

# Midterm

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Intro HCI  
03/21/2013

Emotional interaction

(Ch 1, 10) Usability Goals

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## Effectiveness



<http://blogs.unity3d.com/2009/07/22/unity-summer-of-code-takes-off/>  
[www.id-book.com](http://www.id-book.com)

4

## Efficiency



<http://blogs.unity3d.com/2009/07/22/unity-summer-of-code-takes-off/>  
[www.id-book.com](http://www.id-book.com)

5

## Safety



www.id-book.com,  
<http://www.bigshinyrobot.com/reviews/archives/25540>

6

## Utility



www.id-book.com

7

## Learnability



[www.id-book.com](http://www.id-book.com),  
<http://www.saffronwrites.com/?cat=5>

8

## Memorability



[www.id-book.com](http://www.id-book.com),  
<http://www.saffronwrites.com/?cat=5>

## (Ch 2) What is an assumption?

- Take for granted when shouldn't
  - e.g. TV while driving



## (Ch 9) Degrees of user involvement: Four issues with users

- Want sophisticated ideas too late
- Non-constructive participation
  - Fear of job loss or worsening job conditions
- Don't care/understand software dev issues
- Higher aspirations
  - Hence higher levels of stress
  - Unnecessary conflicts
  - Increased reworking

## (Ch 2) Paradigm

- General approach adopted by a community for carrying out research
  - Assumptions
  - Concepts
  - Values
  - Practices
- Ex:
  - Desktop
  - Ubiquitous computing



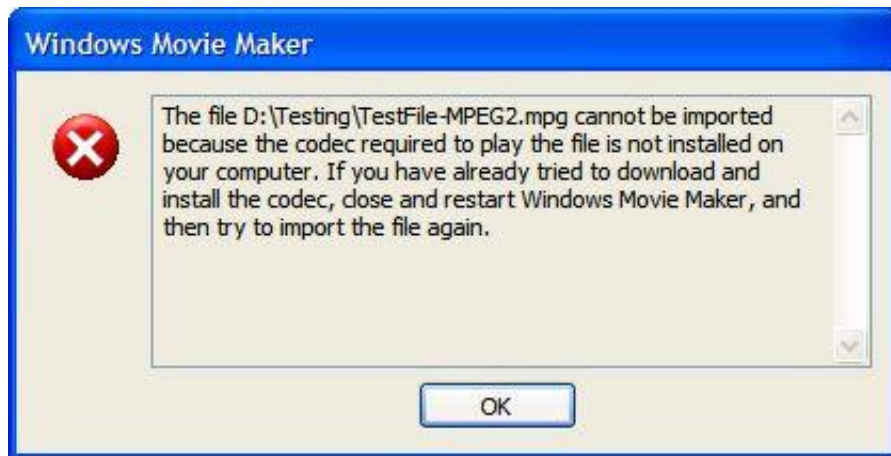
<http://www.appliancist.com/refrigerators/electrolux-screen-fridge.html>

