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## Usability Heuristics

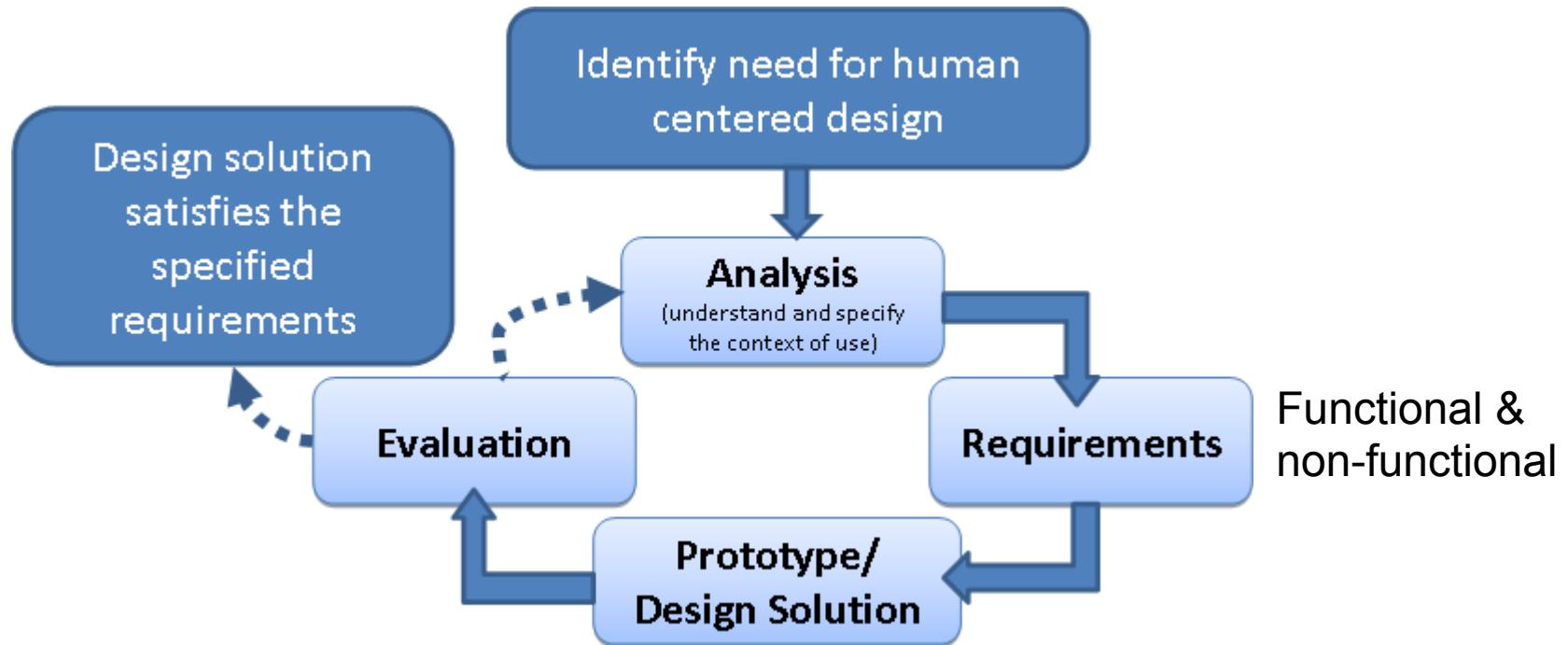




# Today...

- **Usability Heuristics**
- **User Analysis**
- **Task Analysis**
- **Discussion of Reaction Sheets**
- **Team Building**

# Human-Centered Design Process



Human centered design process (based on ISO 13407:1999).

# What is Usability?

- **Definition (ISO 9241):**  
The effectiveness, efficiency and satisfaction with which specified users achieve specified goals in particular environments.
- **effectiveness:** the accuracy and completeness with which specified users can achieve specified goals in particular environments
- **efficiency:** the resources expended in relation to the accuracy and completeness of goals achieved
- **satisfaction:** the comfort and acceptability of the work system to its users and other people affected by its use





# Usability

- Describe 2 problems you encountered and perceived as annoying or irritating when interacting with a software interface.
  - Please use the following template:
    - Software name
    - Problem statement (user perspective, 2-3 sentences)

