

Principles to Support Usability

according to Alan Dix et al.



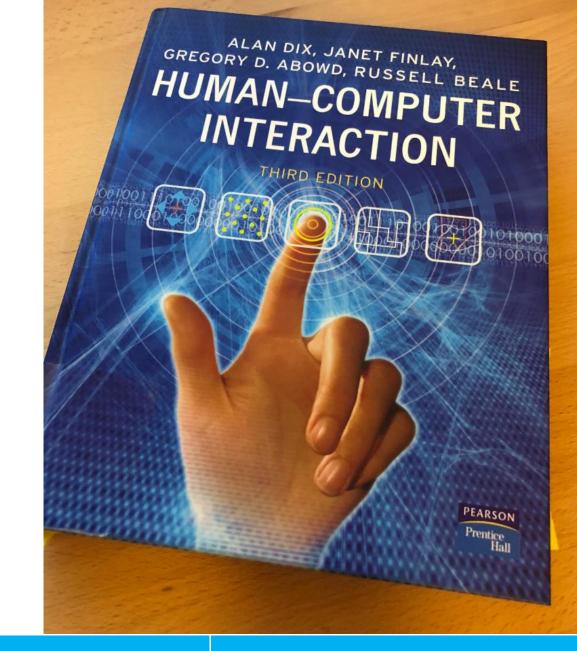
Learning Goals

- Understand ...
 - the principles that support usability according to Dix et al.
 - what points contribute to each of the principles
- Be able to …
 - explain these principles and give examples
 - discuss user interface designs with regard to these principles

Principles to Support Usability By Dix et al.

- Principle 1: Learnability
- Principle 2: Flexibility
- Principle 3: Robustness





3

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Principles to Support Usability

Principles to Support Usability Dix et al.

The ease with which new users can begin effective interaction and achieve maximal performance.

- Predictability
- Synthesizability
- Familiarity
- Generalizability
- Consistency

Dix, A. J., Finlay, J., Abowd, G. D., & Beale, R. (2003). Human-computer interaction. Pearson Education https://hcibook.com/.

Principles to Support Usability Dix et al.

The ease with which new users can begin effective interaction and achieve maximal performance.

Predictability

- Determining effect of future actions based on past interaction history
- Visibility of operations and effects
- Synthesizability
- Familiarity
 - how prior knowledge applies to a new system
 - affordance ('guessability')
- Generalizability
- Consistency

Dix, A. J., Finlay, J., Abowd, G. D., & Beale, R. (2003). Human-computer interaction. Pearson Education https://hcibook.com/.

C:\WINDOWS\system32\cmd.exe

C:∖>move test.txt test

C:∖>dir *.txt Volume in drive C has no label. Volume Serial Number is FCB2-566A

Directory of C:\

25.05.2007 12:36 Ø installDebug.txt 1 File(s) Ø bytes Ø Dir(s) 14,052,261,888 bytes free

:\>cd test

C:\test>dir *.txt Volume in drive C has no label. Volume Serial Number is FCB2-566A

Directory of C:\test

19.11.2007 16:56 Ø test.txt 1 File(s) Ø bytes 0 Dir(s) 14,052,261,888 bytes free

::\test>







Principles to Support Usability Dix et al.

The ease with which new users can begin effective interaction and achieve maximal performance.

- Predictability
- Synthesizability
 - ability of the user to assess the effect of past operations based on the current state
 - the user should see the changes of an operation
 - immediate vs. eventual feedback
- Familiarity
- Generalizability
- Consistency

**** ***	test Text Document O KB
39999 11 11	test Text Document O KB
	A
E Text D E D KB	A ocument

Dix, A. J., Finlay, J., Abowd, G. D., & Beale, R. (2003). Human-computer interaction. Pearson Education https://hcibook.com/.

Principles to Support Usability Dix et al.

25 seconds Show from Movie: Star Trek IV: The Voyage Home https://www.youtube.com/watch?v=hShY6xZWVGE

Dix, A. J., Finlay, J., Abowd, G. D., & Beale, R. (2003). *Human-computer interaction*. Pearson Education https://hcibook.com/.

Principles to Support Usability Dix et al.

The ease with which new users can begin effective interaction and achieve maximal performance.