## Emotional interaction

## (Ch 5) Sources of Frustration: Error Message Guidelines

## SoF: Error message guidelines

## State how to fix

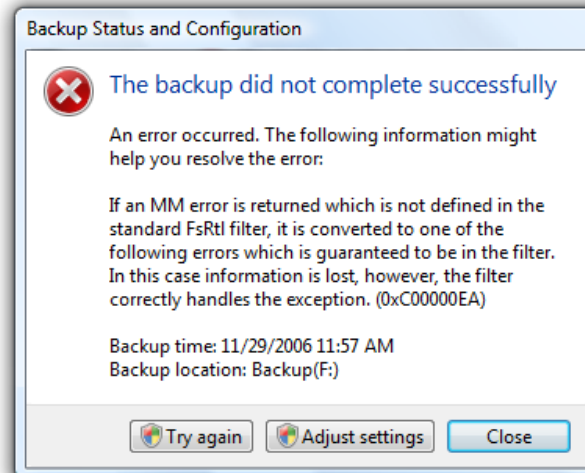


<http://www.papajohn.org/MM2-Importing-Video-MPEG2.html>

13

## SoF: Error message guidelines

## Help icon/command



<http://msdn.microsoft.com/en-us/library/windows/desktop/aa511267.aspx>

14

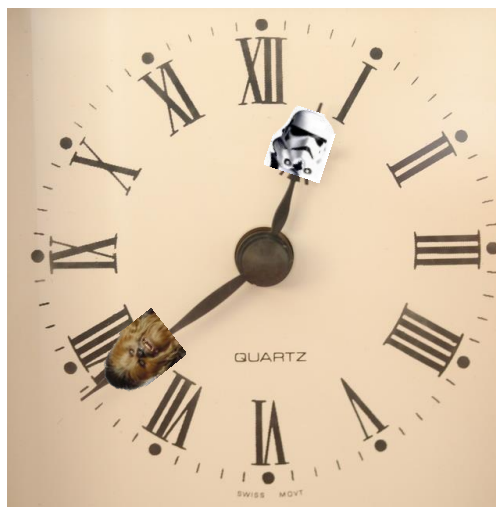
**Key issues**

## (Ch 7) Key Issues: Triangulation

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**Triangulation**

### Data: Time



<http://starwars.wikia.com/wiki/Stormtrooper>, <http://simplicitymom.blogspot.com/2011/10/fishing-for-wookie.htm>16



## Triangulation

### Data: Place



<http://starwars.wikia.com/wiki/Stormtrooper>

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## Triangulation

### Data: People



<http://starwars.wikia.com/wiki/Stormtrooper>,  
<http://kotaku.com/5650591/then-why-we-still-got-ewoks>,  
<http://simplicitymom.blogspot.com/2011/10/fishing-for-wookie.html>

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## Triangulation

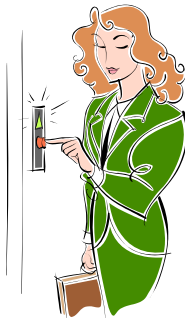
### Investigator



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## Triangulation

### Theory



Perceptual



Cognitive



Motor

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## Triangulation

### Methodology



<http://starwars.wikia.com/wiki/Stormtrooper>

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## Other methods

### (Ch 7) Direct observation in controlled environment

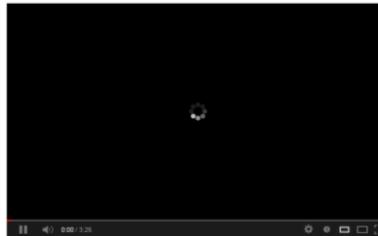


<http://starwars.wikia.com/wiki/Stormtrooper>

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## (Ch 9) How to choose among alternatives

- External
  - What designers focus on
  - Visible
  - Measurable
- Internal
  - Hidden from user's
  - Need to dissect



## (Ch 9) Approaches to ID

- User-centered design
  - User is only guide
- Activity-centered design
  - User's behavior
  - User still plays significant role



## (Ch 9) Approaches to ID

- Systems design
  - System of people, computers, objects, etc.
  - Focus on context
  - User's role is to set goals
  - Good for complex systems



- Genius design
  - Only designer



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- (Ch 3) Recall
  - Remember something without clues
  - Can be hard to do
    - Passwords



- Recognition
  - Remember via reencounter
  - Easier to do than recall

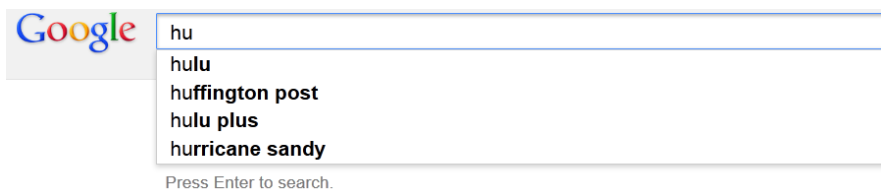


www.id-book.com,  
[http://drafthouse.com/movies/total\\_recall\\_1990/austin](http://drafthouse.com/movies/total_recall_1990/austin)

## (Ch 3) Memory: Search

- Start with recall
- Move on to recognition
- Can improve via
  - Multiple encodings
  - Autofill
  - Searchbox AND history list

Name	Date modified	Type	Size
orig	1/4/2013 2:20 PM	File folder	
01chapter1.pdf	1/17/2013 12:09 PM	PDFPlusReader.Do...	947 KB
01chapter1.ppt	1/17/2013 12:08 PM	Microsoft PowerP...	5,724 KB
02chapter6.pdf	1/24/2013 11:44 A...	PDFPlusReader.Do...	1,348 KB
02chapter6.ppt	1/24/2013 2:38 PM	Microsoft PowerP...	17,310 KB