5 Minutes



## Usability Heuristics 10 Principles by Nielsen

- Simple and natural dialogue
- Speak the users' language
- Minimize user memory load
- Consistency
- Feedback
- Clearly marked exits
- Shortcuts
- Good error messages
- Prevent errors
- Help and Documentation



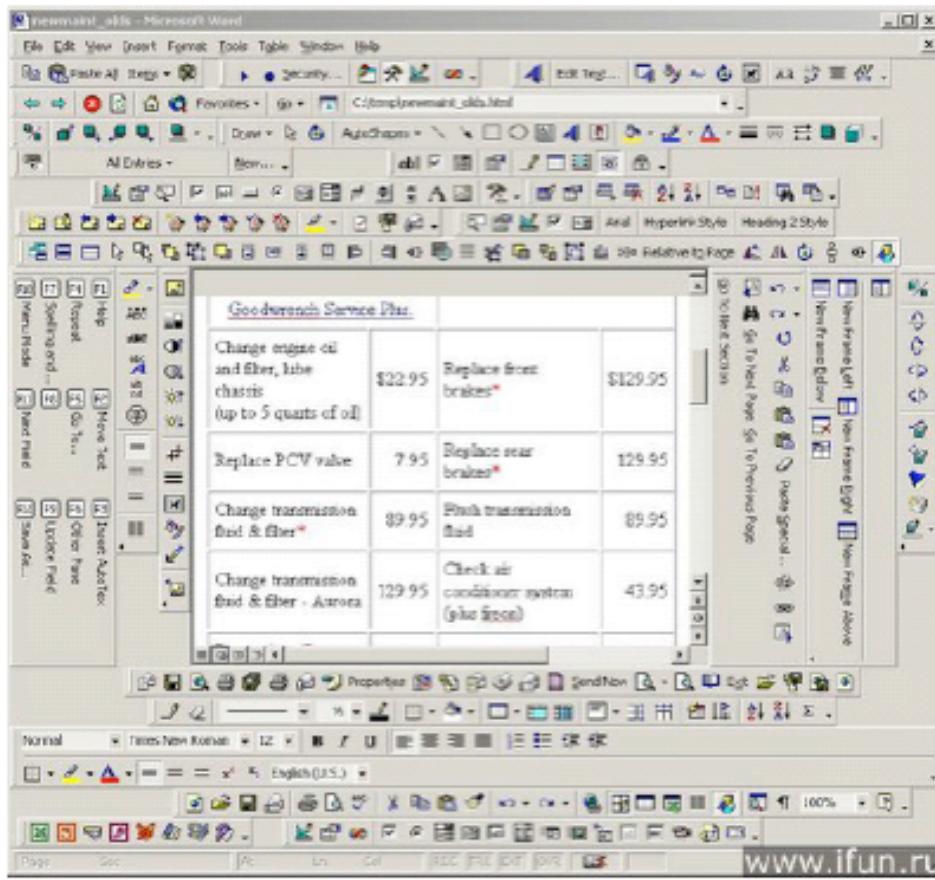


# 1 Simple and natural dialogue

- Interface...
  - ...keep it simple
  - ...keep it natural
  - ...follow perceptual laws: Gestalt laws
- Do not overdo it
  - Colors (color deficiency), fonts
  - Unnecessary functionality (leave it out)
- **Less is more**
  - User needs to sequentially “read” all the available functions on the screen



# Example: Less is more



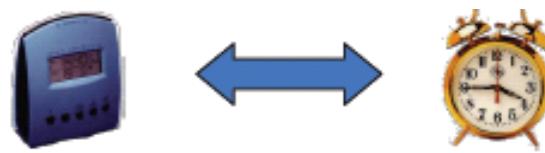
The screenshot shows a Microsoft Word document titled "Innervation\_skills - Microsoft Word". The main content is a table titled "Goodwrench Service Plus" with the following data:

Goodwrench Service Plus			
Change engine oil and filter, lube chassis (up to 5 quarts of oil)	\$22.95	Replace front brakes*	\$129.95
Replace PCV valve	7.95	Replace rear brakes*	129.95
Change transmission fluid & filter*	39.95	Flush transmission fluid	89.95
Change transmission fluid & filter - Automatic	129.95	Check air conditioner system (plus freon)	43.95



## 2 Speak the users' language

- Natural language / domain-specific language
- Avoid technical jargon
- Mother tongue? Prefer over English?
- Dialogue from the users perspective
- Use metaphors (wisely!)



