

Evaluation: Introduction and Heuristics

Human Computer Interaction

Fulvio Corno, Luigi De Russis

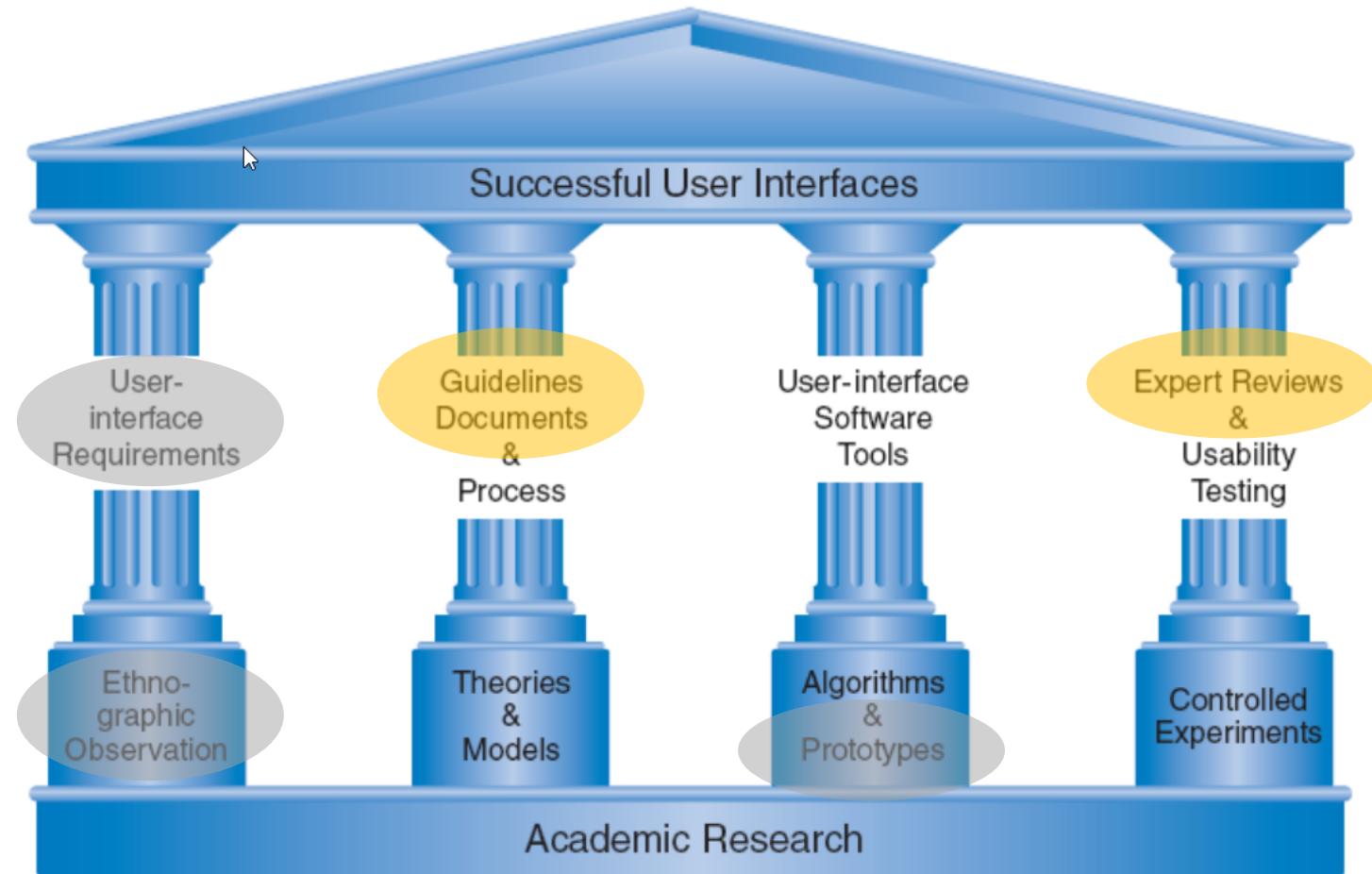
Academic Year 2019/2020



POLITECNICO
DI TORINO



The Four Pillars of Design



Ben Shneiderman & Catherine Plaisant, Designing the User Interface: Strategies for Effective Human-Computer Interaction

Goals

Generating design solutions



Evaluating generated designs



- Guidelines
- Principles
- Theories

- Expert reviews and heuristics
- Usability testing
- Controlled experiments

Evaluation

Testing the usability, functionality and acceptability of an interactive system

Goal

- Evaluation: «Evaluation tests the usability, functionality and acceptability of an interactive system»
 - According to the design stage (sketch, prototype, final)
 - According to the initial goals
 - Alongside the different usability dimensions
 - Using a range of different techniques
- Identify and correct issues as soon as possible

Many Evaluation Approaches

- Evaluation may take place:
 - In the laboratory
 - In the field
- Involving users (Empirical Evaluation):
 - Experimental methods
 - Observational methods
 - Query methods
 - Formal or semi-formal or informal
- Based on expert evaluation:
 - Analytic methods
 - Review methods
 - Model-based methods
 - Heuristics
- Automated evaluation:
 - Simulation and software measures
 - Formal evaluation with models and formulas
 - Especially for low-level issues

Cognitive Walkthrough

A simple technique to analyze all individual step in an interaction path

Cognitive Walkthrough

- Step-by-step revision of a sequence of actions (interaction steps) to perform a given task
- Evaluators examine each step, looking for possible problems
- Particularly suited for systems designed for learning-by-exploration

Walkthrough Organization

Walkthrough specification

- A specification or prototype of the system
- A description of the task the user is to perform on the system
- A complete, written list of the actions needed to complete the task
- An indication of who the users are (experience, knowledge)

For each step, you must check

- Is the *effect* of the action the same as the *user's goal* at that point?
- Will users see that the action is available?
- Once users have found the *correct action*, will they know it is the one they need?
- After the action is taken, will users understand the *feedback* they get?

Example

The screenshot shows a web application interface for the Politecnico di Torino. At the top, there is a header with the university's logo, name, and various links like myPoli, u-GOV, email, and Promef. On the right, there is a navigation bar with 'Apply@polito' and links for Home, Registrazione, and Logout. Below the header, there is a large blue banner with the university's crest and the text 'Progetto Orientamento'. The main content area has a blue header 'Progetto Orientamento'. The text explains the project aims to help students choose a study path by proposing a common course related to mathematics and physics, which can be supplemented with lessons on planning and design. It also mentions that students will follow lessons on mathematics and physics according to indications from their professors. There are options to select participation in planning or design. A note states that participation requires a contribution of 25 euros by November 5th. At the bottom, there are buttons for 'Continua', 'Indietro', and 'Avanti'.

POLITECNICO DI TORINO

myPoli u-GOV

Apply@polito

Home | Registrazione | Logout

ITA | ENG

Main (F363543)

Anagrafica

Cambio password

Studi compiuti

Conoscenze linguistiche

Scegli il percorso

Progetto Orientamento

Materiale Didattico

Riepilogo e conferma

FAQ / Ticket

Progetto Orientamento

Per aiutarti a fare una scelta consapevole del percorso di studi universitari, il Politecnico ti propone un percorso comune legato ai temi della matematica e della fisica a cui puoi aggiungere lezioni legate ai temi della Pianificazione e del Design.

Le lezioni di **matematica e fisica** le seguirai secondo le indicazioni che riceverai dai tuoi professori.

Per seguire anche le lezioni legate al Design e/o alla Pianificazione seleziona le opzioni qui sotto:

Pianificazione: non intendo partecipare 21 gennaio

Design: non intendo partecipare 10 gennaio

Per partecipare al progetto è necessario pagare un contributo di **25 euro** con MAV o Carta di credito.

Devi completare il pagamento **entro il 5 novembre** e stampare lo statino che ti permetterà di accedere alle lezioni.

Continua

Indietro

Avanti

Heuristic Evaluation

Experts check potential issues on your design, by referring to a set of heuristic criteria

When Is Design Critique Useful?

