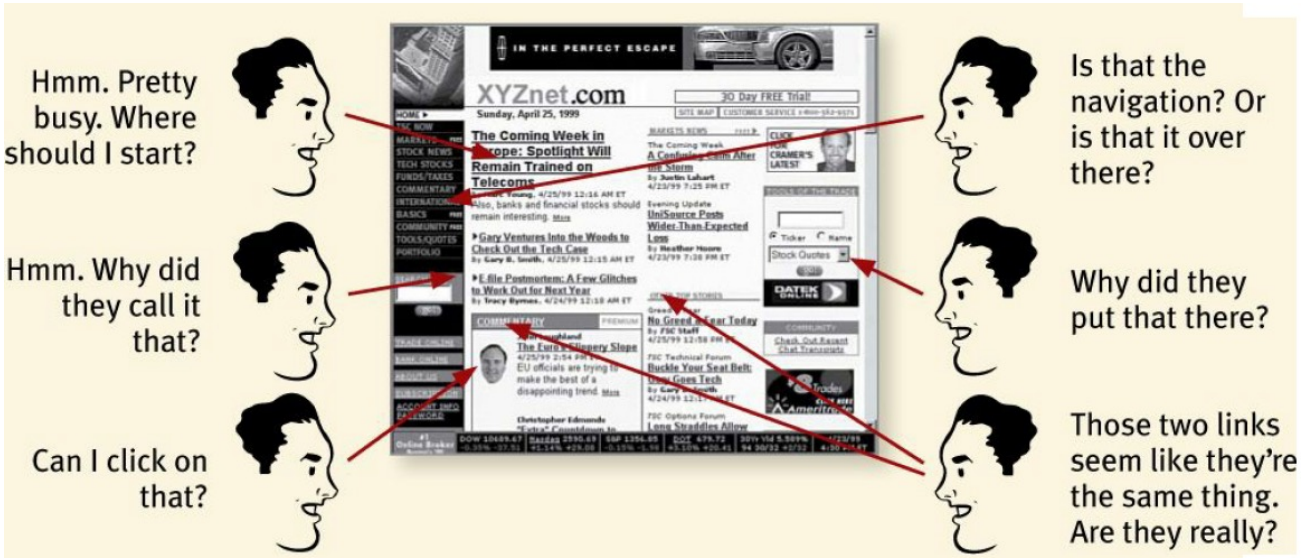


Usability

- **Usability**: how well users can use the system's functionality
- Dimensions of usability:
  - **Usefulness**: does it do something people want?
  - **Learnability**: is it easy to learn?
  - **Memorability**: one learned, is it easy to remember?
  - **Effectiveness**: does it allow reaching the goal?
  - **Efficiency**: once learned, is it fast to use?
  - **Visibility**: is the state of the system visible?
  - **Errors**: are errors few and recoverable?
  - **Satisfaction**: is it enjoyable to use?

Usability: Don’t Make Me Think

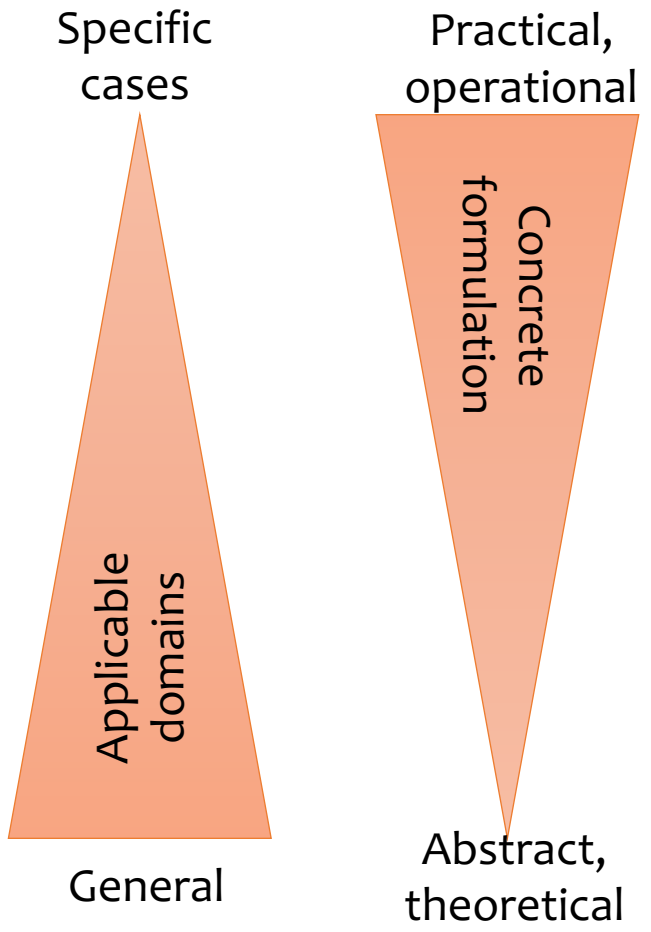




Design Guidelines, Theories and Principles

Generating design solutions

- **Guidelines**: Low-level focused advice about good practices and cautions against dangers.
- **Principles**: Mid-level strategies or rules to analyze and compare design alternatives.
- **Theories**: High-level widely applicable frameworks to draw on during design and evaluation, as well as to support communication and teaching.