- Predictability
- Synthesizability
- Familiarity

Generalizability

 extending specific interaction knowledge to new situations

Consistency

 likeness in input/output behavior arising from similar situations or task objectives



8

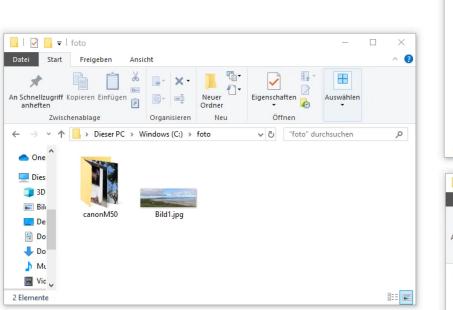
Dix, A. J., Finlay, J., Abowd, G. D., & Beale, R. (2003). *Human-computer interaction*. Pearson Education https://hcibook.com/.

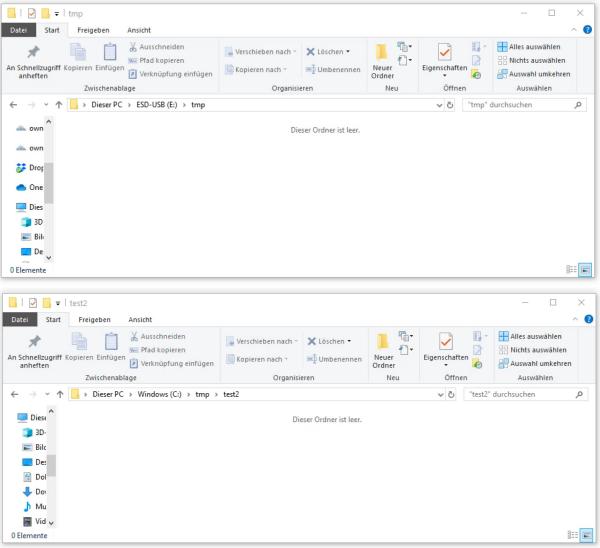
25 seconds

Show from Movie: Star Trek IV: The Voyage Home https://www.youtube.com/watch?v=hShY6xZWVGE

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Example: Predictability, Consistency

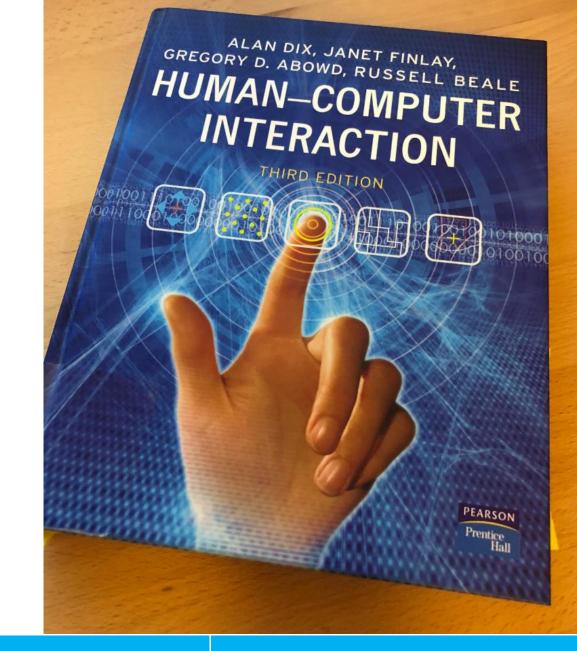




Principles to Support Usability By Dix et al.

- Principle 1: Learnability
- Principle 2: Flexibility
- Principle 3: Robustness





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10

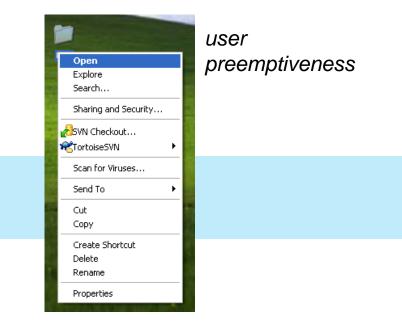
Principles to Support Usability

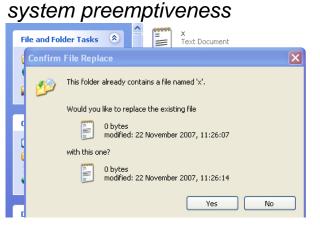
Principles to Support Usability Dix et al.

The multiplicity of ways the user and system exchange information.