- Before user testing
 - To save effort
 - Solving easy-to-solve problems
 - Leaving user testing for bigger issues
- Before redesigning
 - Identify the good parts (to be kept) and the bad ones (to be redesigned)
- To generate evidence for problems that are known (or suspected)
 - From ‘murmurs’ or ‘impressions’ to hard evidence
- Before release
 - Smoothing and polishing



Heuristic Evaluation

- A method developed by Jacob Nielsen (1994)
 - Structured design critique
 - Using a set of simple and general heuristics
 - Executed by a small group of experts (3-5)
 - Suitable for any stage of the design (sketches, UI, ...)
 - Goal: find usability problems in a design
- Also popularized as “Discount Usability”

Basic idea

- Define a set of heuristics (or principles)
- Give those heuristics to a group of experts
 - Each expert will use heuristics to look for problems in the design
- Experts work independently
 - Each expert will find different problems
- At the end, experts communicate and share their findings
 - Findings are analyzed, aggregated, ranked
- The discovered violations of the heuristics are used to fix problems or to re-design



<https://www.nngroup.com/articles/how-to-conduct-a-heuristic-evaluation/>

The screenshot shows the NN/g Nielsen Norman Group website. The header includes the logo, navigation links for Home, Articles (which is underlined), Training & Events, Consulting, Reports & Books, and About NN/g. The main content is titled 'How to Conduct a Heuristic Evaluation' by Jakob Nielsen on November 1, 1994, with a topic of 'Heuristic Evaluation'. The summary states: 'Heuristic evaluation involves having a small set of evaluators examine the interface and judge its compliance with recognized usability principles (the "heuristics").' Below this is a detailed explanation of the heuristic evaluation process, mentioning Jakob Nielsen and the 1990 Nielsen-Molich study. A sidebar on the left lists various research methods and topics. The bottom right features a diagram with a grid of black squares representing user interface elements. Some squares have 'Unsuccessful' written above them, while others have 'Successful'. Arrows point from the text to specific parts of the grid, illustrating how multiple evaluations can identify different types of usability problems.

Heuristics

- Nielsen proposed 10 heuristic rules
 - Good at finding most design problems
 - Inspired and connected to the Design Principles (→Guidelines)
- In a specific context, application domain, or for specific design goals ...
 - ... new heuristics can be defined
 - ... some heuristic can be ignored

Phases of Heuristic Evaluation

1. Pre-evaluation training
 - Give evaluator information about the domain and the scenario to be evaluated
2. Evaluation
 - Individual
3. Severity Rating
 - First, individually
 - Then, aggregate and find consensus
4. Debriefing
 - Review with the design team

Evaluation (I)

- Define a set of tasks, that the evaluators should analyze
- For each task, the evaluator should step through the design several times, and inspect the UI elements
 - On the real design, or on a preliminary prototype
- At each step, check the design according to each of the heuristics
 - 1st step, get a general feeling for the interaction flow and general scope
 - 2nd step (and following), focus on specific UI elements, knowing where they fit in the general picture
- Heuristics are used as a “reminder” of things to look for
 - Other types of problems can also be reported

Evaluation (II)

- Comments from each evaluator should be recorded or written
 - There may be an observer, taking notes
 - The observer may provide clarifications, especially if the evaluator is not a domain expert
- Session duration is normally 1h – 2h
- Each evaluator should provide a list of usability problems
 - Which heuristic (or other usability rule) has been violated, and why
 - Not a subjective comment, but a reference to a known principle
 - Each problem reported separately, in detail

Evaluation (III)

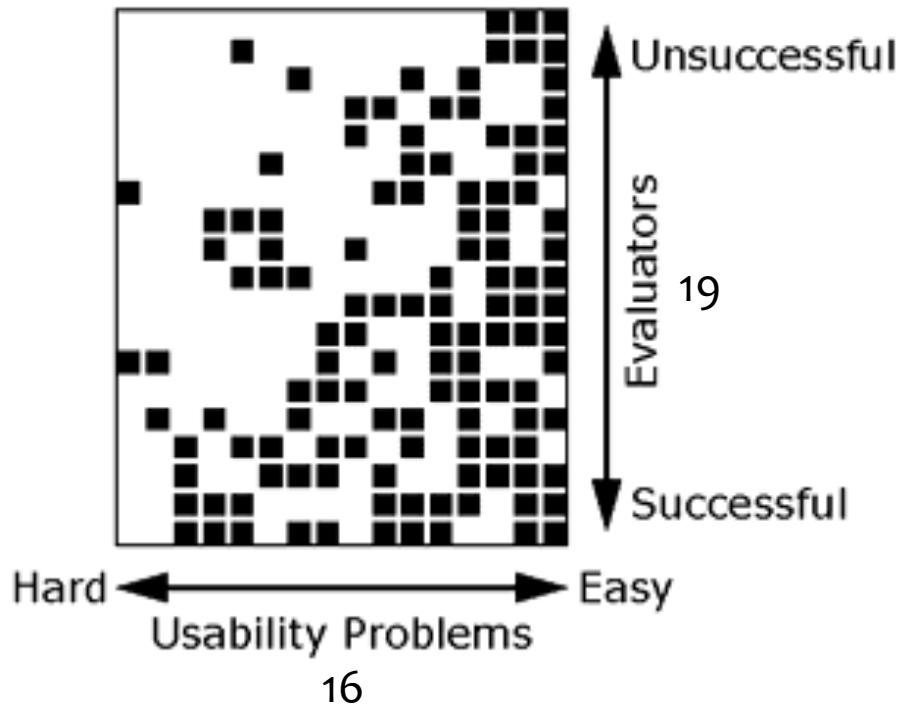
- Where problems may be found
 - A single location in the UI
 - Two or more locations that need to be compared
 - Problem with the overall UI structure
 - Something is missing
 - May be due to prototype approximation
 - May still be unimplemented



<https://www.nngroup.com/articles/usability-problems-found-by-heuristic-evaluation/>

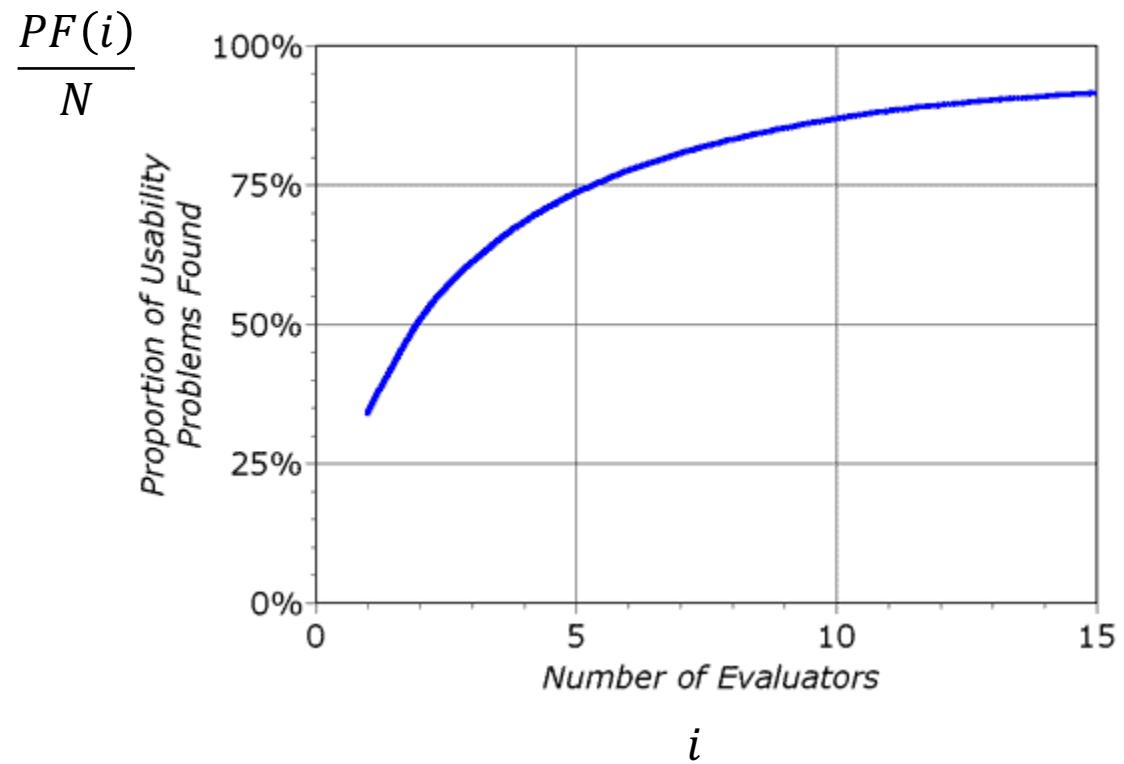
Multiple Evaluators

- No evaluator finds all problems
 - Even the best one finds only ~1/3
- Different evaluators find different problems
 - Substantial amount of nonoverlap
- Some evaluators find more problems than others