Design Principles

The important aspects that we need to consider when creating a design.

The “What”

The 8 Golden Rules of Interface Design

- Strive for consistency
- Cater to universal usability
- Offer informative feedback
- Design dialogs to yield closure
- Prevent errors
- Permit easy reversal of actions
- Keep users in control
- Reduce short-term memory load

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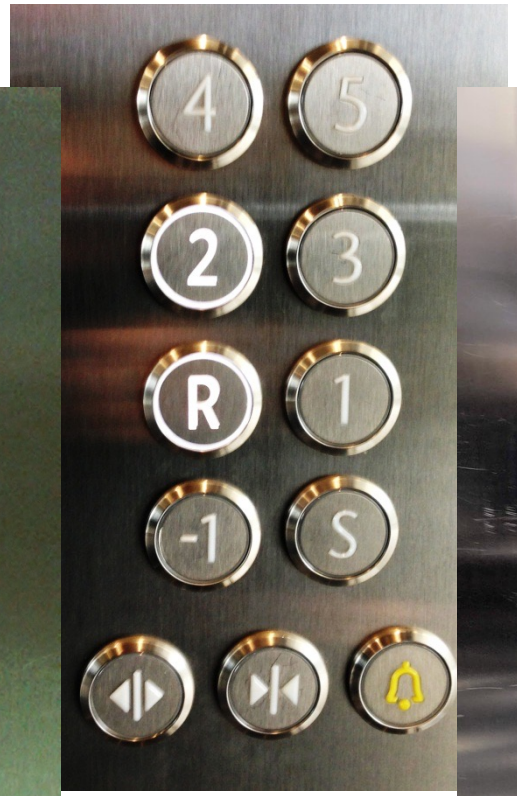
- Similar situations should lead to similar sequences of actions
- Same terminology in prompts, menus, help
- Color, layout, capitalization, fonts, …
- Exceptions should be comprehensive and limited
  - E.g., delete, password echo

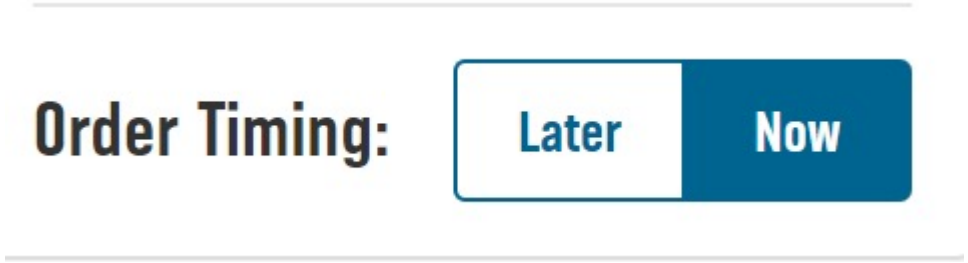
Internal consistency

Consistency with mental models



https://twitter.com/grmcall/status/1182586857814659073?s=20

Consistency of interpretation



- Which one is the selected one?
  - Color codes are ambiguous
  - No further internal clues
  - No external clues
- Does it represent the current status?
- Does it represent the status that we want to achieve?

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- Users with different needs: let the interface *adapt*, let content be *transformed*
- Novices vs. experts. Young vs elderly. Web vs. mobile. Users with disabilities (→Accessibility)
- **Responsive** design
- International (and cultural) variations