- Dialogue initiative
 - freedom from system imposed constraints on input dialogue
 - user preemptiveness: user initiates dialog
 - system preemptiveness: system initiates dialog
- Multithreading
- Task migratability
- Substitutivity
- Customizability







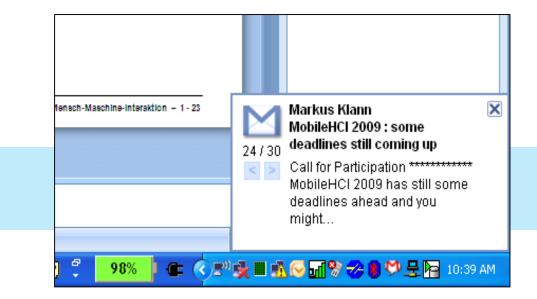
Principles to Support Usability

Principles to Support Usability Dix et al.

The multiplicity of ways the user and system exchange information.

- Dialogue initiative
- Multithreading
 - system supports user interaction for several tasks at a time
 - <u>concurrent multimodality</u>: simultaneous communication of information pertaining to separate tasks
 - interleaving multimodality: permits temporal overlap between separate tasks, dialog is restricted to a single task
- Task migratability
- Substitutivity
- Customizability

Dix, A. J., Finlay, J., Abowd, G. D., & Beale, R. (2003). Human-computer interaction. Pearson Education https://hcibook.com/.



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Slide adapted from Dr. Paul Holleis

Principles to Support Usability Dix et al.

The multiplicity of ways the user and system exchange information.

- Dialogue initiative
- Multithreading
- Task migratability
 - passing responsibility for task execution between user and system, e.g. spell checking
- Substitutivity
- Customizability

Dix, A. J., Finlay, J., Abowd, G. D., & Beale, R. (2003). *Human-computer interaction*. Pearson Education https://hcibook.com/.

Spelling							
Not in Dictionary <u>:</u>	migratability						
Change <u>t</u> o:	irritability	Ignore	Ignore All				
Suggestions:	irritability	Change	Change All				
		Add	Suggest				
Add <u>w</u> ords to:	CUSTOM.DIC 💌	AutoCorrect	Close				

Tack migrata hility

Principles to Support Usability

Principle 2: Flexibility

Principles to Support Usability Dix et al.

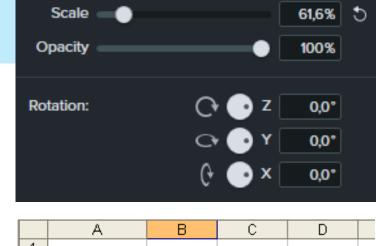
The multiplicity of ways the user and system exchange information.

- Dialogue initiative
- Multithreading
- Task migratability

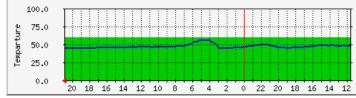
Substitutivity

- allowing equivalent values of input and output to be substituted for each other
- representation multiplicity
- equal opportunity: blurs the distinction between input and output
- Customizability

Dix, A. J., Finlay, J., Abowd, G. D., & Beale, R. (2003). Human-computer interaction. Pearson Education https://hcibook.com/.



	A	В	С	D	
1					
2	Summand 1	1	2	1	
3	Summand 2	2	2	2	
4	Summand 3	3	3	3	
5	Total sum	6	7	6	
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Slide adapted from Dr. Paul Holleis

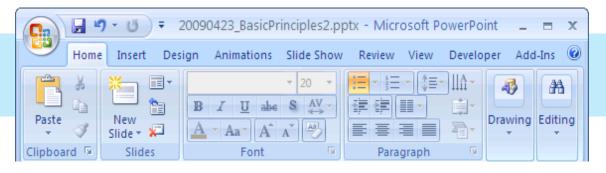
Principles to Support Usability Dix et al.

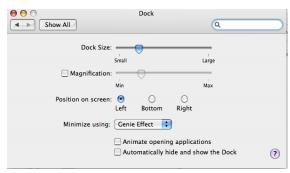
The multiplicity of ways the user and system exchange information.

- Dialogue initiative
- Multithreading
- Task migratability
- Substitutivity
- Customizability
 - modifiability of the user interface by the user (adaptability) or system (adaptivity)
 - <u>adaptability (anpassbar)</u>: users ability to adjust the form of input and output
 - adaptivity (adaptive): automatic customization of the user interface by the system



Image: State of the state







2019-06-26 - Basics and Principles of HCI.pptx - PowerPoint

Principle 2: Flexibility

Principles to Support Usability Dix et al.

The multiplicity of ways the user and system exchange information.