16

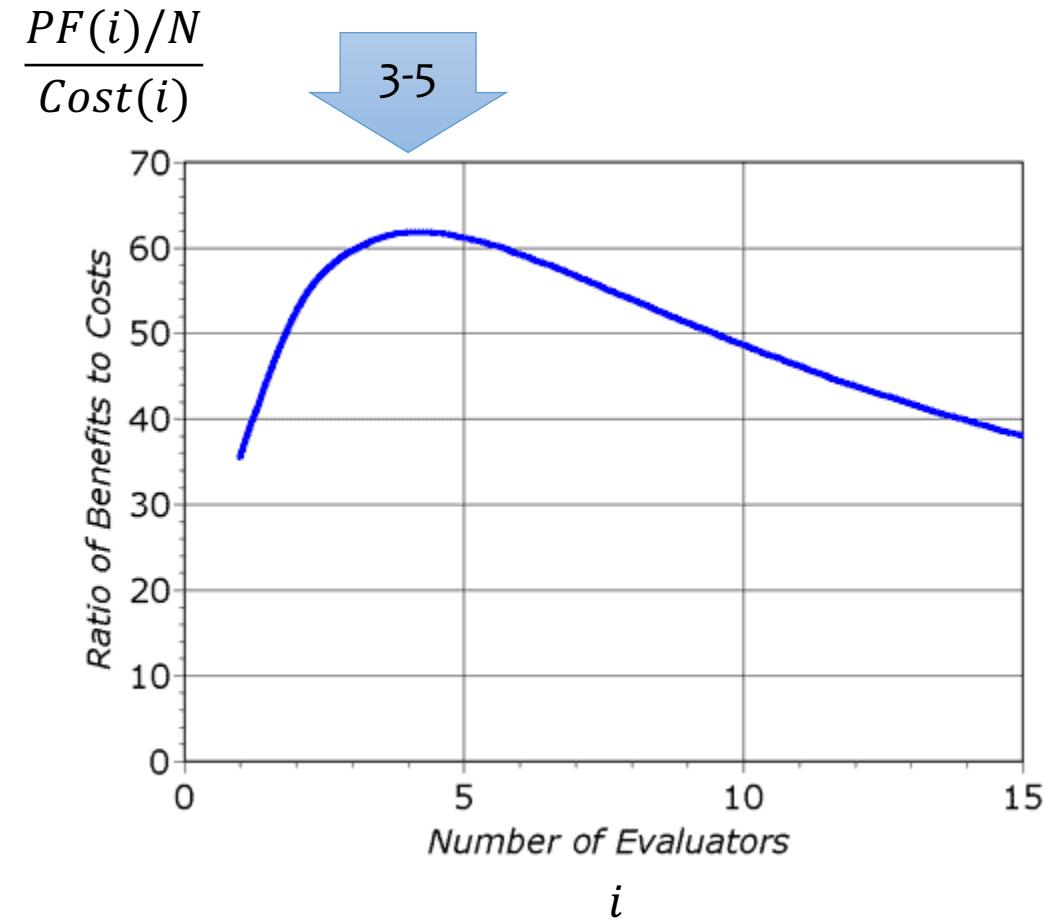
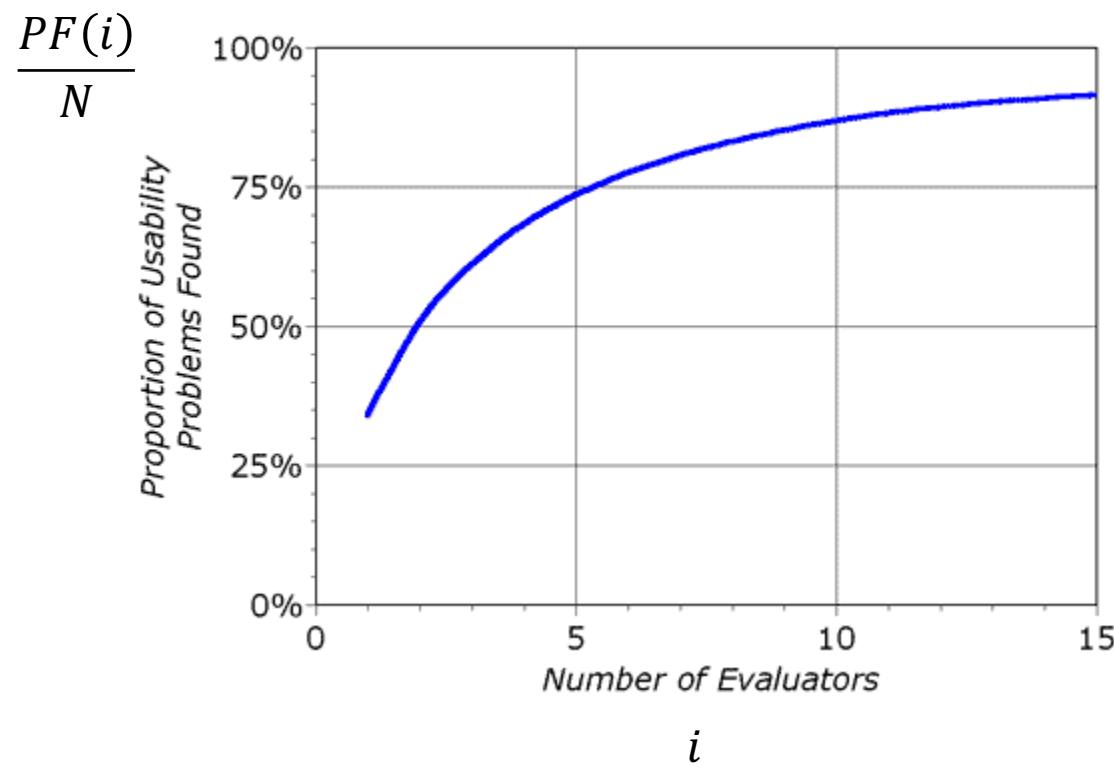
How Many Evaluators?



- $PF(i) = N(1 - (1 - l)^i)$
- $PF(i)$: problems found
- i : number of *independent* evaluators
- N : number of existing (but unknown) usability problems
- l : ratio of usability problems found by a single evaluator

How Many Evaluators?

$$Cost(i) = \text{Fixed} + \text{Fee} \times i$$



Severity Rating

- We need to allocate the most resources to fix the most serious problems
- We need to understand if additional usability efforts are required
- **Severity** is a combination of:
 - **Frequency** with which the problem occurs: common or rare?
 - **Impact** of the problem if it occurs: easy to overcome or difficult?
 - **Persistence**, is it one-time or will it occur many times to users?
- Define a *combined severity rating*
 - Individually, for each evaluator

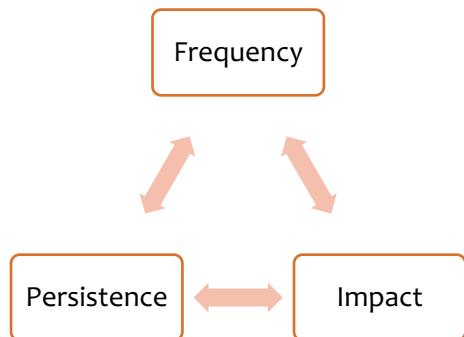
The screenshot shows the NN/g Nielsen Norman Group website. The page title is "Severity Ratings for Usability Problems" by Jakob Nielsen, published on November 1, 1994. The page discusses how severity ratings can help prioritize usability problems based on frequency, impact, and persistence. It includes sections on recent articles and popular articles, along with a summary of the three factors used to determine severity. At the bottom, there's a section on "Severity Ratings in Heuristic Evaluation" and a note about the difficulty of getting good estimates from evaluators.