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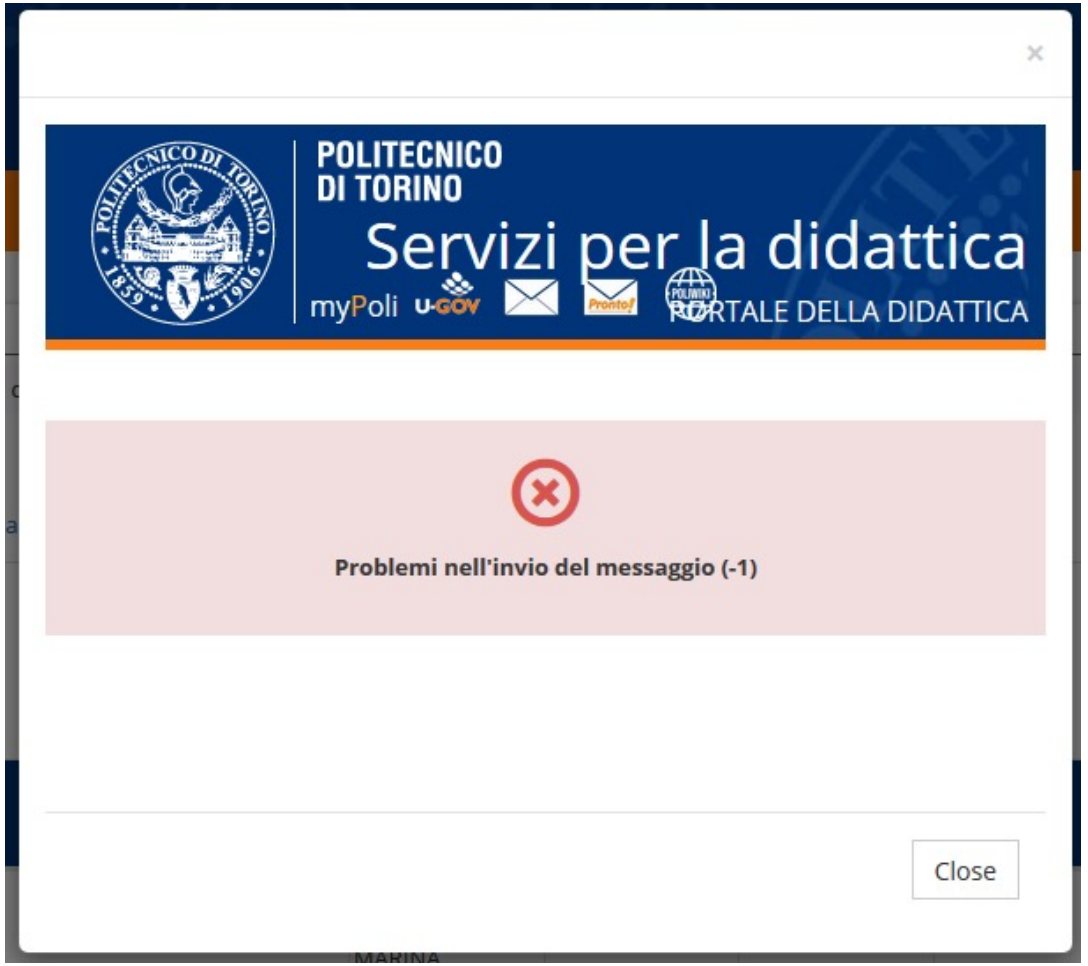
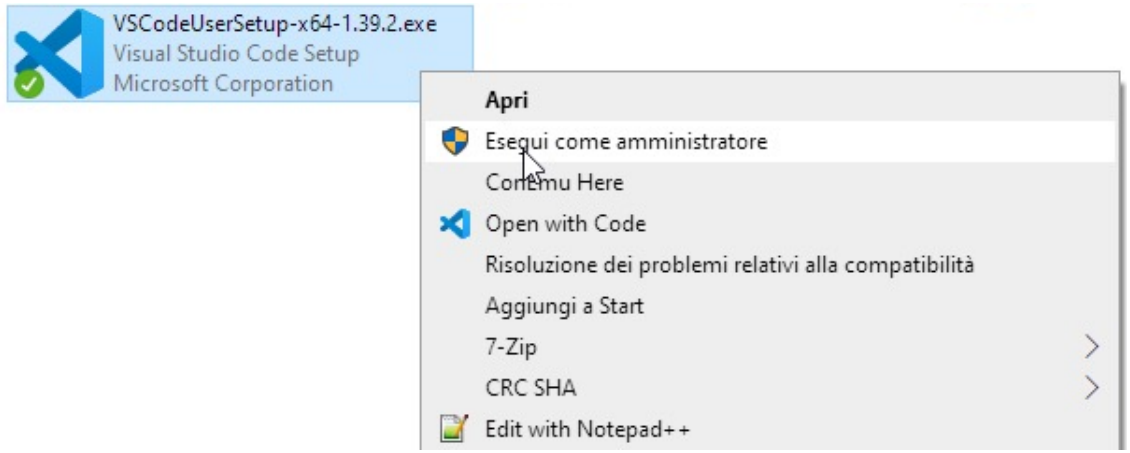
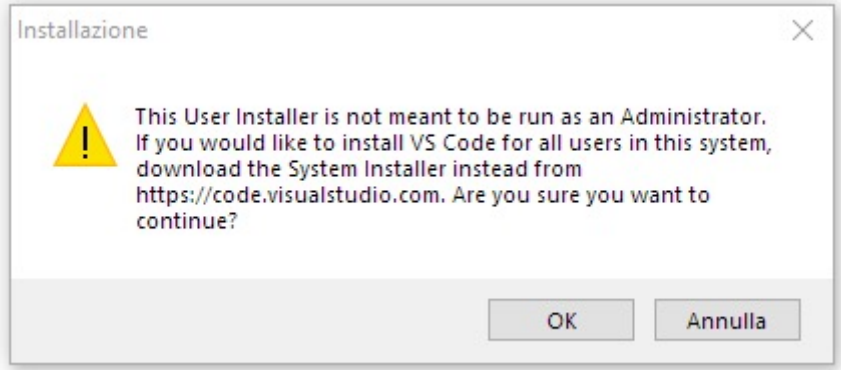
- For ***every*** human action, there should be an interface feedback
- Frequent and minor actions: light feedback
- Infrequent and major actions: stronger feedback
- Visual presentation of objects helps showing the changes (e.g., dim, highlight, grey out, …)

Example

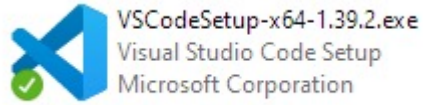

POLITECNICO
DI TORINO
Servizi per la didattica
myPoli
PORTALE DELLA DIDATTICA
Problemi nell'invio del messaggio (-1)
Close

Example





Try to install VS Code for all users on a computer (install to Program files rather than user's folders)