- Dialogue initiative
- Multithreading
- Task migratability
- Substitutivity
- Customizability
 - modifiability of the user interface by the user (adaptability) or system (adaptivity)
 - adaptability (anpassbar): users ability to adjust the form of input and output
 - <u>adaptivity (adaptive)</u>: automatic customization of the user interface by the system

Öffnen

Ŀ	Zuletzt verwendet enster ausschneiden	Heute 2019-06-26 - Basics and Principles of HCI.pptx	26.06.2019 10:29
	OneDrive - Persönlich nhenze@gmail.com	C: » Users » Niels Henze » Dropbox » lectures-even more » GHCI Gestern	20.00.2019 10.29
	Dieser PC	2019-06-19 Writing.pptx C: » Users » Niels Henze » Dropbox » lectures-even more » AUE	25.06.2019 09:29
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	Durchsuchen	2019-06-12 - Models.pptx C: » Users » Niels Henze » Dropbox » lectures-even more » GHCI	19.06.2019 13:21
		2019-06-04-PaperWriting.pptx C: » Users » Niels Henze » Dropbox » lectures-even more » Forschungsse	19.06.2019 11:53
		2018-08-14 - How to get papers into CHI.pptx C: » Users » Niels Henze » Dropbox » Presentations	19.06.2019 09:48

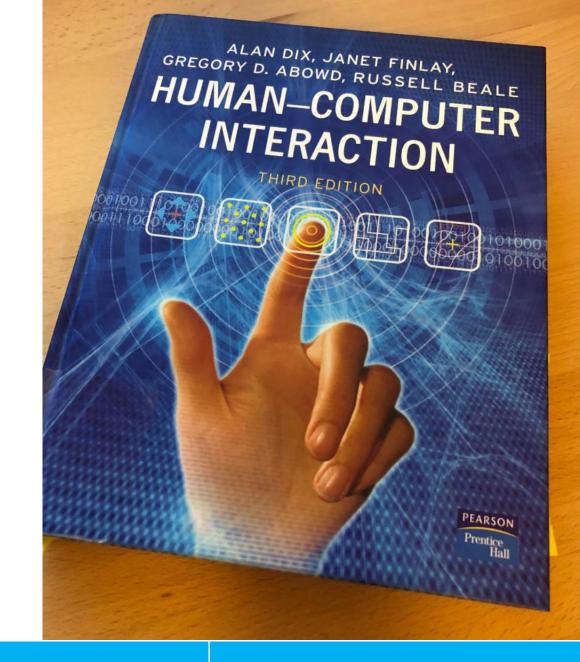
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Dix, A. J., Finlay, J., Abowd, G. D., & Beale, R. (2003). *Human-computer interaction*. Pearson Education https://hcibook.com/.

Principles to Support Usability By Dix et al.

- Principle 1: Learnability
- Principle 2: Flexibility
- Principle 3: Robustness





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17

Principles to Support Usability

Principle 3: Robustness

Principles to Support Usability Dix et al.

The level of support provided to the user in determining successful achievement and assessment of goal-directed behaviour.

- Observability
- Recoverability
- Task conformance
- Responsiveness

Dix, A. J., Finlay, J., Abowd, G. D., & Beale, R. (2003). Human-computer interaction. Pearson Education https://hcibook.com/.

Principles to Support Usability

19

Principle 3: Robustness

Principles to Support Usability Dix et al.

The level of support provided to the user in determining successful achievement and assessment of goal-directed behaviour.

Observability

- ability of the user to evaluate the internal state of the system from its perceivable representation
- Recoverability
- Task conformance
- Responsiveness



Dix, A. J., Finlay, J., Abowd, G. D., & Beale, R. (2003). Human-computer interaction. Pearson Education https://hcibook.com/.

Principle 3: Robustness

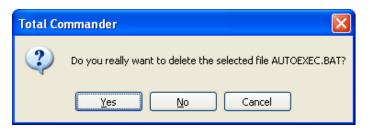
Principles to Support Usability Dix et al.

The level of support provided to the user in determining successful achievement and assessment of goal-directed behaviour.

- Observability
- Recoverability
 - ability of the user to correct a recognized error
 - reachability (states): forward (redo) / backward (undo) recovery
 - commensurate effort (more effort / steps for deleting a file than for moving it)
- Task conformance
- Responsiveness

Dix, A. J., Finlay, J., Abowd, G. D., & Beale, R. (2003). Human-computer interaction. Pearson Education https://hcibook.com/.





Principle 3: Robustness

Principles to Support Usability Dix et al.

The level of support provided to the user in determining successful achievement and assessment of goal-directed behaviour.