<https://www.nngroup.com/articles/how-to-rate-the-severity-of-usability-problems/>



Severity Ratings scale

0	No problem	I don't agree that this is a usability problem at all
1	Cosmetic problem only	need not be fixed unless extra time is available on project
2	Minor usability problem	fixing this should be given low priority
3	Major usability problem	important to fix, so should be given high priority
4	Usability catastrophe	imperative to fix this before product can be released



Combined Severity Ratings

- Severity ratings from one evaluator have been found *unreliable*, they should not be used
- After all evaluators completed their rankings
 - Either let them discuss, and agree on a consensus ranking
 - Or just compute the average of the 3-5 ratings

Debriefing

- Meeting of all evaluators, with observers, and members of the development team
- Line-by-line analysis of the problems identified
 - Discussion: how can we fix it?
 - Discussion: how much will it cost to fix it?
- Can also be used to brainstorm general design ideas

Heuristic Evaluation vs. User Testing

Heuristic Evaluation

- Faster (1-2h per evaluator)
- Results are pre-interpreted (thanks to the evaluators)
- Could generate *false positives*
- Might miss some problems

User Testing

- Need to develop sw, and prepare the set-up
- More accurate (by definition!)
 - Actual users and tasks
- ... more on this later in the course!

Heuristic Evaluation vs User Testing

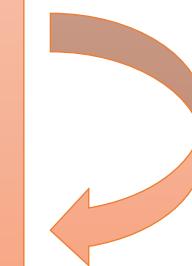
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User Testing

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- More accurate (by definition!)
 - Actual users and tasks



<https://www.nngroup.com/articles/usability-problems-found-by-heuristic-evaluation/>

Nielsen's Usability Heuristics

10 Usability Principles to be used in Heuristic Evaluation

10 Nielsen's Usability Heuristics

The 10 Usability Heuristics

11 videos • 9,192 views • Last updated on Oct 6, 2019

The 10 basic principles for designing a good user experience: these have remained true for decades, since they were introduced for heuristic evaluation of user interfaces. More info: <https://www.nngroup.com/articles/ten-usability-heuristics/>

#UX #HeuristicEvaluation

NN/g NNgroup SUBSCRIBE

1 Usability Heuristic 1: Visibility of System Status
NNgroup 2:37

2 Usability Heuristic 2: Match Between the System and the Real World
NNgroup 3:09

3 Usability Heuristic 3: User Control & Freedom
NNgroup 2:16

4 Usability Heuristic 4: Consistency and Standards
NNgroup 2:38

5 Usability Heuristic 5: Error Prevention
NNgroup 2:53

6 Usability Heuristic 6: Recognition vs. Recall in User Interfaces
NNgroup 2:49

7 Usability Heuristic 7: Flexibility and Efficiency of Use
NNgroup 2:55

8 Usability Heuristic 8: Aesthetic and Minimalist Design
NNgroup 1:58

9 Usability Heuristic 9: Help Users Recognize, Diagnose and Recover from Errors
NNgroup 2:20

10 Usability Heuristic 10: Help & Documentation
NNgroup 2:47



https://www.youtube.com/playlist?list=PLJOFJ3Ok_idtb2YeifXIG1-TYoMBLoG6I

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- When and How to Create Customer Journey Maps
- Design Thinking 101
- The Distribution of Users' Competence Skills: Worse Than You Think
- Mapping Methods Compared: A

#1: Visibility of system status

The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.

(Read full article on [visibility of system status](#) and watch 3 min. [video on the visibility heuristic](#).)

#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.

(Read full article on [match between the system and the real world](#) and watch 3 min. [video on the real-world heuristic](#).)

#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.

(Watch 2-min. [video on the user control heuristic](#).)

#4: Consistency and standards

Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow [platform conventions](#).

(Watch 3-min. [video on consistency & standards](#).)

#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.



<https://www.nngroup.com/articles/ten-usability-heuristics/>



<https://www.nngroup.com/articles/ten-usability-heuristics/>

10 Nielsen's Usability Heuristics

- #1: Visibility of system status
- #2: Match between system and the real world
- #3: User control and freedom
- #4: Consistency and standards
- #5: Error prevention
- #6: Recognition rather than recall
- #7: Flexibility and efficiency of use
- #8: Aesthetic and minimalist design
- #9: Help users recognize, diagnose, and recover from errors
- #10: Help and documentation

#1: Visibility of system status

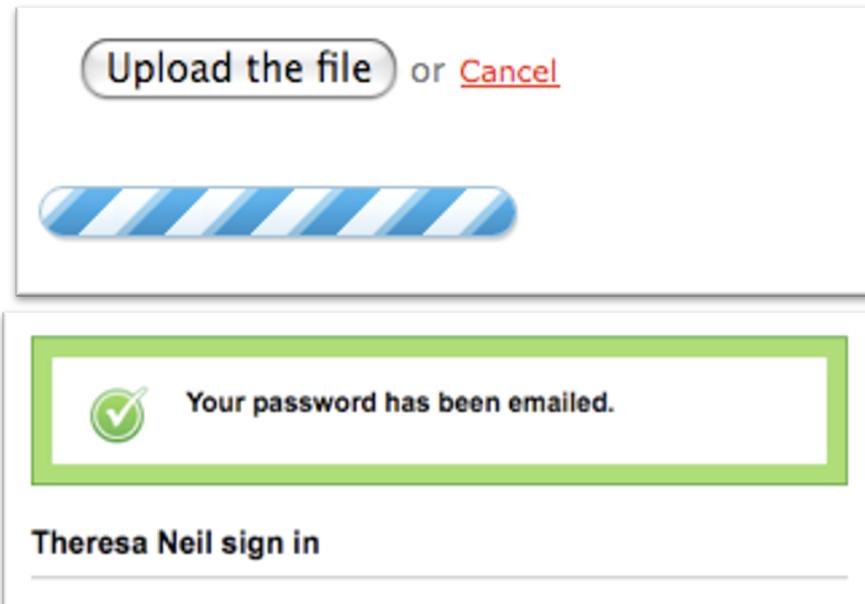
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<https://www.nngroup.com/articles/visibility-system-status/>

#1: Visibility of system status

- The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.



Examples from: <http://designingwebinterfaces.com/6-tips-for-a-great-flex-ux-part-5>

Which Feedback?

- Time
 - Execution time for tasks
- Space
 - E.g., occupation of cloud storage
- Change
 - Ensure that the user is aware of changes that he requested (e.g., save, delete, send, ...)
- Action
 - What is happening (running, stopped, ...), in a redundant way
- Next steps
 - What will happen because of your action, and your possible next actions at this point
- Completion
 - Clarify when a task has been finalized

Rule of Thumb (time)

- If the execution time is...
- ... Less than 1 second ⇒ just show the outcome of the action
- ... Around 1-2 seconds ⇒ show feedback that the action is underway
- ... More 2-3 seconds ⇒ show progress (percentage, estimated time, ...)