We went a long way from…

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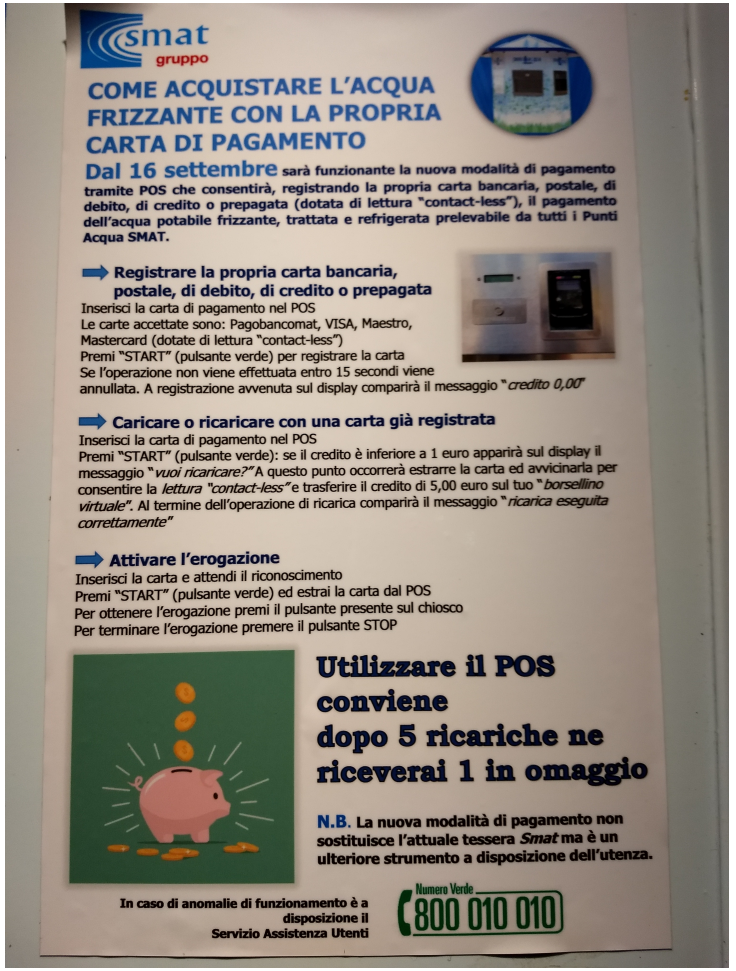
- Every sequence of actions should have
  - Beginning
  - Development
  - End
- Provide clear feedback at end
  - Satisfy users
  - ‘Delete’ current task from their working memory, prepare for the next

Clear dialog sequence



smat
gruppo

COME ACQUISTARE L'ACQUA FRIZZANTE CON LA PROPRIA CARTA DI PAGAMENTO

Dal 16 settembre sarà funzionante la nuova modalità di pagamento tramite POS che consentirà, registrando la propria carta bancaria, postale, di debito, di credito o prepagata (dotata di lettura "contact-less"), il pagamento dell'acqua potabile frizzante, trattata e refrigerata prelevabile da tutti i Punti Acqua SMAT.

Registrare la propria carta bancaria, postale, di debito, di credito o prepagata

Inserisci la carta di pagamento nel POS
Le carte accettate sono: Pagobancomat, VISA, Maestro, Mastercard (dotate di lettura "contact-less")
Premi "START" (pulsante verde) per registrare la carta
Se l'operazione non viene effettuata entro 15 secondi viene annullata. A registrazione avvenuta sul display comparirà il messaggio "*credito 0,00*"

Caricare o ricaricare con una carta già registrata

Inserisci la carta di pagamento nel POS
Premi "START" (pulsante verde): se il credito è inferiore a 1 euro apparirà sul display il messaggio "*vuoi ricaricare?*" A questo punto occorrerà estrarre la carta ed avvicinarla per consentire la *lettura "contact-less"* e trasferire il credito di 5,00 euro sul tuo "*borsellino virtuale*". Al termine dell'operazione di ricarica comparirà il messaggio "*ricarica eseguita correttamente*"

Attivare l'erogazione

Inserisci la carta e attendi il riconoscimento
Premi "START" (pulsante verde) ed estrai la carta dal POS
Per ottenere l'erogazione premi il pulsante presente sul chiosco
Per terminare l'erogazione premere il pulsante STOP

