Projektas Informatikos ir programų sistemų studijų programų kokybės gerinimas (VP1-2.2-ŠMM-07-K-02-039)



Heuristic evaluation

Lecture 10 dr. Kristina Lapin



www.id-book.com

Aims:

- Describe the key concepts associated with inspection methods.
- Explain how to do heuristic evaluation

Iterative Design



Inspections

- Several kinds.
- Experts use their knowledge of users & technology to review software usability.
- Expert critiques (crits) can be formal or informal reports.
- Heuristic evaluation is a review guided by a set of heuristics.
- Walkthroughs involve stepping through a pre-planned scenario noting potential problems.

Heuristical inspection

- Developed Jacob Nielsen in the early 1990s.
- Based on heuristics distilled from an empirical analysis of 249 usability problems.
- These heuristics have been revised for current technology.
- Heuristics being developed for mobile devices, wearables, virtual worlds, etc.
- Design guidelines form a basis for developing heuristics.

Nielsen's original heuristics

- Visibility of system status.
- Match between system and 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, recover from errors.
- Help and documentation.

Show

- time: for an operation longer than 1 sec. show progress bar
- **space:** free space left
- change: ask whether to save when something was edited
- **action**: sorted from the most important action
- **next steps**: can be described
- **end**: something is performed, submitted, set, etc.

1. Visibility of system status: modes



Advantage: all required information in one place Drawback: edit mode is similar to the main windo

1. Visibility of system status: invisible functionality, where can I tap?





"Become a member" does not looks like a button. "Already a member?" is correct

How to listen to a recorded program?

http://www.nngroup.com/reports/ipad-app-and-website-usability/c

-Constantly inform the user



• Windows Live account

Type new password:	*********
	Six-characters minimum; case sensitive
Password strength:	Strong

 A feedback message is displayed when an action is performed (Tick)



Theresa Neil sign in

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

Should be as specific as possible, based on user's input Best within the context of the action

🐃 Form1 📃 🗆 🗙	
Saving	
Cancel	ļ
- Formi	ЦX
Saving file heuristics.ppt in folder topics	
Saving file heuristics.ppt in folder topics	





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Percent Copied: 0%	100%
Press [Esc] To Abort	

– Response time

- how users perceive delay
 - » 0.1 second max: perceived as "instantaneous"
 - » 1 seconds max: user's flow of thought stays uninterrupted, but delay noticed
 - » 10 seconds: limit for keeping user's attention focused on the dialog
 - » > 10 seconds: user will want to perform other tasks while waiting

- Short delays
 - cursor
- Longer delays
 - progress bar with anticipated time
- Long operation
 - message







2. Match between system and real world(metaphors)

- 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.

2. Match between system and real world(metaphors)

• Familiar metaphors

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Delivery Address:	
Today's date:	
Credit Card No.:	for dept use: validation id:
Catalog Item	
Number:	Quantity: Cost/item: Total:
Balance Owing:	Next Catalog Item (PF5)
	Trigger Invoice (PF8)

2017.04.21 13:11

2. Match between system and real world (metaphors)



Follow real-world conventions, making information appear in a natural and logical order.

2. Match between system and real world(metaphors)

iTunes

Mindomo



- 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.
 - cancel, exit
 - Show route (bread crumbs, navigation)
- Support undo and redo.

-Clear exits

Network ? 🗙
Configuration Identification Access Control
The following <u>n</u> etwork components are installed:
Elient for Microsoft Networks
Intel EtherEuropean 1C or 1CTP
TCP/IP -> Intel EtherExpress 16 or 16TP
Personal Web Server
Add <u>R</u> emove <u>Properties</u>
Primary Network Logon:
Client for Microsoft Networks
<u>File and Print Sharing</u>
Description
TCP/IP is the protocol you use to connect to the Internet and
wide-area networks.
OK Cancel







- Strategies
 - -Cancel button
 - -Undo
 - –Quit
 - -Defaults

CollabFinder

	Search Cancel	Map	Message Board	Browse Designers
	Find	Developers	Designers	
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	graphic design			+ CollabFi People I

Wufoo



Search is easy to open, enter info, execute or cancel. To go through an extended dialogue. Supports undo and redo and a clear way to navigate. Clearly marks where the person is and where they can go by showing the selection in each menu

24 2017.04.21 13:11

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

Pages

Balsamiq



Cell editing shows row and column ids, and the cells used in the equation. The equation can be saved or canceled.