#2: Match between system and the real world

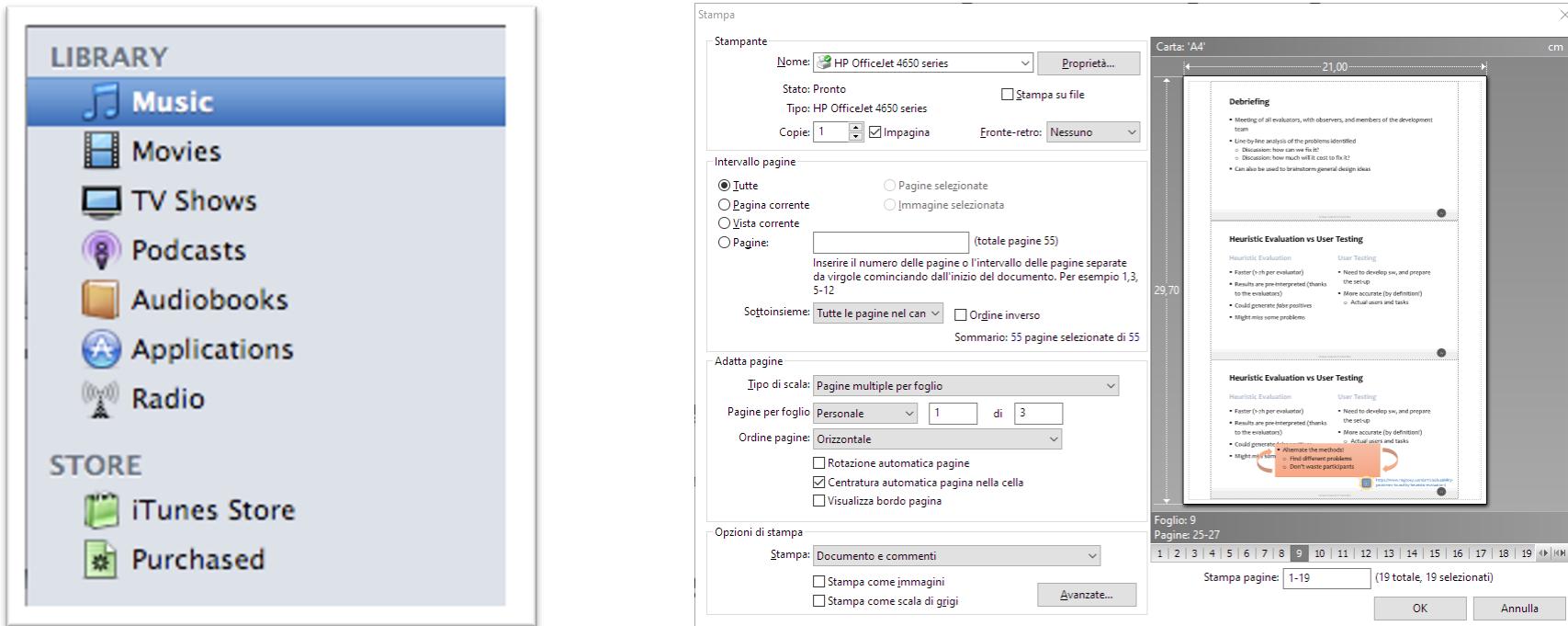
- The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.
- Use familiar metaphors and language



<https://www.nngroup.com/articles/match-system-real-world/>

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- 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.



Exploit Familiarity

- Familiar Metaphors
 - Files, paper, folders, highlighters, ...
- Familiar Language
 - Avoid jargon, acronyms, etc. that could be unknown to your users
- Familiar Categories
- Familiar Choices
 - E.g., explain the meaning of the error message (what happened, what are the consequences, what are the available options) in a simple way

#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.

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- 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.

Search Cancel	Map	Message Board	Browse Designers
Find <input type="checkbox"/> Developers <input type="checkbox"/> Designers Who know <input type="text" value="Rails, iPhone, CSS..."/> Near City <input type="text" value="New York, Paris, Rome..."/> More than or equal to <input type="radio"/> ★ <input type="radio"/> ★ <input type="radio"/> ★ <input type="radio"/> ★ <input type="radio"/> <input type="button" value="Find Collaborators"/> Cancel Search			
 CollabFii			

Home → Gallery → Templates

The Wufoo
FORM GALLERY

Forms

Surveys Selected

Invitations

Registrations

Lead Generation

Online Orders

Survey TEMPLATES

- 1 Customer Satisfaction Survey**
- 2 Cancellation Survey**
- 3 Business Demographic Survey**
- 4 Web Site Visitor Survey**
- 5 Tech Support Satisfaction Survey**
- 6 Health Survey**

Download HTML **Add to Wufoo**

Wufoo

Customer Satisfaction Survey

Please take a few moments to complete this satisfaction survey.

How long have you used our product / service?

Less than a month

1-6 months

1-3 years

Over 3 Years

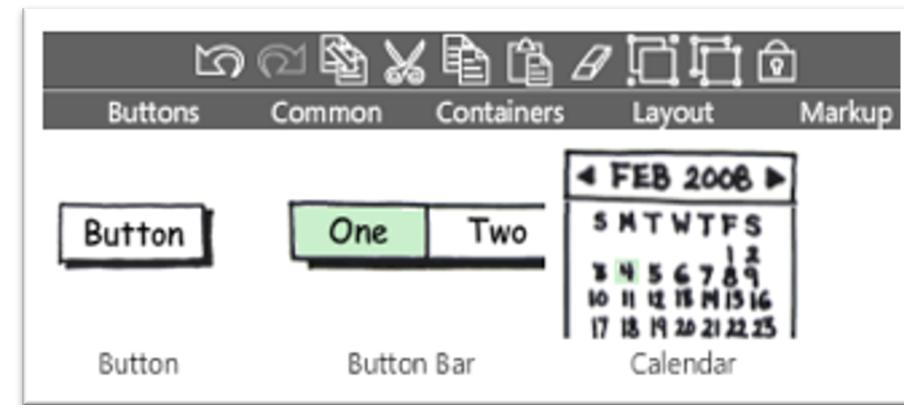
Suggestions

- Always provide a “back” (or equivalent) button
- Allow users to “explore” different alternative paths
 - Except for one-shot wizard-like paths, aimed at novices or first-time users

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	A	B	C	D
1	Item	Quantity	Price	Total
2	Tacos	40	\$5.00	= B2 * C2
3				

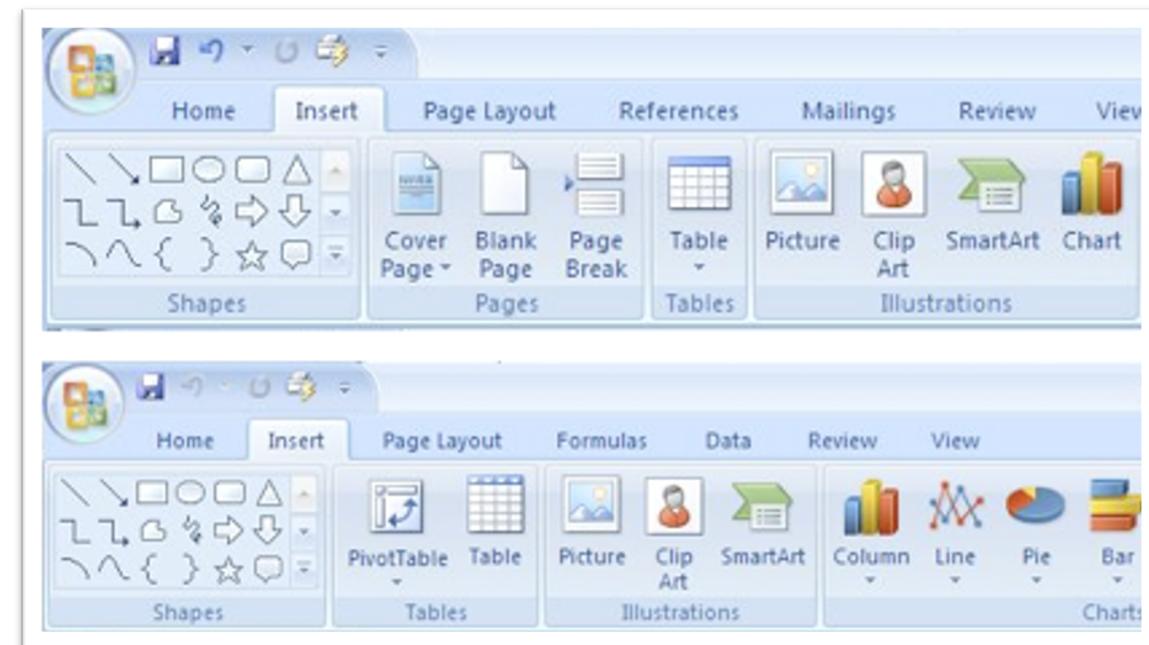
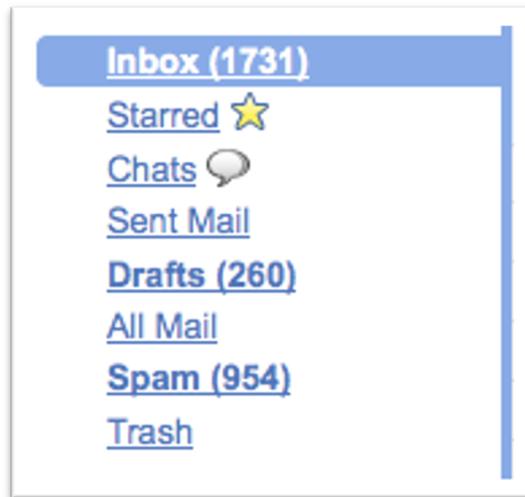