## (Ch 3) Memory: What not to do

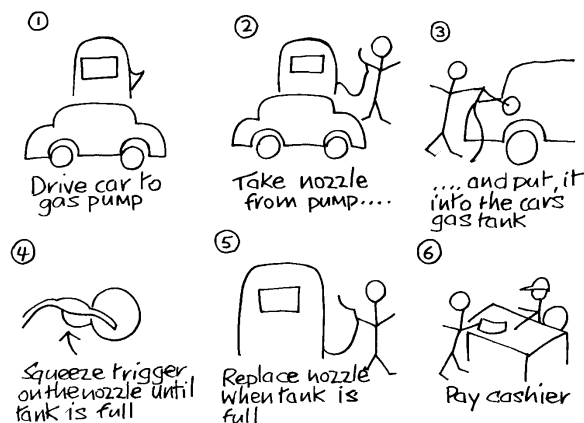
- Only 7 menu options
- Display only 7 tool bar icons
- No more than 7 bullets in a list
- Only 7 items on pull down menu
- Only 7 tabs at the top of a webpage
- Wrong because recognition, not recall!

## (Ch 3) Memory: Activity

- Grandparents' birthdays
- Cover of last two bought DVDs
- Which easiest? Why?
- Good at remembering visual cues
  - Color
  - Location
  - Marks
- Harder to remember arbitrary material
  - Birthdays
  - Phone numbers

## Intro Evaluation

## (Ch 12) Formative evaluation



## (Ch 12) Summative evaluation



<http://blog.busbank.com/fuel-surcharges-sweeping-industry/>

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## (Ch 10) Task description: Use cases



<http://starwars.wikia.com/wiki/Stormtrooper>, <http://www.bigshinyrobot.com/reviews/archives> [www.id-boc](http://www.id-boc)



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## (Ch 10) Task description: Essential use cases



<http://starwars.wikia.com/wiki/Stormtrooper>, <http://www.bigshinyrobot.com/reviews/archives> [www.id-book.com](http://www.id-book.com)

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## (Ch 10) Example essential use case for travel organizer

retrieveVisa

### USER INTENTION

find visa requirements

supply required information

obtain copy of visa info

choose suitable format

### SYSTEM RESPONSIBILITY

request destination and nationality

obtain appropriate visa info

offer info in different formats

provide info in chosen format

## (Ch 1, 10) Usability Goals

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## Effectiveness



<http://blogs.unity3d.com/2009/07/22/unity-summer-of-code-takes-off/>  
[www.id-book.com](http://www.id-book.com)

38

## Efficiency



[www.id-book.com,  
http://blogs.unity3d.com/2009/07/22/unity-summer-of-code-takes-off/](http://blogs.unity3d.com/2009/07/22/unity-summer-of-code-takes-off/)

39

## Safety



[www.id-book.com,  
http://www.bigshinyrobot.com/reviews/archives/25540](http://www.bigshinyrobot.com/reviews/archives/25540)

40

## Utility



[www.id-book.com](http://www.id-book.com)

41

## Learnability



[www.id-book.com](http://www.id-book.com),  
<http://www.saffronwrites.com/?cat=5>

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## Memorability



www.id-book.com,  
http://www.saffronwrites.com/?cat=5

www.id-book.com 43

## (Ch 1) User experience (UX) goals

### Desirable aspects

satisfying	helpful	fun
enjoyable	motivating	provocative
engaging	challenging	surprising
pleasurable	enhancing sociability	rewarding
exciting	supporting creativity	emotionally fulfilling
entertaining	cognitively stimulating	

### Undesirable aspects

boring	unpleasant
frustrating	patronizing
making one feel guilty	making one feel stupid
annoying	cutesy
childish	gimmicky



## (Ch 1) Design principles

- Do's and don'ts of interaction design
- Derived from
  - Theory-based knowledge
  - Experience
  - Common-sense

## Visibility

- Easy to find things
- Ex:



- Non-Ex:






From:  
www.baddesigns.com

<http://www.politifact.com/truth-o-meter/article/2009/mar/30/light-switch-tax-cap-and-trade/>

## Feedback

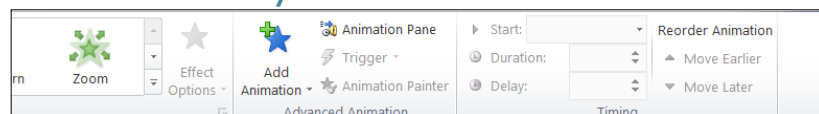
www.id-book.com 46

- Send info back to user about what was done
- Includes
  - Sound
  - Highlighting
  - Animation
- Ex:  → "ccclchhk"
-  → 
- Non-Ex: Shower