Undo and Redo buttons are available in the toolbar, and can also be accessed with the standard keyboard shortcuts

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

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

• Shortcuts and icons

- Ctrl + S shortcut
- Alt FS hot keys



• These are labels with a raised appearance.

 Is it any surprise that people try and click on them?



Consistency within system



4. Consistency and standardsConsistency within system





30

After selecting the third menu item from the left (left image), navigation disappears https://www.baekdal.com/plus

Gmail

Inbox (1731) Starred ☆ Chats ♀ Sent Mail Drafts (260) All Mail Spam (954) Trash

The Gmail organizational folders are the same as used in client email applications: Inbox, Drafts, Sent Mail

Microsoft Office



Word, Excel, and PowerPoint all use the same style toolbar with the same primary menu options: Home, Insert, Page Layout...

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

2017.04.21 13:11

- General rules
 - Prevent errors before they occur
 - Detect and correct errors when they do occur
 - User correction through feedback and undo

• Prevent errors

- try to make errors impossible
- modern widgets: only "legal commands" selected, or "legal data" entered
- Provide reasonableness checks on input data
 - on entering order for office supplies
 - 5000 pencils is an unusually large order. Do you really want to order that many?

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- Two types of human errors
 - Slips
 - occur when users intend to perform one action, but end up doing another (often similar) action.
 - are typically made when users are on autopilot,
 - and when they do not fully devote their attention resources to the task at hand.

– Errors

- are made when users have goals that are inappropriate for the current problem or task
 - even if they take the right steps to complete their goals, the steps will result in an error.
 - For example, misunderstanding of the meaning of the action

5. Error prevention: avoiding unconscious slips



Slip prevention example:





Remind the goal



Show user route

→ PRADŽIA → DISKUSIJOS → KONTAKTAI → DETALI PAIEŠKA

Pagrindinis > LTF > Dokumentai

Θ

Guidelines for preventing slips – include helpful constraints

Southwest											
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19 20 21 22	23 24	25	16 1	7	18	19	20	21	22		
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Boston Logan, MA - BOS New York (LaGuard)	ia), NY -	Depart Wed,	Jul 8 2015	5	Retur	n Sat,	Jul 113	2015	٨	suite	Seniors

Southwest's calendar widget for picking flight dates uses helpful constraints to prevent users from accidentally setting a nonsensical date range. Even if users attempt to set the return date before the departure date, this widget forces them to pick a departure date first. In addition, it subtly uses color to provide context about which date is about to be changed (in this case, blue for departure), which helps users see which field they are selecting (instead of having to keep that information in their working memory) 37
5. Error prevention

Guidelines for preventing slips Offer Suggestions



Remembering how to spell Etymotic Research is difficult for users searching for high-quality headphones, and typing is likely to be low accuracy as well. Amazon's clickable search suggestions enable users to type less, thereby making fewer slips or mistakes that would produce no results.

 \odot

5. Error prevention

Guidelines for preventing slips

choose good defaults

Google's Inbox app for iOS allows you to "snooze" an email until a later time. The default options are sensible and prevent typing errors for common choices.



5. Error prevention

Guidelines for preventing slips

Use Forgiving Formatting

* NAME			
First Name		Last Name	
* MOBILE NUN	IBER		
+1 \$	(555) 666-7778		
LANGUAGE			
	ited States)		

Uber.com automatically displays the phone number in the desired format as users type, so that they can more easily scan their work to confirm that it's correct.

 \odot

6. Recognition better than recall

- Avoid codes
- Provide recommended options
- Allow preview

6. Recognition better than recall

Visible objects, actions and options

Font		? ×
Eont: Times New Roman	Font style: Bold	Size: OK
''과 MT Extra ''과 Playbill ''과 Symbol ''과 Tahoma ''과 Times New Roman	► Regular Bold Italic Bold Italic	18 ▲ 20 24 ─ <u>Preview</u> 32 ▼
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	Subscript	Default for new objects

🕖 Adobe Caslon Pro

🕖 Adobe Caslon Pro Bold

🕖 Adobe Garamond Pro

O Adobe Garamond Pro Bold

🕁 Agency FB

ካ Algerian

ት Arial

沿 Arial Black

Arial Narrow

- 🕆 Arial Rounded MT Bold
- 🕆 Arial Unicode MS

🕖 Arno Pro

🕖 Arno Pro Caption



Common Shortcuts

Add Action	Return
New Window	ЖN
Synchronize with Server	^%S
Clean Up	жк
Planning Mode	361
Context Mode	%2
Inbox	75961
Quick Entry	^ ℃Space
Quick Entry's shortcut can be customized in Preferences	,

- Accelerators
 - 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.