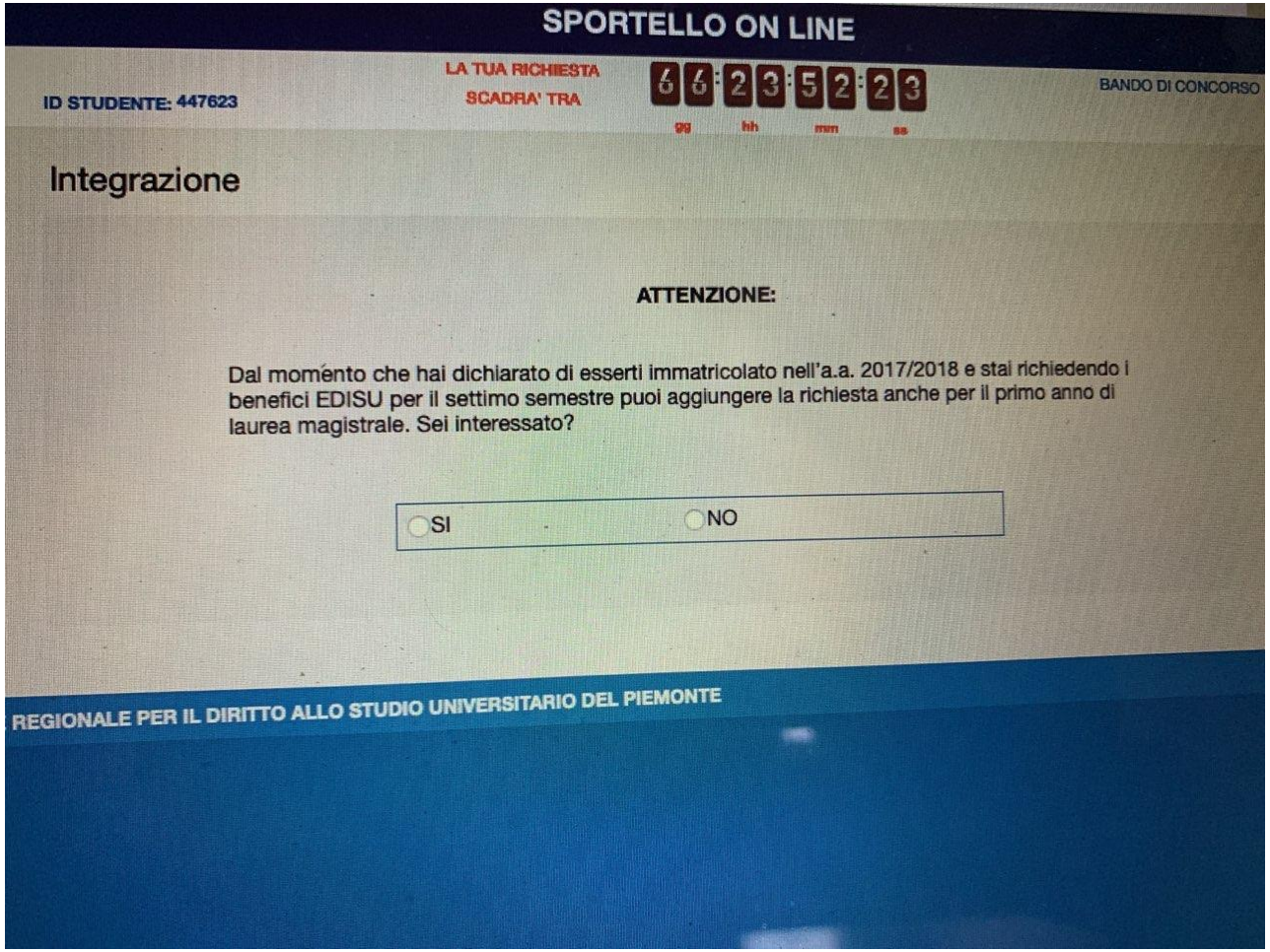
Utilizzare il POS conviene dopo 5 ricariche ne riceverai 1 in omaggio

N.B. La nuova modalità di pagamento non sostituisce l'attuale tessera *Smat* ma è un ulteriore strumento a disposizione dell'utenza.

In caso di anomalie di funzionamento è a disposizione il Servizio Assistenza Utenti

Numero Verde 800 010 010

Clear dialog sequence



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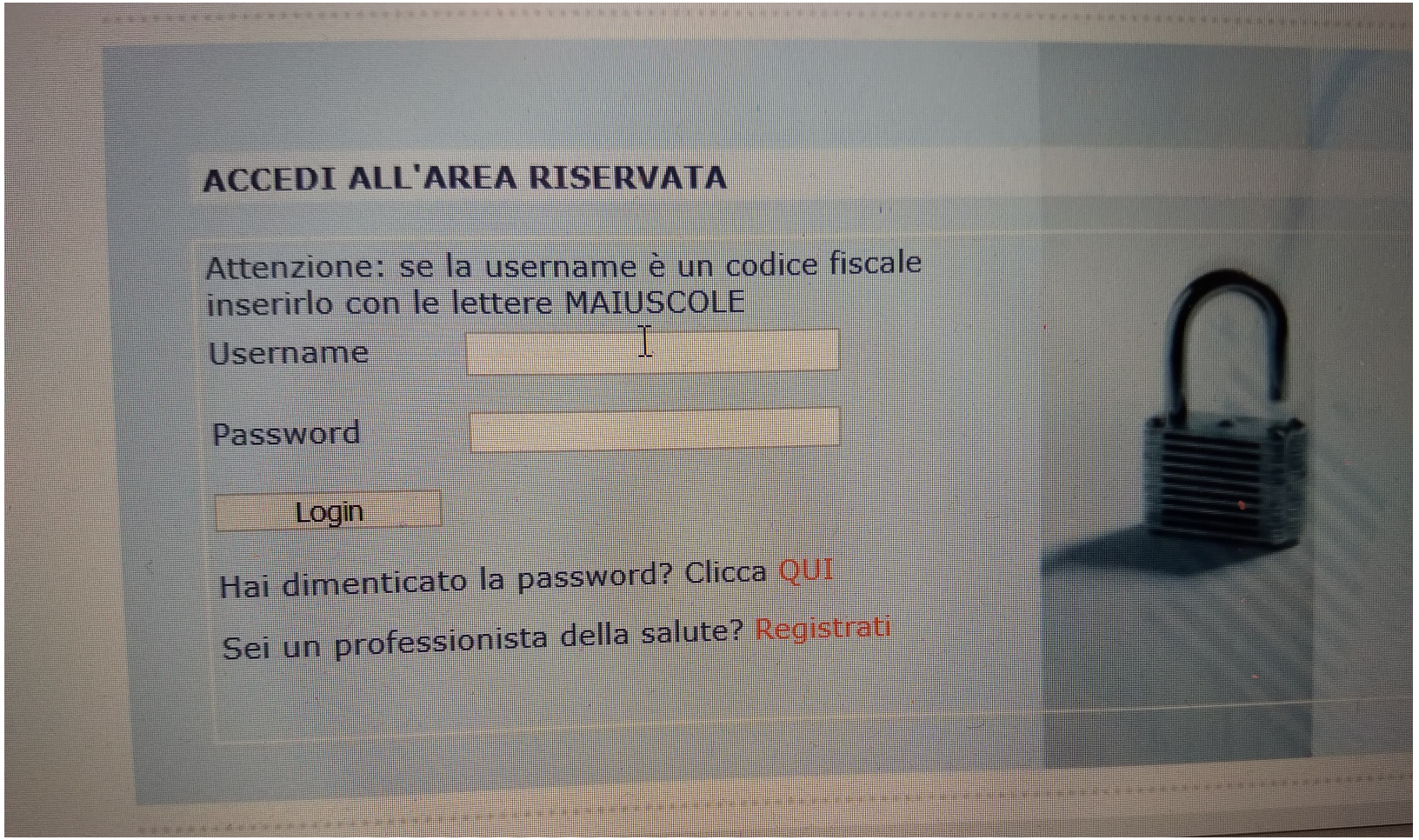
- Avoid the possibility of making errors
- Disable menu items, buttons, links, … that are not applicable
- Prevent entering illegal characters
- Offer simple, constructive and specific instructions for recovery
  - Repair only the faulty part
- Errors should not alter application state (or make it easy to restore)