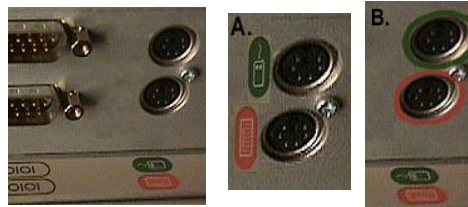
www.id-book.com, 47  
www.baddesigns.com

## Constraints

- Restricting possible actions
- Prevents selection of incorrect options
- Ex:
  - Insert a key into a lock



- Non-Ex:

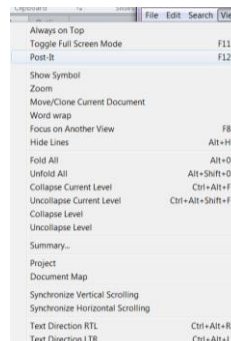
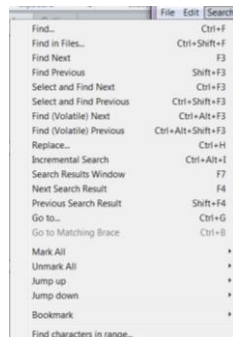


## Consistency

- Similar operations and similar elements for similar tasks
- Easier to learn and use
- Ex: ctrl key plus first initial of the command (ctrl+C, ctrl+S, ctrl+O)

## Internal consistency

- Behave the same within an application
- Difficult with complex interfaces
- Ex:

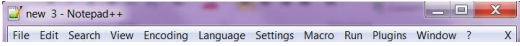


- Non-Ex: Modes (Caps Lock, Photoshop)



## External consistency

www.id-book.com 50

- Behave the same across applications and devices
- Pertains to operations, interfaces, etc.
- Very rarely the case
  - Based on different designer's preference
- Ex: 
- Non-Ex:

(a) phones,  
remote controls

1	2	3
4	5	6
7	8	9
	0	

(b) calculators,  
computer keypads

7	8	9
4	5	6
1	2	3
0		

www.id-book.com 51

## Affordances

- Attribute of an object that suggests use
- Physical ('Real') Affordances
  - Direct mapping between action and effect
  - Ex:
    - Mouse button invites pushing
    - Door handle affords pulling
- Virtual ('Perceived') Affordances
  - Learned conventions of arbitrary mappings between action and effect
    - Some mappings are better than others
  - Ex:
    - Scrollbars to afford moving up and down
    - Icons to afford clicking on

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## (Ch 1) When consistency breaks down

- These slides
- >1 command starts with same letter
  - Ex: Save, spelling, select, style
  - Must find other initials or combo of keys
  - Breaks the consistency rule
- Increases learning burden
  - People more prone to errors

[www.id-book.com](http://www.id-book.com),  
[www.windows.microsoft.com](http://www.windows.microsoft.com)

## (Ch 1) When consistency gets in the way

- Ex: Windows 8



[www.id-book.com](http://www.id-book.com),  
[www.windows.microsoft.com](http://www.windows.microsoft.com)

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## (Ch 3) Perception: Gestalt laws

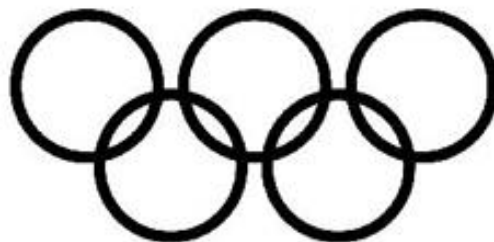
- Mind tends to perceive patterns
- Groupings based on certain rules
- Relative strength not really known

[www.id-book.com](http://www.id-book.com)

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## Perception: Gestalt laws

- Core principle:
- Pragnanz
  - Regular, simple, orderly

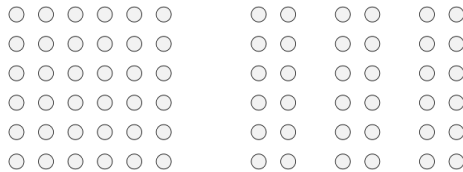


[www.id-book.com](http://www.id-book.com), [http://www.borisfx.com/tutorials/olympic\\_promo.php](http://www.borisfx.com/tutorials/olympic_promo.php)  
[www.interaction-design.org/encyclopedia/gestalt\\_principles\\_of\\_form\\_perception.html](http://www.interaction-design.org/encyclopedia/gestalt_principles_of_form_perception.html)