# Example: Domain-Specific Metaphors



Quelle: <https://videoonline.edu.lmu.de/en/node/6772/4016160>

# Example: User Perspective and Metaphors



Quelle: <https://videoonline.edu.lmu.de/en/node/6772/4016160>



## 3 Minimize user memory load

- Short-term memory very restricted: 7+/-2 rule
- Implications for design
  - Minimize the number of simultaneous options, e.g. menus
  - Recognition “beats” recall
  - Beginners, advanced users, experts



## 4 Consistency

- Look and feel
  - Fonts, colors, icons
- Structure and organization
  - Layout, order, sequences
- Text and language
  - Menus, help, labels
- Interaction
  - Types/forms, across devices (mouse, keyboard, touch)



# Example: inconsistency / little structure

Haupblkat Ausbildung

Zurück

Praxisjahr:  AbKZ:   
Erfass.-dat.:  eif.KSt:  Lfd.Nr.:

Titel:  Vorname:  Name:   
PLZ:  Wohnort:  Straße:   
Tel.-Nr:  Tel.-Nr 2:  Vers.-Nr:  GebDatum:

Nation:  Fam.Stand:  GeschL:

Kinder (Mitversicherte):  
Name:  Geb.-Datum:  Vers.-Nr.:  Mitvers.:

Bank:  BLZ:  KtoNr:   
BH geb:  FüSch(e):  Auto vorhanden:

Füh. Einheit:  Verdienstvorstellung:  Status:   
Vollzeit:  Teilzeit:  h.Teilzeit:  TZ-vorm:  TZ-nachm:  Student:   
DauerDV: kurzfristig:  langfristig:  PL ja/nein:    
BP:  BF:  FB:  MP:

Verhandelte Verdienstvorstellungen: Geh./M:  S/h:  für  h/Woche

Opik:  Aufgaben:  Kleidung:  Bait:  Sprache:   
Schm:  Verhalten:



## 5 Feedback

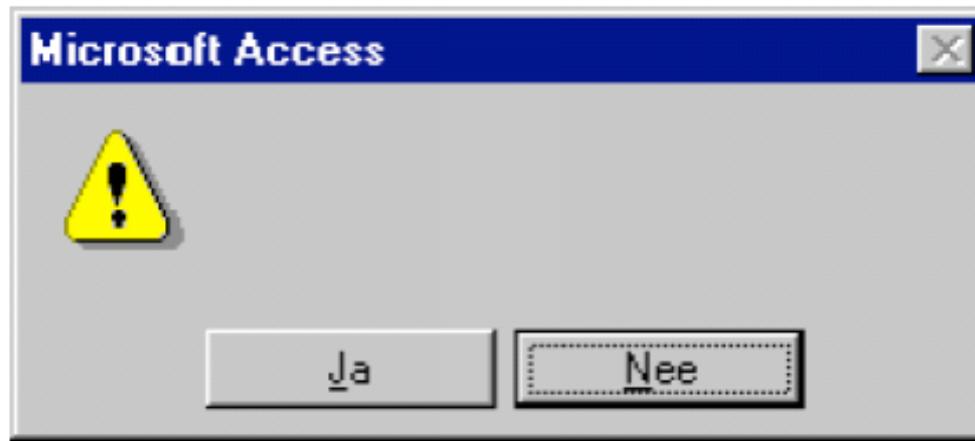
- User needs feedback about the state of the system
- Positive Feedback
- Partial Feedback
- Clear Message
- Response Time
- System Failure



Öffnet beispieldatei.xls: A progress bar consisting of a series of blue squares of varying lengths, showing the progress of opening a file.