Error prevention



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- Actions should be reversible (at the cost of extra development effort)
  - Relieves anxiety
  - Encourages exploration
- Different levels of reversibility
  - A single action
  - A data-entry task
  - A complete group of actions

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- The interface should *always* respond to user actions
- Minimize the tedious and lengthy tasks
- Avoid surprises or changes in familiar behavior
- Provide undo/redo, cancel/confirm

Example

*Come docente, quali problemi hai avuto nello svolgimento degli esami?

Scegliere una o più delle seguenti opzioni

- [x] Non ho avuto problemi
- [x] Organizzazione dell'esame (poca chiarezza nella spiegazione delle modalità, sovrapposizione di date, procedure troppo confuse, deposito e consultazione documentazione complesso, ecc.)
- [ ] Dispongo di hardware/software inadeguato
- [ ] La connessione che uso è lenta/non continua
- [ ] Problemi ambientali (troppo rumore, confusione, scarsa possibilità di concentrazione)

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- **Reduce short-term memory load**

- Rule of thumb:
  - People can remember 7±2 chunks of information
- Information on a screen should not be needed (remembered) in the next screen
- No entry of phone numbers (collect from addressbook), show website location, fit long forms in a single page, …

Design Guidelines

Shared language to promote **consistency** among multiple designers in terminology usage, appearance, and action sequences

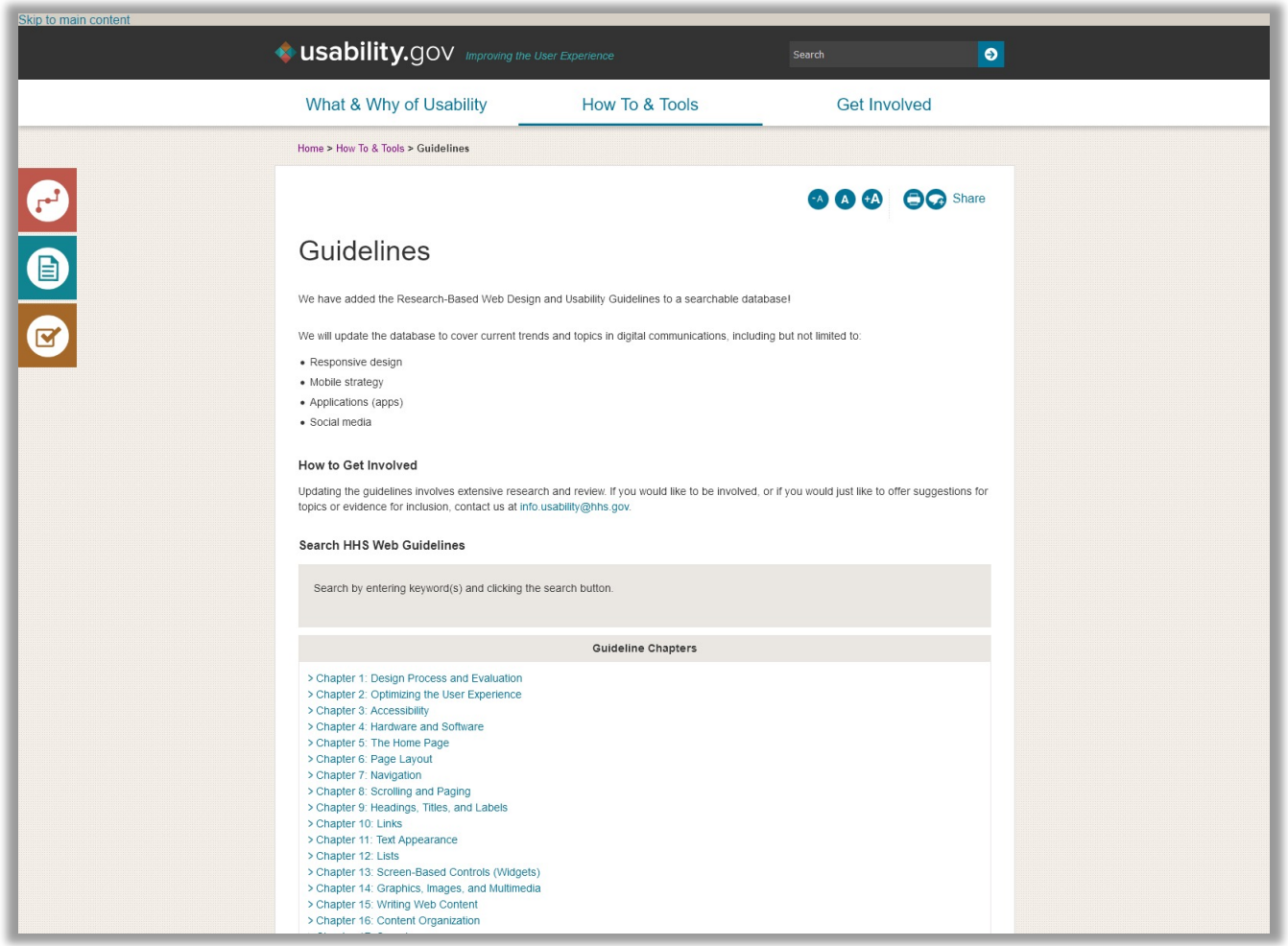
The “How”