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## Perception: Gestalt laws

- Proximity – Close together



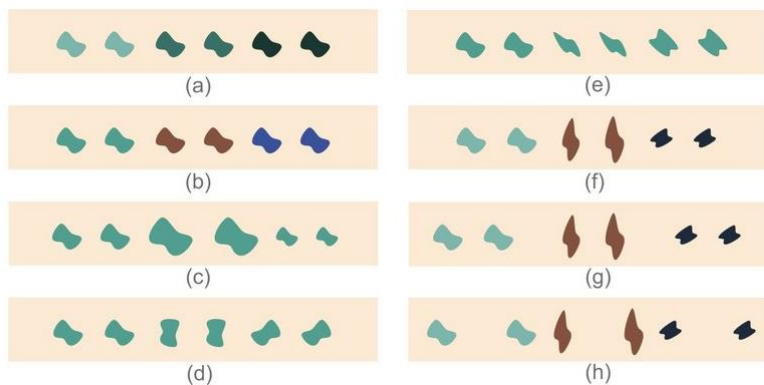
- Too much whitespace can be detrimental

[www.id-book.com](http://www.id-book.com), [https://en.wikipedia.org/wiki/Principles\\_of\\_Gestalt](https://en.wikipedia.org/wiki/Principles_of_Gestalt)  
[http://www.interaction-design.org/encyclopedia/gestalt\\_principles\\_of\\_form](http://www.interaction-design.org/encyclopedia/gestalt_principles_of_form)

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## Perception: Gestalt laws

- Similarity

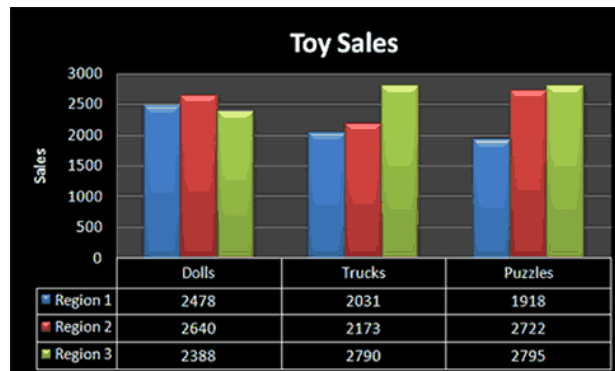


[www.id-book.com](http://www.id-book.com), [http://www.scholarpedia.org/article/Gestalt\\_principles](http://www.scholarpedia.org/article/Gestalt_principles)

58

## Perception: Gestalt laws

- Similarity



www.id-book.com,  
[http://www.baycongroup.com/excel2007/04\\_excel.htm](http://www.baycongroup.com/excel2007/04_excel.htm)

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## Perception: Gestalt laws

- Closure – Incomplete shapes



www.id-book.com, [https://en.wikipedia.org/wiki/Principles\\_of\\_grouping](https://en.wikipedia.org/wiki/Principles_of_grouping),  
[www.interaction-design.org/encyclopedia/gestalt\\_principles\\_of\\_form\\_perception.html](http://www.interaction-design.org/encyclopedia/gestalt_principles_of_form_perception.html)

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## Perception: Gestalt laws

- Symmetry



[www.id-book.com](http://www.id-book.com), [https://en.wikipedia.org/wiki/Gestalt\\_psychology#Gestalt\\_laws\\_of\\_grouping](https://en.wikipedia.org/wiki/Gestalt_psychology#Gestalt_laws_of_grouping),  
[www.interaction-design.org/encyclopedia/gestalt\\_principles\\_of\\_form\\_perception.html](http://www.interaction-design.org/encyclopedia/gestalt_principles_of_form_perception.html)

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## Perception: Gestalt laws

- Common fate – All moving same way

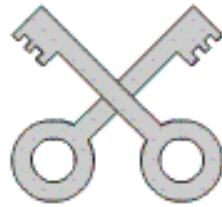


[www.id-book.com](http://www.id-book.com),  
[https://en.wikipedia.org/wiki/Principles\\_of\\_grouping](https://en.wikipedia.org/wiki/Principles_of_grouping)