#4: Consistency and standards

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

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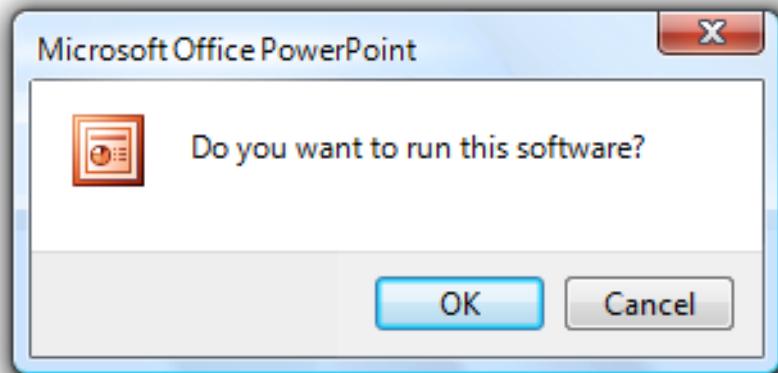
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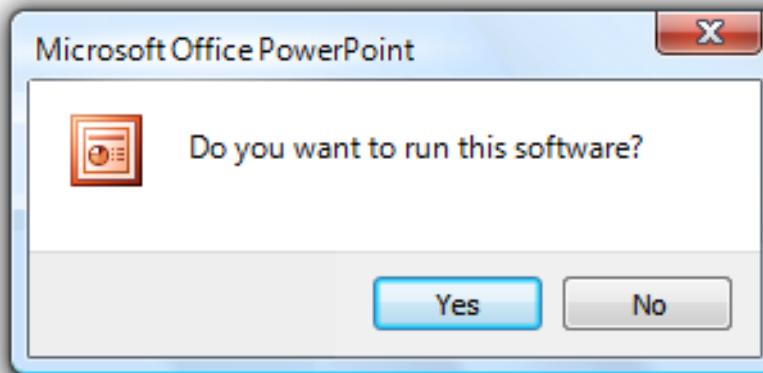
Suggestions

- Consistent layout for dialogs and forms
 - E.g., position of the navigation elements
 - E.g., position of the confirmation buttons
- Consistent meaning for Ok/Cancel, Yes/No choices
 - E.g., avoid: “Do you want to interrupt task?”
 - Still better, label buttons with the actual effect “Insert”, “Interrupt”, ...
- Categories, lists of names, geographical regions, etc, should be taken from “standard” vocabularies

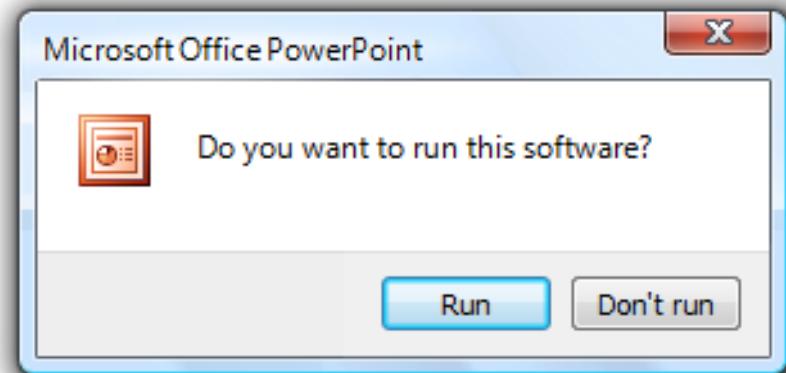
Examples



Bad



Acceptable



Better

source: <https://docs.microsoft.com/en-us/windows/win32/uxguide/win-dialog-box>

#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.



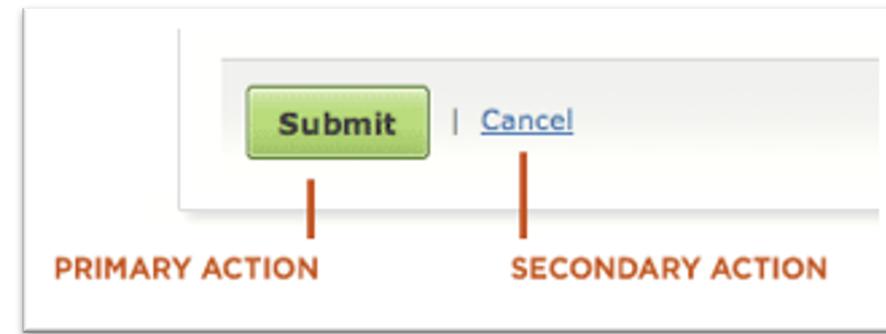
[https://www.nngroup.com/articles/
slips/](https://www.nngroup.com/articles/slips/)

Suggestions

- Preventing data loss
- Prevent clutter
- Prevent confusing flow
- Prevent bad input
- Prevent unnecessary constraints (e.g., provide defaults for missing data)

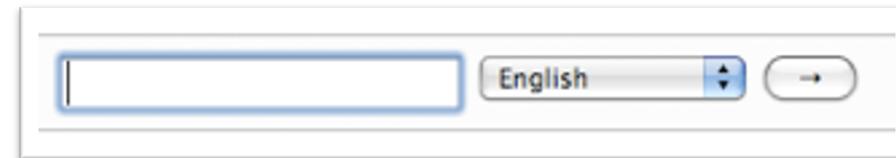
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#6: Recognition rather than recall

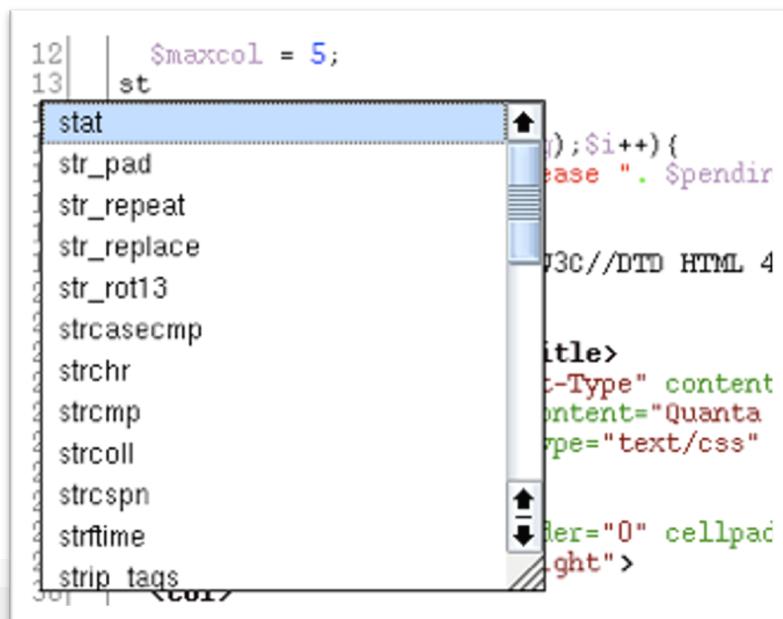
- Minimize the user's memory load by making objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.