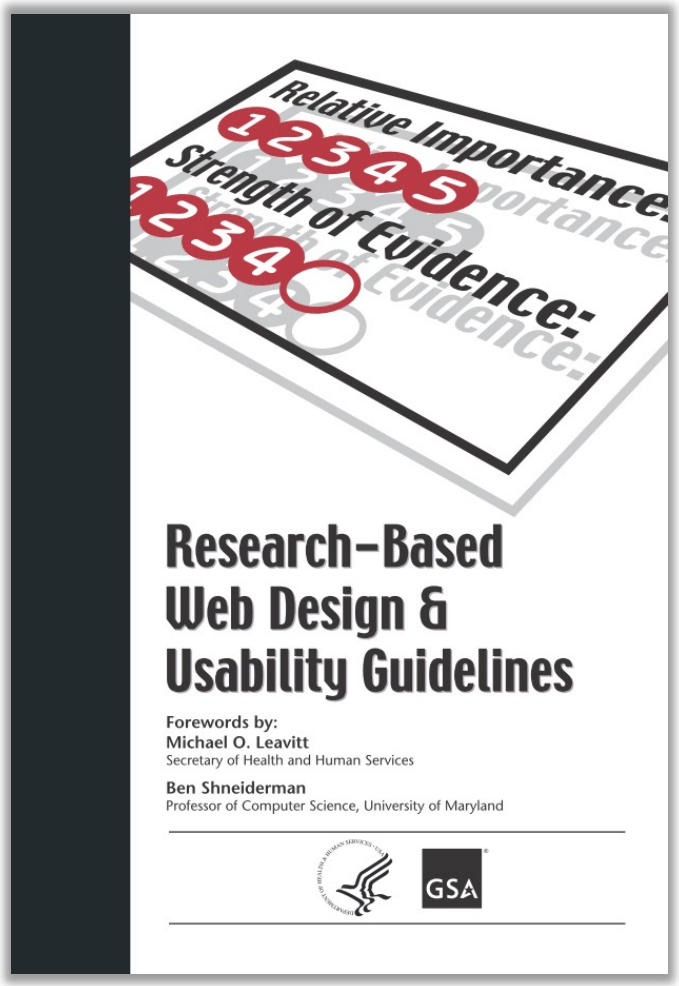
Design Guidelines

- Concrete suggestions about “How” the Principles may be satisfied
- Often rule-based
- Based on best practices
- Encapsulate experience of expert designers
- Sometimes blessed as «standards»
- But:
  - May be too specific and hard to apply to your situation
  - Difficult to develop a general-purpose guideline

Research-based Web Design and Usability Guidelines

U.S. Dept. of Health and Human Services. The Research-Based Web Design & Usability Guidelines, Enlarged/Expanded edition. Washington: U.S. Government Printing Office, 2006. https://guidelines.usability.gov/