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## Perception: Gestalt laws

- Continuity– Continuous direction



www.id-book.com,  
[https://en.wikipedia.org/wiki/Principles\\_of\\_grouping](https://en.wikipedia.org/wiki/Principles_of_grouping)

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## Perception: Gestalt laws

- Past experience

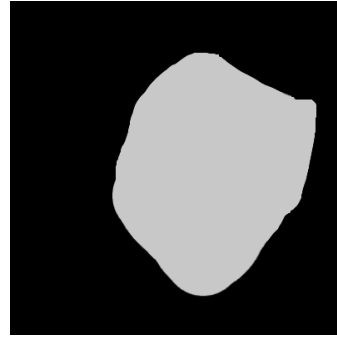
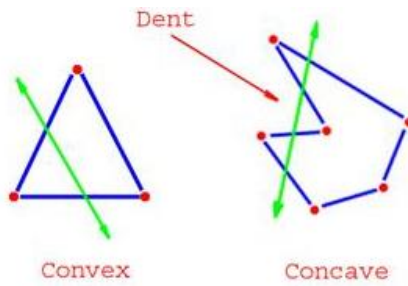


www.id-book.com,  
[http://www.scholarpedia.org/article/Gestalt\\_principles](http://www.scholarpedia.org/article/Gestalt_principles)

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## Perception: Gestalt laws

- Convexity



[www.id-book.com](http://www.id-book.com),  
[http://www.codesampler.com/d3dbook/chapter\\_02/chapter\\_02.htm](http://www.codesampler.com/d3dbook/chapter_02/chapter_02.htm)

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## Perception: Gestalt laws

- Common region



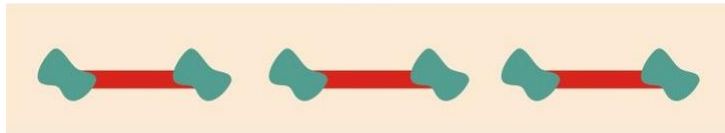
[www.id-book.com](http://www.id-book.com),  
[http://www.scholarpedia.org/article/Gestalt\\_principles](http://www.scholarpedia.org/article/Gestalt_principles)



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## Perception: Gestalt laws

- Element connectedness



www.id-book.com,  
[http://www.scholarpedia.org/article/Gestalt\\_principles](http://www.scholarpedia.org/article/Gestalt_principles)

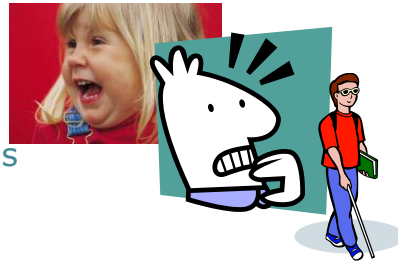
www.id-book.com 67

## (Ch 2) Interaction types

- Way user interacts with product
- Instructing
  - Issuing commands
  - Selecting options
- Conversing
  - Interacting with system via “conversation”
- Manipulating
  - Interacting with objects via manipulation
- Exploring
  - Moving through environment

## (Ch 2) Best interaction type <sup>68</sup>

- **Instruction**
  - Repetitive actions on multiple objects
  - Ex: spell-checking, file management
- **Manipulation**
  - 'doing' types of tasks
  - Ex: drawing, flying, driving, sizing windows
- **Conversation**
  - Children
  - Computer-phobic
  - Disabled users
  - Specialised applications
    - Phone services



<http://www.badsience.net/2007/10/oooooh-im-in-the-minority-report/> [www.id-book.com](http://www.id-book.com)

## (Ch 6) Interface types <sup>69</sup>

Interface type	See also
1. Command-based	
2. WIMP and GUI	
3. Multimedia	WIMP and web
4. Virtual reality	Augmented and mixed reality
5. Information visualization	Multimedia
6. Web	Mobile and multimedia
7. Consumer electronics and appliances	Mobile
8. Mobile	Augmented and mixed reality
9. Speech	
10. Pen	Shareable, touch
11. Touch	Shareable, air-based gesture
12. Air-based gesture	Tangible
13. Haptic	Multimodal
14. Multimodal	Speech, pen, touch, gesture, and haptic
15. Shareable	Touch
16. Tangible	
17. Augmented and mixed reality	Virtual reality
18. Wearable	
19. Robotic	
20. Brain-computer	