<https://www.nngroup.com/articles/recognition-and-recall/>

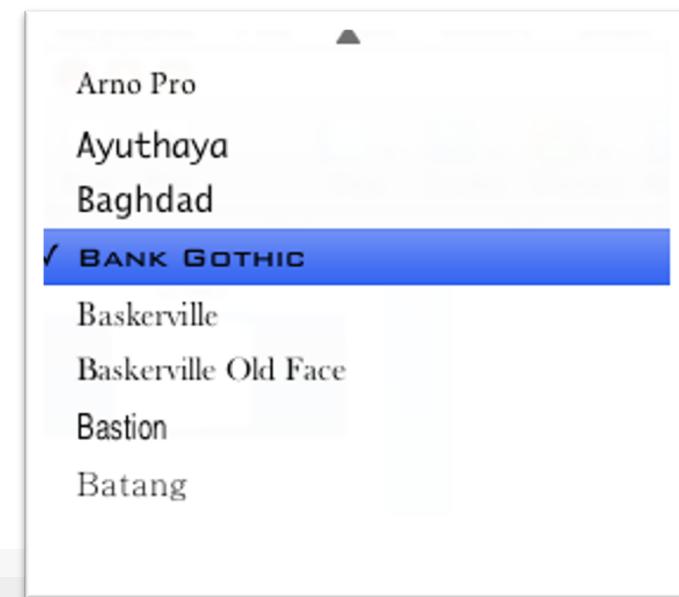
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A screenshot of a code editor showing a scrollable list of string manipulation functions. The list includes: stat, str_pad, str_repeat, str_replace, str_rot13, strcasecmp, strchr, strcmp, strcoll, strcspn, strftime, and strip_tags. The word 'stat' is currently selected.

```
12 | $maxcol = 5;
13 | st
stat
str_pad
str_repeat
str_replace
str_rot13
strcasecmp
strchr
strcmp
strcoll
strcspn
strftime
strip_tags
```



Example

The image shows two windows side-by-side. On the left is a screenshot of Visual Studio Code with the file 'related-work.tex' open. A search and replace dialog is displayed, with 'and' selected in the search field and 'or' in the replace field. A tooltip 'Replace All (Ctrl+Alt+Enter)' is visible over the replace button. The code editor shows several occurrences of 'and' and 'or' in the document, with some words highlighted in red. The status bar at the bottom indicates 'Ln 4, Col 54 (3 selected)'. On the right is a terminal window titled 'openSUSE-Leap-15-1' showing the command-line history:

```
\section{Related Work}
\label{sec:related-work}

This work lies in the software engineering domain and is intended to provide insights about the suitability of a computational narrative approach to document, execute, and share the steps involved in IoT prototyping, especially for novice programmers.

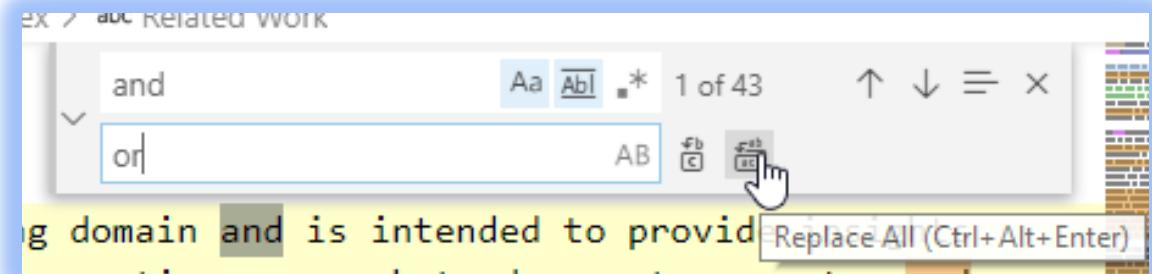
%To the best of our knowledge, \highlight{no other authors}\footnote{it's a strong statement... are we absolutely sure?} have explored this strategy. In the following, we addressed the related work from the perspective of (i) exploring and analyzing the current use of notebooks, and (ii) customizing them to fit into a particular context.

In~\cite{Corino:2019} we propose a first approach to an IoT-tailored literate computing tool in the form of a computational notebook. In this article we presented a use case of a typical IoT system involving several interconnected components and described the implementation of a computational notebook as a tool to support its development. Through the analysis of the use case and the landscape of the current computational notebooks, we determined that besides the features of the current computational notebooks an IoT notebook must enable (i) multiple programming languages in the same notebook; (ii) the capability to execute code in the documents in external devices; (iii) keep some code snippets on background execution; (iv) support the specification and installation of mandatory dependencies; and (v) support the visualization of data coming from the sensing devices or external services and platforms. By implementing a prototypical system of the IoT notebook and by validating it against the use case, we could conclude that special attention should be paid on how to execute the code snippets on external devices, and a more in-depth assessment of the benefits and limitations of a computational narrative in the context of IoT software development and prototyping is needed.

Rule~\textit{et al.}~\cite{Rule:2018} assessed the current use of computational notebooks through quantitative analysis of over 1 million notebooks shared online, qualitative analysis of over 200 academic computational notebooks, and interviews with 15 academic data analysts. These analyses demonstrated a tension between exploration and explanation that comp
:g/\<and\>/s//or/g
```

Suggestions

- Avoid codes (use explicit names)
 - E.g., L, VL, EL, EA, ... ???
- Avoid extra hurdles
 - E.g., asking for unnecessary (or premature) information
- Provide previews
 - Code completion
 - Page preview
 - Order summary
 - Itinerary
 - ...



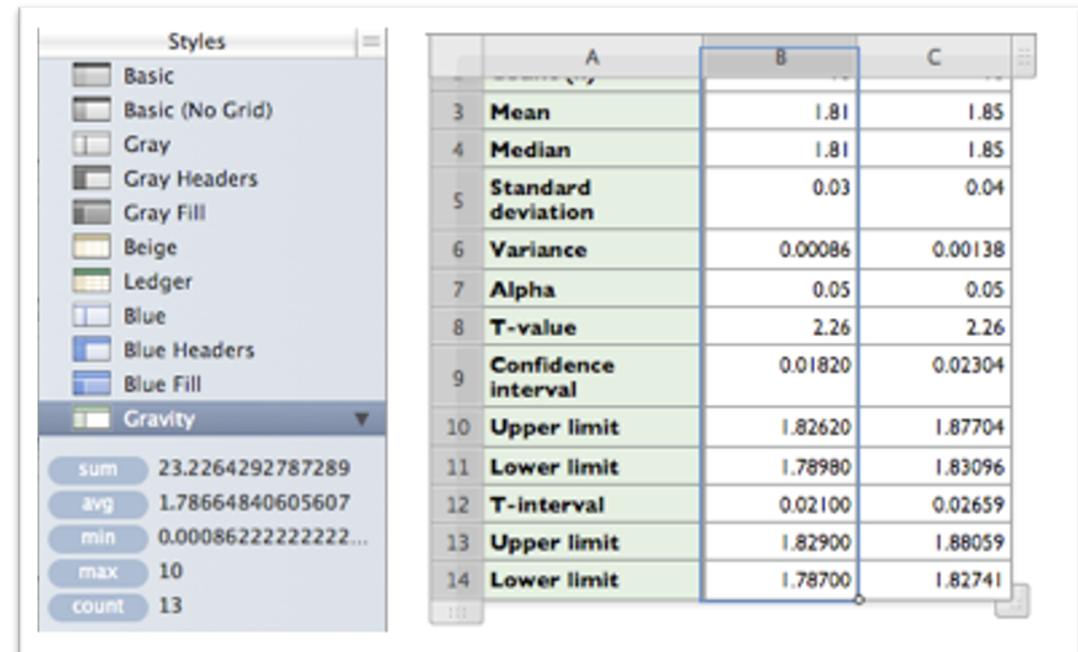
#7: Flexibility and efficiency of use

- 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.

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Common Shortcuts	
Add Action	Return
New Window	⌘N
Synchronize with Server	⌃⌘S
Clean Up	⌘K
Planning Mode	⌘1
Context Mode	⌘2
Inbox	⌃⌘1
Quick Entry	⌃⌃Space
Quick Entry's shortcut can be customized in Preferences	



The image shows a software interface with a 'Styles' palette on the left and a data table on the right.