7. Flexibility and efficiency in website design

• Flexibility

options to find content on the page

- Hyperlinks;
- Basic search form;
- Advanced search form;
- -Site map;
- Alphabetical index.

7. Flexibility and efficiency in website design

Efficiency

- word hyperlinks properly;
 - preferably with the title of the page the link leads to;
- search results should include a description of the link,
 - in addition to the title of the page;
- design your site map in a logical manner; and
- provide an alphabetical index
 - which includes as many categories, content areas, departments and keywords as possible.

- Operation shortcuts
- Default choices
 - Provide recommended options
 - Show last entered value
- Show related information
 - E.g. weather forecast in calendar
- Proactive
 - Pvz. siūlyti galimybę atsisakyti tam tikro siuntėjo laiškų

- Shortcut strategies:
 - Key shortcuts (hot keys)
 - Key combinations
 - Autocomplete
 - Function keys
 - Mouse shortcut
 - Context menus
 - Double clicks
 - Navigation
 - Operation retrospective

Hot keys



7. Provide shortcuts



- The important information above the page fold
- Avoid the clutter

• Minimalism

- Provide information neede for current step
- Panaikinti arba paslėpti retai arba iš viso nenaudojamą informaciją
 - pvz. įmonės rekvizitai kiekviename puslapyje
- Nes ji blaško dėmesį ir varžosi su aktualia informacija

Rekomendacijos

- Sumažinti režimus arba tinkamai juos pavaizduoti
- Taupiai naudoti langus
 - Papildomi langai reikalauja perteklinės navigacijos



JavaScript

Thank you for your interest in browsing out catalog! It's Easy and it's Efficient! Adobe Acrobat Reader 4.0 uses a 'Pointing Finger' with a 'W' for a mouse pointer whenever you encounter an area where a 'Selection' can be made. When the catalog index page appears, you will notice that the 'Pointing Finger' will appear when you pass over an index. item (Product Type) that is selectable. If you click on an item, the pages related to that product will be downloaded to you. Each page has been modularized so that typical download times with a V.90 modern will not exceed 60 seconds with the average download time less than 20 seconds. Depending on your Browser, you may not see a time line, just be patient and the pages will appear. In some cases another index page will appear requiring further selection. The same process should be followed. Using the pager in Acrobat Reader is easy and efficient and in a short time you will be an expert at it. To return to the previous index, simply click your Browser 'Back' button. Two other configurations of mouse pointers are also used by Acrobat Reader. An 'Open Hand' for moving the page around and a 'Magnifier' for zooming in and out while viewing the page. You may select either one from the tool bar at the upper part of the screen. Please carefully jot down the Model Numbers of interest so that they can be entered accurately in the on-line ordering system.



53

X

9. Help users recognize, diagnose, and recover from errors

- Clear error messages
- Recommend a solution
- Show next steps
- Provide alternatives

Microsoft Visual SourceSafe



Adding more than 150 files is not recommended. Windows may fail to add all selected files. Continue? X

|--|







Revision Master Failed to check out file. An error occurred while accessing the library. The error was: No error occured. Try again? r'es No. Inane Dialogai NetInfo Error NetInfo read failed! (Operation succeeded) 🕸 mosaix33 File Bookmarks 0K When you click the GLOSSARY button, you access an extensive list of MOSAIX and Campaign Director terms and definitions. Do NOT click this button during this introductory tutorial, or you may give the program a nervous breakdown. QUIT GLOSSARY PREV NEXT

9. Help users recognize, diagnose, and recover from errors

Whenever your local SMS Administrator sends you an actual software Package, the SMS Package Command Manager will appear (usually at actionsk logon time) displaying the available Package(s). The following severashots display scenes similar to what you will see when you receive an actual SMS Package. To start the demonstration, diels the "OLI OK DER<mark>OLI CORRESPONDENCED W</mark>item of the sensess.