## (Ch 6) 3. Multimedia

- Combine media within single interface
  - Various forms of interactivity
  - Graphics, text, video, sound, and animations
  - Differs from GUI because includes web

- Ex: BioBlast

- Popular for
  - Education/Training
  - General Browsing



## (Ch 6) Pros and cons

- The Good
  - Rapid access to multiple representations of info
  - Whole can be better than the parts
  - Can enable
    - Easier learning/understanding
    - More engagement/pleasure
  - Encourage exploration
  - Tendency to explore multiple elements at once
- The Bad
  - Promotes fragmented interactions
    - Fix: Require text to be read before continuing

## (Ch 6) 9. Speech

- Person converses with system
- Ex: Apple's Siri
- Popular for
  - Basic inquiry
  - Call routing
  - The blind and visually impaired
- The Good
  - Not limited by input device
- The Bad
  - Limited by tech (Natural Language Processing)



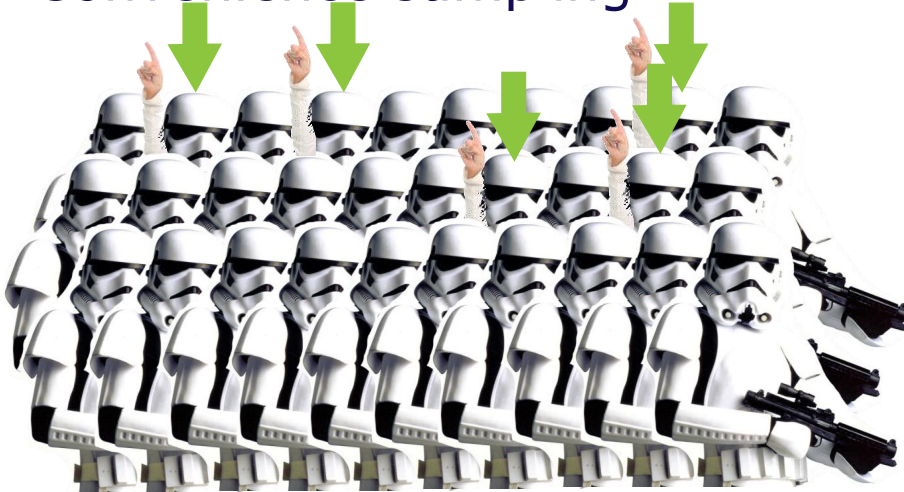
[www.id-book.com](http://www.id-book.com)  
<https://www.apple.com/ios/siri/siri-faq/>