Styles Palette:

- Basic
- Basic (No Grid)
- Gray
- Gray Headers
- Gray Fill
- Beige
- Ledger
- Blue
- Blue Headers
- Blue Fill
- Gravity

Data Table:

	A	B	C
3	Mean	1.81	1.85
4	Median	1.81	1.85
5	Standard deviation	0.03	0.04
6	Variance	0.00086	0.00138
7	Alpha	0.05	0.05
8	T-value	2.26	2.26
9	Confidence interval	0.01820	0.02304
10	Upper limit	1.82620	1.87704
11	Lower limit	1.78980	1.83096
12	T-interval	0.02100	0.02659
13	Upper limit	1.82900	1.88059
14	Lower limit	1.78700	1.82741

Suggestions

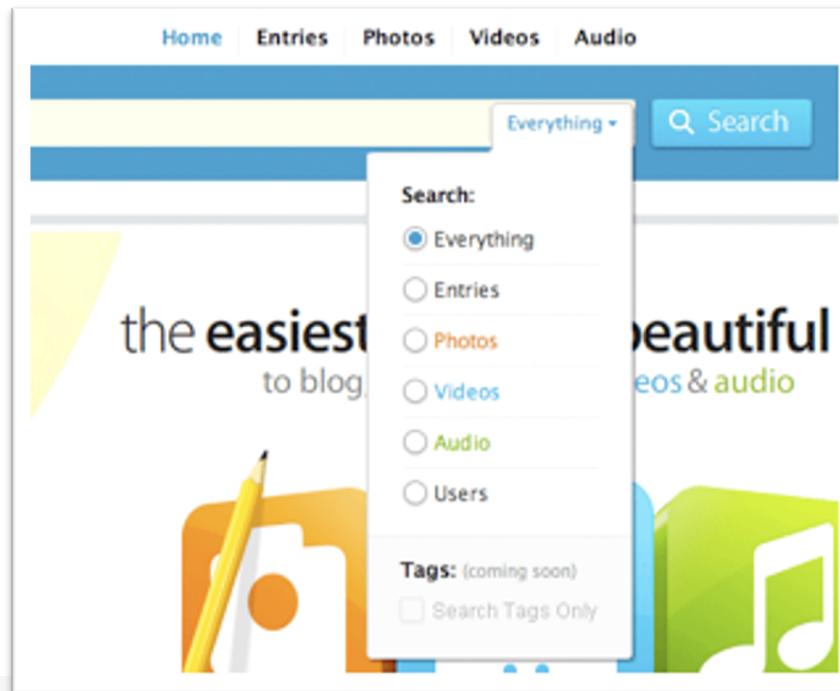
- Flexibility = Default + Options
 - E.g., present some popular choices, but let the user enter a custom one (train ticket machines)
- Exploit background information for providing more information
 - E.g., weather forecasts in a calendar interface
- Proactivity
 - E.g., “mark as spam” proposed to “unsubscribe”, too
- Recommendations
- Provide relevant information, only

#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.

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Timesheet for Theresa Neil							
04 May 2009 - 10 May 2009	Mon May 04	Tue May 05	Wed May 06	Thu May 07	Fri May 08	Sat May 09	Sun May 10
CLIENT - PROJECT (TASK)							
① [redacted]					4.00		4.00
② [redacted]					2.50		2.50
③ [redacted]		4.00					4.00
④ [redacted]		1.00					1.00
⑤ [redacted]		1.00					1.00
⑥ [redacted]		4.50					4.50
⑦ [redacted]		1.00					1.00
⑧ [redacted]		1.50	1.00				2.50
⑨ [redacted]	10.00	6.00					16.00
⑩ [redacted]				2.00	2.00		4.00
Total	10.00	6.00	7.00	6.00	9.50	2.00	40.50

Suggestions

- Key information must be “above the fold”
 - Especially on low-resolution devices
- Keep high signal-to-noise ratio
 - Colors, fonts, backgrounds, animations, ...
 - Borders, dividers, ...
- Minimalistic login experience
- Accept redundant ways of entering information
- Prune features that are outside the “core” functionality

#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.

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Or start a new account

Choose a username (no spaces)

bert is already taken. Please choose a different username.

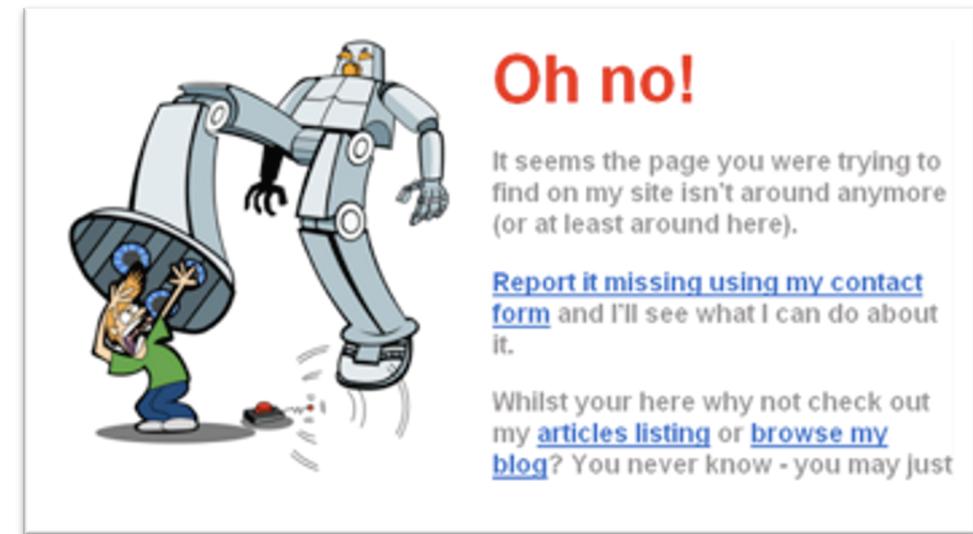
Choose a password

Passwords must be at least 6 characters and can only contain letters and numbers.

Retype password

Email address (must be real!)
not an email
 Send me occasional Digg updates.

The email provided does not appear to be valid



Suggestions

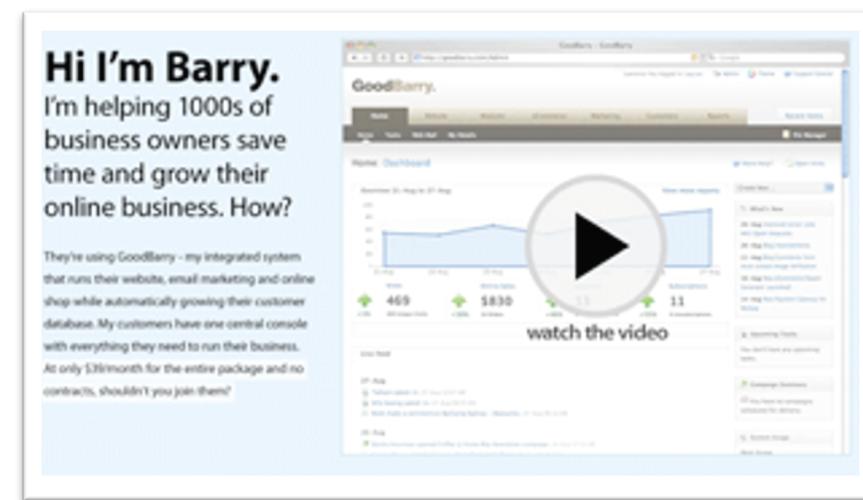
- Make errors easy to identify
 - Colors, fonts, ...
- Make problem clear
 - Problem cause
 - Problem location
- Provide a solution
 - Give a suggestion
 - Show a path forward
 - Propose an anternative

#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.

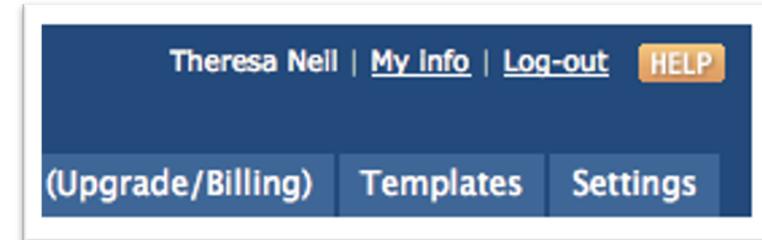
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Suggestions

- Provide examples
 - In documentation
 - In complex choices
- Help the user understanding the error gravity
 - E.g., printing outside margins
- Provide ‘tips’ for showing new actions or steps
- Use pop-overs to point to changes in UI (or for first usage)
- Avoid too-opaque “terms and conditions” (summarize, if possible)

References

- Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale: Human Computer Interaction, 3rd Edition
 - Chapter 9: Evaluation Techniques
- Ben Shneiderman, Catherine Plaisant, Maxine S. Cohen, Steven M. Jacobs, and Niklas Elmquist, Designing the User Interface: Strategies for Effective Human-Computer Interaction
 - Chapter 5: Evaluation and the User Experience
- COGS120/CSE170: Human-Computer Interaction Design, videos by Scott Klemmer, https://www.youtube.com/playlist?list=PLLssT5z_DsK_nusHL_Mjt87THSTIgrsyJ



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