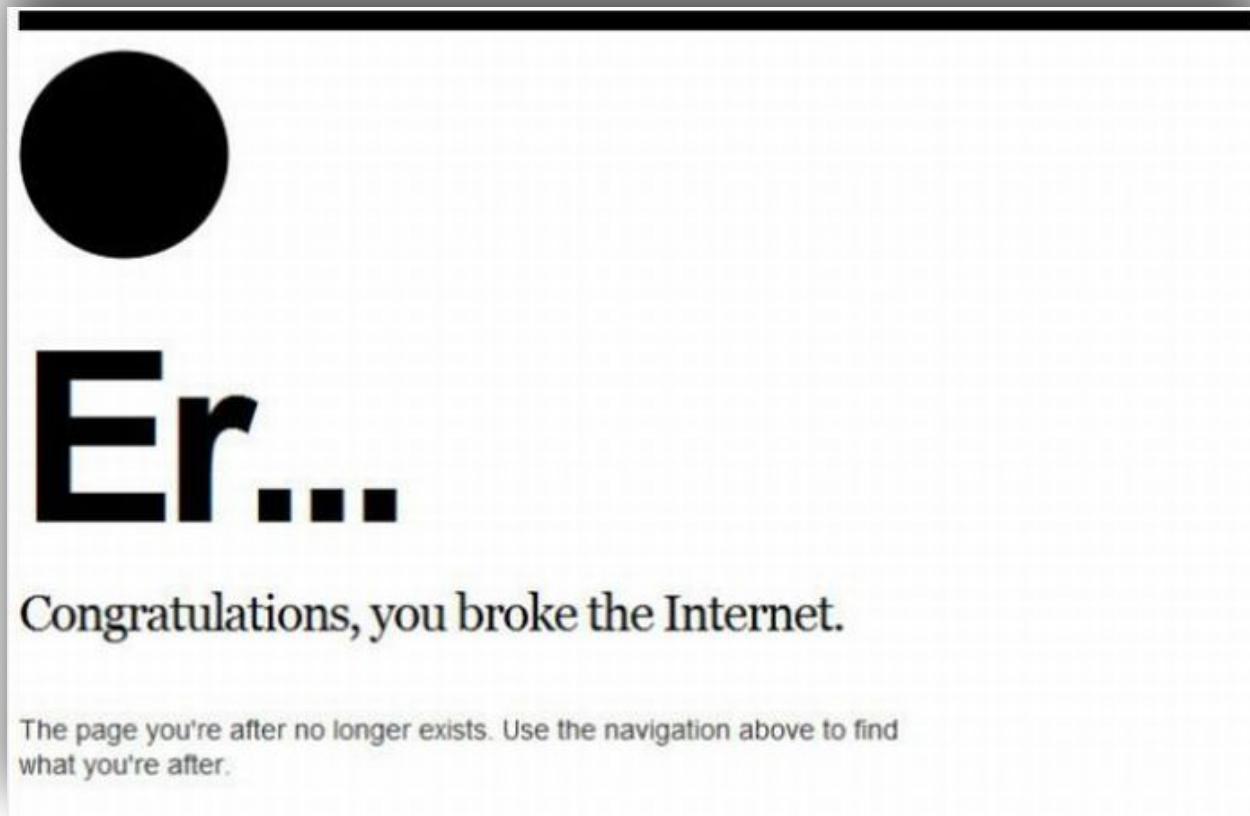


# Example: Bad Feedback





# Example: Bad Feedback



[http://3.bp.blogspot.com/\\_Fzq94YVbHHM/TKZGMhPQl1/AAAAAAA5zA/6QN89ucpbsc/s1600/best\\_404\\_error\\_pages\\_14.jpg](http://3.bp.blogspot.com/_Fzq94YVbHHM/TKZGMhPQl1/AAAAAAA5zA/6QN89ucpbsc/s1600/best_404_error_pages_14.jpg)