- Observability
- Recoverability

Task conformance

- degree to which system services support all of the user's tasks
- task completeness
- task adequacy
- Responsiveness



Dix, A. J., Finlay, J., Abowd, G. D., & Beale, R. (2003). *Human-computer interaction*. Pearson Education https://hcibook.com/.

Principles to Support Usability

Principle 3: Robustness

Principles to Support Usability Dix et al.

The level of support provided to the user in determining successful achievement and assessment of goal-directed behaviour.

- Observability
- Recoverability
- Task conformance
- Responsiveness
 - how the user perceives the rate of communication with the system
 - preferred: short durations and instantaneous responses
 - stability and indication of response time

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Dix, A. J., Finlay, J., Abowd, G. D., & Beale, R. (2003). *Human-computer interaction*. Pearson Education https://hcibook.com/.

Principles to Support Usability

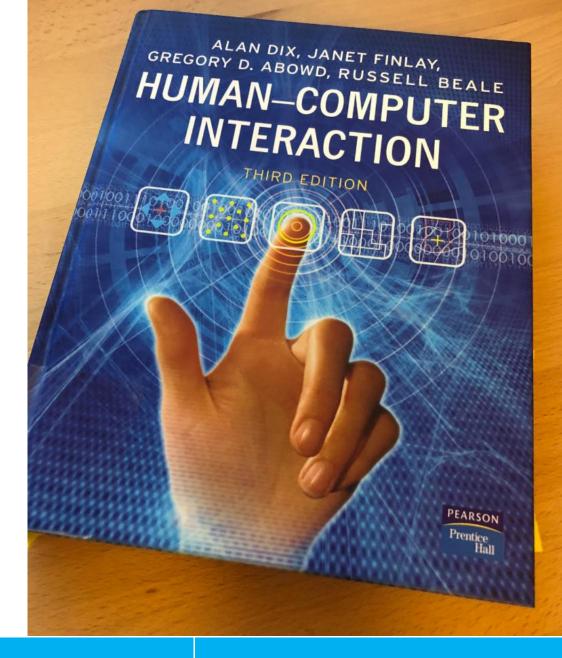
By Dix et al.

- Learnability
 - Predictability
 - Synthesizability
 - Familiarity
 - Generalizability
 - Consistency
- Flexibility
 - Dialogue initiative
 - Multithreading
 - Task migratability
 - Substitutivity
 - Customizability

Dix, A. J., Finlay, J., Abowd, G. D., & Beale, R. (2003). *Human-computer interaction*. Pearson Education, p260ff, https://hcibook.com/.



- Robustness
 - Observability
 - Recoverability
 - Responsiveness
 - Task conformance



Conversation with Alan Dix

https://youtu.be/n8S6ZgZzgbo

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Principles to Support Usability

Alan Dix

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Albrecht Schmidt

enconcentration i

Did you understand this block?

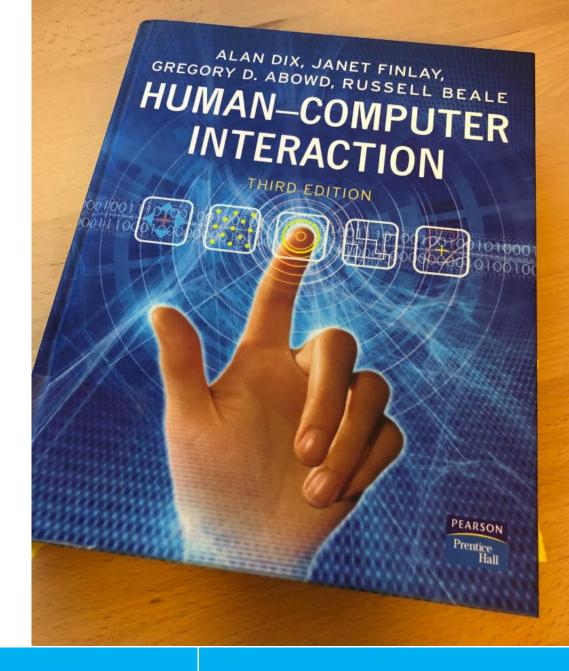
Can you answer these questions?

- What are the 3 principles to support usability according to Alan Dix et al.?
- Give an example for robustness?
- How did our expectations for learnability change over the last 20 years?
- How does recoverability contribute to robustness?
- What two forms of customizability can be discriminated? Give an example for each.
- How does predictability improve learnability? How is predictability achieved?



Reference

 Dix, A. J., Finlay, J., Abowd, G. D., & Beale, R. (2003). Human-computer interaction. Pearson Education, pp.260ff <u>https://hcibook.com/</u>



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