## Key issues

## (Ch 7) Key Issues: Identifying Participants

## Identifying Participants

### Convenience sampling

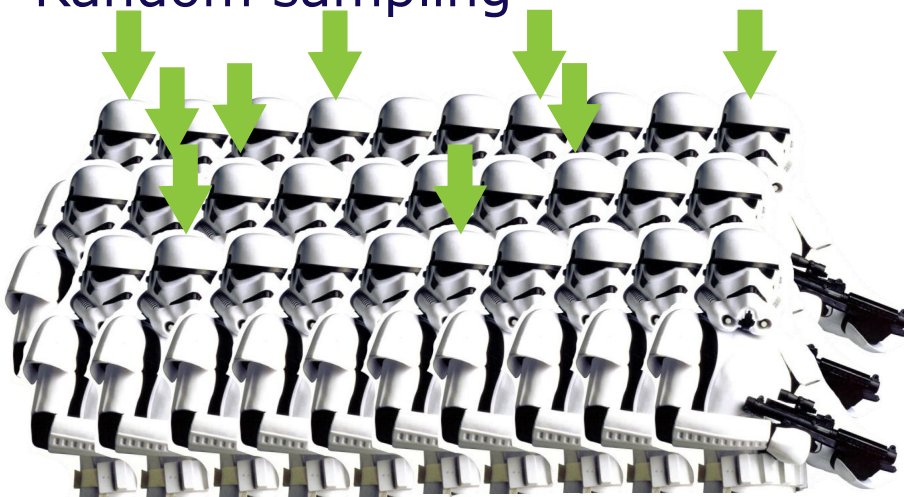


<http://starwars.wikia.com/wiki/Stormtrooper>

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## Identifying Participants

### Random sampling

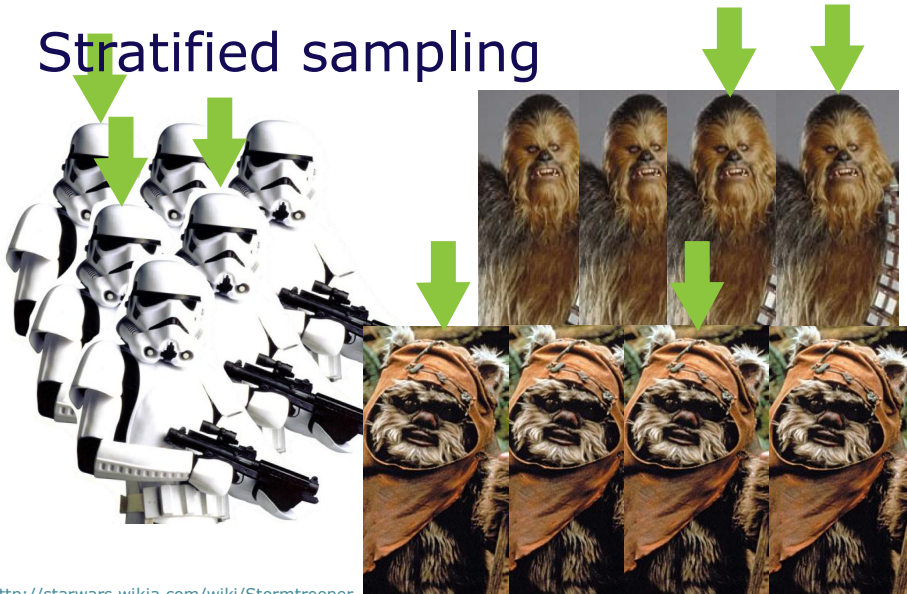


<http://starwars.wikia.com/wiki/Stormtrooper>

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## Identifying Participants

### Stratified sampling



<http://starwars.wikia.com/wiki/Stormtrooper>,  
<http://kotaku.com/5650591/then-why-we-still-got-ewoks>,  
<http://simplicitymom.blogspot.com/2011/10/fishing-for-wookie.html>

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## Data recording

### (Ch 7) Data Recording: Types

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## Types

## Notes plus still camera



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## Types

## Audio plus still camera



79

**Types**

## Video



80

**Interviews**

## (Ch 7) Interview Types

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## Interview Types

### Unstructured



<http://starwars.wikia.com/wiki/Stormtrooper>

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## Interview Types

### Structured



<http://starwars.wikia.com/wiki/Stormtrooper>

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## Interview Types

## Semi-structured

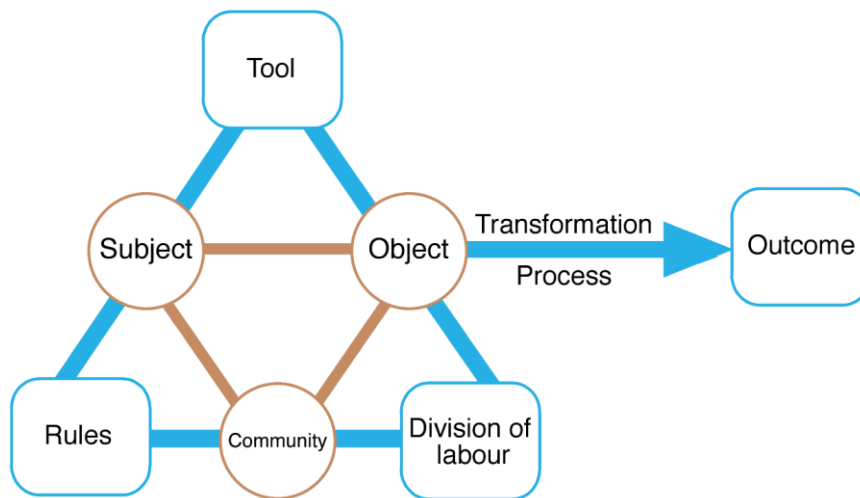


<http://starwars.wikia.com/wiki/Stormtrooper>

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## Activity theory

## (Ch 8) Overall system



[www.id-book.com](http://www.id-book.com), <https://en.wikipedia.org/wiki/Mario>

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## (Ch 9) Who are the users?

www.id-book.com 86

Primary



Secondary



Tertiary



## Compromises

### (Ch 11) Low-fidelity vs. high-fidelity



<http://starwars.wikia.com/wiki/Stormtrooper>, <http://www.bigshinyrobot.com/reviews/archives/25540>

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