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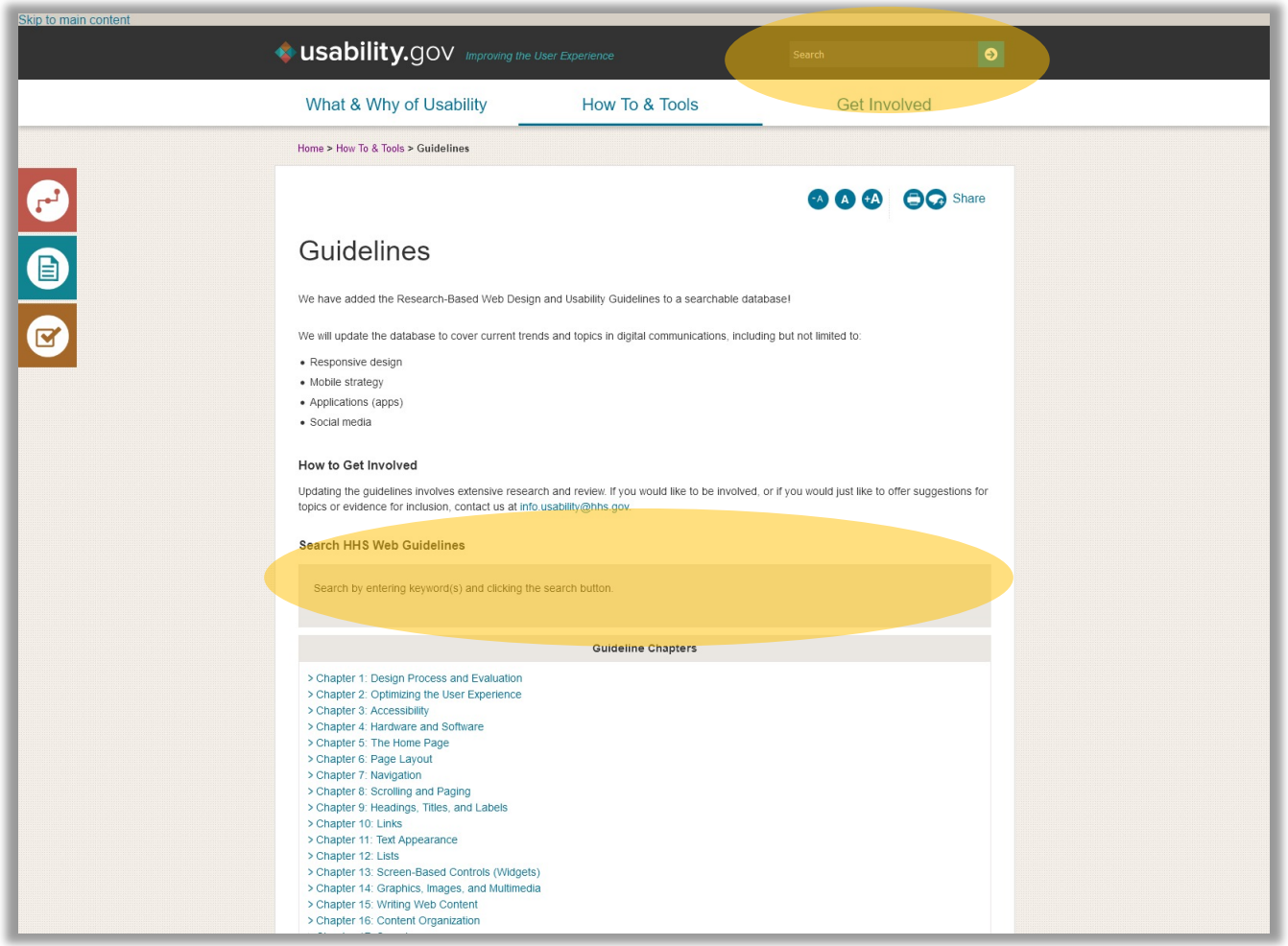
Skip to main content
usability.gov
Improving the User Experience
Search
What & Why of Usability
How To & Tools
Get Involved
Home > How To & Tools > Guidelines
Share
Guidelines
We have added the Research-Based Web Design and Usability Guidelines to a searchable database!
We will update the database to cover current trends and topics in digital communications, including but not limited to:
• Responsive design
• Mobile strategy
• Applications (apps)
• Social media
How to Get Involved
Updating the guidelines involves extensive research and review. If you would like to be involved, or if you would just like to offer suggestions for topics or evidence for inclusion, contact us at info.usability@hhs.gov.
Search HHS Web Guidelines
Search by entering keyword(s) and clicking the search button.
Guideline Chapters
> Chapter 1: Design Process and Evaluation
> Chapter 2: Optimizing the User Experience
> Chapter 3: Accessibility
> Chapter 4: Hardware and Software
> Chapter 5: The Home Page
> Chapter 6: Page Layout
> Chapter 7: Navigation
> Chapter 8: Scrolling and Paging
> Chapter 9: Headings, Titles, and Labels
> Chapter 10: Links
> Chapter 11: Text Appearance
> Chapter 12: Lists
> Chapter 13: Screen-Based Controls (Widgets)
> Chapter 14: Graphics, Images, and Multimedia
> Chapter 15: Writing Web Content
> Chapter 16: Content Organization

References

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    - PDF, https://elite.polito.it/files/courses/02JSKOV/2020/slide/02-whatisHCI.pdf
    - Video, https://youtu.be/LIyesd7Zpj4
  - Guidelines
    - PDF, https://elite.polito.it/files/courses/02JSKOV/2020/slide/06-guidelines.pdf
    - Video (part I), https://youtu.be/VIND_Xk7X0A
    - Video (part II), https://youtu.be/p3rbSjKa9gI

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