Ten Usability Heuristics  J. Nielsen
https://www.nngroup.com/articles/ten-usability-heuristics/

- Visibility of system status
- Match between system and the real world
- User control and freedom
- Consistency and standards
- Error prevention
- Recognition rather than recall
- Flexibility and efficiency of use
- Aesthetic and minimalist design
- Help users recognize, diagnose, and recover from errors
- Help and documentation
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Visibility of system status
The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.

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.

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.

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

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.

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.
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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.

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.

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.

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.
Golden Rules of UI Design:
1. Consistency

- Action language / grammar
- Terminology
- Look and feel
  - Layout
  - Color palette
  - Shapes, typography
  - Behavior during interaction
- But, note need for exceptions
- Confirmation of irreversible actions

Confirmation message received when requesting the CU libraries to order a book for reserve, 2014
Golden Rules of UI Design: 2. Universal Usability

- Diversity, diversity, diversity
  - Experience, ability, technology,…
- E.g., support for shortcuts
  - Increase speed for frequent users/cmds
  - Accommodate/encourage increasing expertise
    - Abbreviations, key accelerators
    - Macro facilities

Golden Rules of UI Design: 2. Universal Usability

- Accessibility
  - Make your computer easier to use
  - Quick access to common tools
  - Magnifier
  - Start Magnifier
  - Start On-Screen Keyboard

Analysis

UI modification
Golden Rules of UI Design: 3. Feedback

- Minimize the “Gulf of Evaluation”
- Discrete ↔ Continuous Feedback
  - Highlighting selected object
  - Displaying object/cursor tracking finger/mouse


- Group actions to provide frequent “milestones”
  - Give sense of accomplishment when (part of) a task has been finished
  - Minimize feeling of suspense
Golden Rules of UI Design:
5. Error Prevention/Handling

- Prevent errors
- Minimize consequences

Golden Rules of UI Design:
6. Easy Reversal of Actions

- Undo
  - One level
  - Multi-level
  - Across sessions
Golden Rules of UI Design:
7. User in Control
- User in charge; system responds

Golden Rules of UI Design:
8. Reduce STM Load
- Remember
  - $\mu_{WM}$ (and even $\mu_{WM^*}$) are small
  - $\delta_{WM}$ is short
- Minimize
  - amount of information to remember
  - time information must be remembered
Golden Rules of UI Design:
8. Reduce STM Load

- Minimize
  - amount of information to remember
  - time information must be remembered
Golden Rules of UI Design:
8. Reduce STM Load

- Minimize
  - amount of information to remember
  - time information must be remembered

Back to that initial page,…
Errors

- Matching pairs: [], {}, <TAG> </TAG>, ...
  - If possible to correct, why require?
- Editor support for language
  - Automated checks
  - Syntax-directed editors / Structure editors
    - Editor knows about / enforces language syntax

Errors

- Package complete sequences of actions
  - Minimize need for user to repeatedly issue the same set of commands
    - Predefined sequences ("wizards")
    - Facilities for defining/invoking sequences
      - Macros
Errors

- Correction
  - Fix individual commands/arguments
    - “Thier” → “Their”

- Prevention
  - Command completion
    - Automated vs. requested
    - Menu of possible completions

Errors

- Design to prevent errors
  - “Open old file” and “Create new file” [Office]
    - User must know whether file exists before choosing command
    - vs.
  - “Open file” [emacs <ctrl>x <ctrl>f]
    - Opens existing file or creates new one
    - Doesn’t actually write new file, avoiding accidental side effect
Example: Forcing your user to make a mistake May 2005

- Fill out an address
- Note
  - “Address”
  - “Zip/postal code”
  - “City”
  - “State, region or county”
  - “Country”

- Address is automatically “propagated” from previous page,…
- But, what went wrong?
- How can I fix it?
Example: Forcing your user to make a mistake May 2005

- What’s wrong?
- It’s worse than you think!
- Charge is denied (instantly)

Test, test, test!

- Heuristics aside, how do users respond to the design/system?
  - Do they “get it”?
- Does the system implement the design?
- What about boundary conditions?
Example: Terminology

- Consistency with standard usage
  - What do “This Week” and “Next Week” mean?
Example: Terminology

- Consistency with standard usage
  - What do “This Week” and “Next Week” mean?
  - How about “Next 30 Days” and “Next Month”?
Example: Terminology

- Consistency with standard usage
  - What do “This Week” and “Next Week” mean?
  - How about “Next 30 Days” and “Next Month”?

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