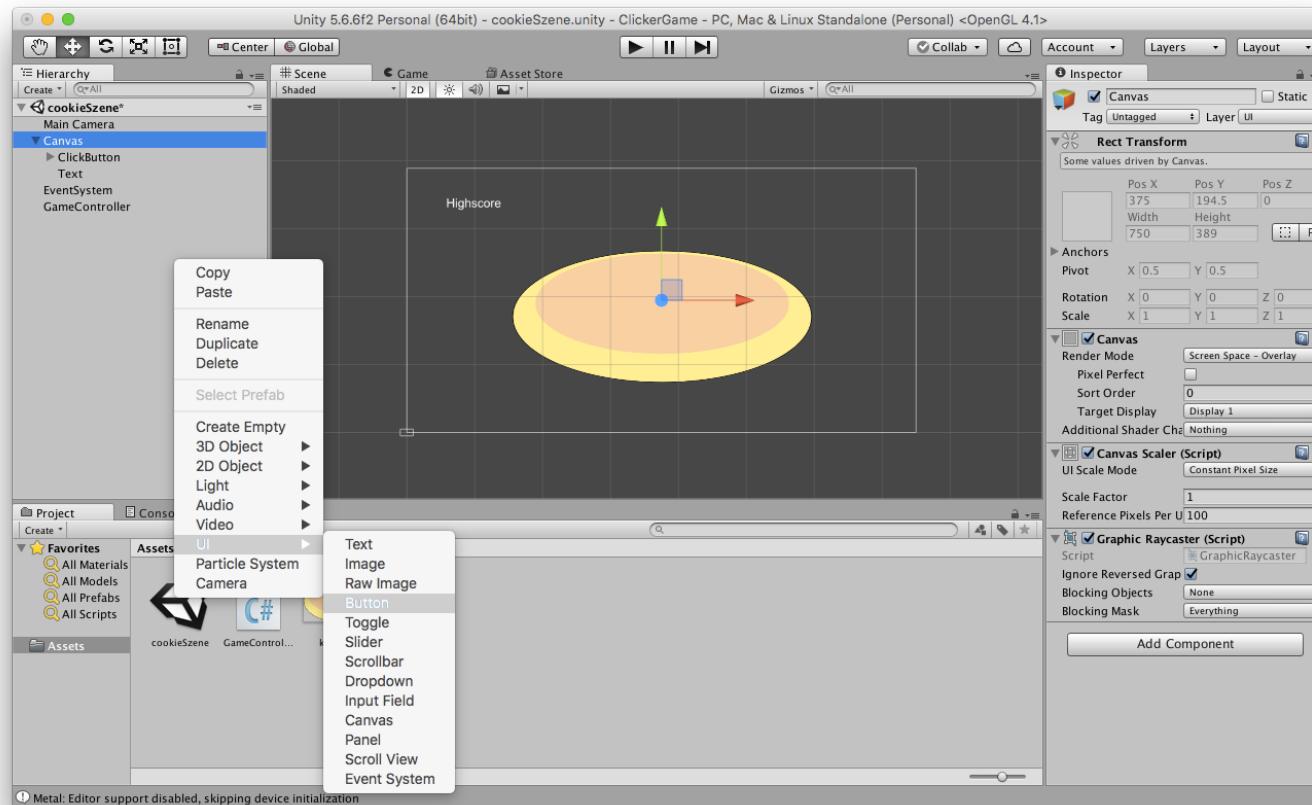


## 6 Clearly marked exits

- Cancel button
- Undo
- Visible!

# 6 Clearly marked exits

- Why is “Undo” important for the user?





## 7 Shortcuts

- Shortcuts for advanced and expert users
- Type-ahead
- Consistent key combinations



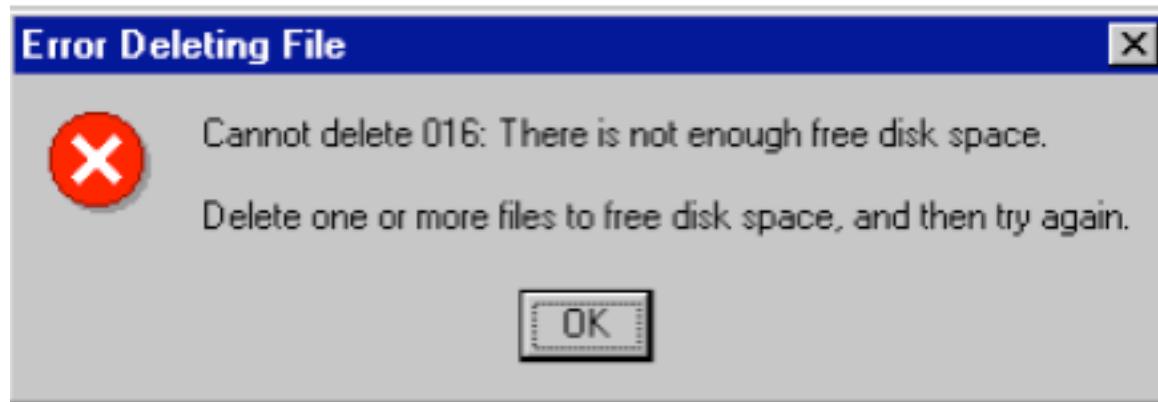
# Example: Type Ahead

A screenshot of the DuckDuckGo search engine interface. At the top is the DuckDuckGo logo, which consists of a white duck wearing a green bow tie inside a red circle. Below the logo is the brand name "DuckDuckGo". The search bar contains the partially typed query "human compu". To the right of the search bar is a green button with a white magnifying glass icon. A dropdown menu below the search bar lists nine suggested completions:

- human computer interaction
- human computers
- human computer interface design
- human computer interaction degree
- human computers at nasa
- human computer riverside
- human computer interaction pdf
- human computer interaction ppt

## 8 Good error messages

- Clear and simple language
- Precise descriptions
- Polite and \*not\* intimidating



# Examples for bad error messages





## 9 Prevent errors

- Use constraints, e.g.,
  - Indicators for inputs
  - Default values
  - Pre-defined selections (drop down)
- Avoid different modes: A key should always have the same meaning regardless of the system mode
  - e.g., Key F1 is always “help”



# 10 Help and documentation

- ... who reads manuals??
- Users do trial and error
- Complete and clear documentation
- Update help and documentation with changes in the tool
- Online help
- Tutorials



# Usability Heuristics

- Describe 2 problems you encountered and perceived as annoying or irritating when interacting with a software interface.
  - Please use the following template:
    - Software name
    - Problem statement (user perspective, 2-3 sentences)
    - **Please add your usability issues to the following padlet:**

<https://padlet.com/mhmnn9/heuristics>

Password: HCI2020

8 Minutes



# Heuristic Evaluation

## 1. Briefing Session:

- Guideline available?

## 2. Evaluation Period:

- 1 - 2 hours on product, using the heuristics for guidance
- at least 2 passes through the interface: feel for the flow of interaction - identify potential usability issues

## 3. Debriefing Session:

- Evaluators come together and discuss their findings, suggest solutions

(Preece et al. 2015, p. 508/509)



# Usability Heuristics

<https://www.youtube.com/watch?v=hWc0Fd2AS3s>



# Sources

- Nielsen, J. (1993): Usability Engineering, San Diego (p. 115-163)
- Preece, J., Rogers, Y., & Sharp, H. (2015). Interaction design: beyond human-computer interaction. John Wiley & Sons (p. 500 - 511)
- ISO 9241
- Peter Purgathofer: Vorlesungsfolien User Interface Design WS05
- Isys Information Architects „Interface Hall of Shame“: <http://halloffshame.gp.co.at/>



# Anhang für Interessierte

- Styleguides
- Shneiderman – 8 Goldene Regeln





# Styleguides

- Ziel: konsistente Benutzungsoberfläche
- Alle Projektbeteiligte sollen den Styleguide kennen und anwenden
- Look And Feel: Aussehen und Interaktivität
  - Aussehen von einzelnen Interaktionselementen
  - Anordnung von Interaktionselementen zu Dialogen oder Formularen
  - Logik von Dialogen
  - Verwendung von Begriffen und Bezeichnungen
  - Verwendung von Icons und bildhaften Beschreibungen
  - Verwendung von Farben und Formen
  - Abfolge und Ablauf von einzelnen Schritten
  - Aufteilung von Inhalt, Gestaltung und Funktionalität (Websites)

Siehe: nächste Vorlesung zu “Design Principles”



# Shneiderman – 8 Goldene Regeln (1)

## 1. Konsistenz

- Verwende Styleguides und weitere schriftliche Konventionen.

## 2. Berücksichtige unterschiedliche Erfahrungen

- Jedem sollte eine Benutzungsschnittstelle möglichst eine passende Interaktionsform anbieten.
- Anfänger: über Menüs
- Abkürzungen für erfahrene Benutzer





## Shneiderman – 8 Goldene Regeln (2)

### 3. Rückmeldungen auf Aktionen des Benutzers

- Aktion bei der Software angekommen
- Insbesondere, wenn die Aktion nicht schnell ein Ergebnis liefert.
- Akustisch, visuell, taktil

### 4. Abgeschlossene Operationen

- Schritte einer Operation im Zusammenhang darstellen

### 5. Fehler verhindern

- Darstellung eindeutig
- Alternativen auswählen



## Shneiderman – 8 Goldene Regeln (3)

### 6. Einfache Rücksetzmöglichkeiten

- Selbstsicherheit des Benutzers steigt stark an
- Exploratives Lernen

### 7. Benutzerbestimmte Eingaben

- Gefühl, die Anwendung steuern, kontrollieren zu können.

### 8. Geringe Belastung des Kurzzeitgedächtnisses

- Kapazität 7 +– 2 Einheiten
- Aufbau von Menüs besser breit statt tief