http://digilander.libero.it/chiediloapippo/Engineering/iarchitect/mshame.htm

ŽKS ištakos ir struktūra

Motyvacija

Studijų reikalavim



Error messages





http://digilander.libero.it/chiediloapippo/Engineering/iarchitect/mshame.htm

ŽKS ištakos ir struktūra

Motyvacija

Studijų reikalavima



Error messages

Application Error





Fatal Application Error

Jazz Jackrabbit 2 Shareware signaled the following internal error:

memAlloc() Amnesia Error: Out of memory

<u>Q</u>uit

Х

ŽKS ištakos ir struktūra

Motyvacija

Studijų reikalavima



Cluttered space

Document2 - Microsoft Word				
File Edit View Insert Format Tools Table Window Help				
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Page Sec At Ln Col REC TRK EXT OVR DX				

ŽKS ištakos ir struktūra

Motyvacija

Studijų reikalavima



9. Help users recognize, diagnose, and recover from errors

OPositiv feedbackk

• AutoCAD Mechanical



Adobe Image Ready

ImageReady



Could not fully start the application because a pointer was nil when it should not have been.



- Documentaiton should be easy to search
- Focused on the user's task,
- List concrete steps to be carried out,
- It should not be too large.

Help Topics: Microsoft PowerPoint	Help Topics: Microsoft PowerPoint	? ×
Key information Getting Help Installing and Removing PowerPoint Coreating, Opening, and Saving Presentations Creating, Opening, and Saving Presentations Vorking in Different Views Working with Slides	Help Topics: Microsoft PowerPoint Contents Index Find Image: Second s	? ×
 Creating, Opening, and Saving Presentations Creating the Look of Your Presentation Working in Different Views Working with Slides Adding and Formatting Text Formatting Paragraphs Checking Spelling and Correcting Typing Mistakes Making Notes Pages and Handouts Printing Presentations Drawing and Working with Objects Adding Clip Art and Other Pictures 	agenda slides aligning objects aligning text aligning text in objects allowing fast saves almanac in Bookshelf American Heritage Dictionary Animation Player animation creating animated slides downloading animations from Internet overview previewing running in Web presentations slide design considerations	
<u>Open</u> <u>Print</u> Cancel	what's new in PowerPoint 97	

Display

Cancel

• Hints



• Wizards





• Tips



Useful sites

• Home page check list

http://www.userfocus.co.uk/resources/homepagechecklist.html

- Usability evaluation reports
 http://www.usabilitynet.org/tools/r report.htm
- Nielsen J, 1995?, "How to Conduct a Heuristic Evaluation". http://www.useit.com/papers/heuristic/heuristic (iš http://www.useit.com/papers/heuristic/)
- Ask Tog. 'The following principles are fundamental to the design and implementation of effective interfaces, whether for traditional GUI environments or the web.' <u>http://www.asktog.com/basics/firstPrinciples.html</u>
- Usability Special Interest Group. <u>http://www.stc.org/pics/usability/resources/</u>
- http://www.useit.com/hotlist/

Gerhardt-Powals heuristics

- 1. Automate unwanted workload
 - Free cognitive resources for high-level tasks
 - Eliminate mental calculations, estimations, comparisons, and unnecessary thinking
- 2. Reduce uncertainty
 - Display data in a manner that is clear and obvious
- 3. Fuse data
 - Reduce cognitive load by bringing together lower level data into a higher level summation

Gerhardt-Powals heuristics

- 4. Present new information with meaningful aids to interpretation
 - Use a familiar framework, making it easier to absorb
 - Use everyday terms, metaphors, etc
- 5. Use names that are conceptually related to function
 - Context-dependent
 - Attempt to improve recall and recognition
- 6. Group data in consistently meaningful ways to decrease search time

Gerhardt-Powals heuristics

7. Limit data-driven tasks

- Reduce the time spent assimilating raw data.
- Make appropriate use of color and graphics
- Include in the displays only that information needed by the user at a given time
 - Allow users to remain focused on critical data
 - Exclude extraneous information that is not relevant to current tasks
- 9. Provide multiple coding of data when appropriate
- 10.Practice judicious redundancy (to resolve the possible conflict between heuristics 6 and 8)

Weinschenk and Barker euristikcs for speech systems

- 1. User Control.
- 2. Human Limitations
- 3. Modal Integrity
- 4. Accommodation
- 5. Linguistic Clarity
- 6. Aesthetic Integrity
- 7. Simplicity
- 8. Predictability
- 9. Interpretation

10. Accuracy

- 11.Technical clarity
- 12. Flexibility
- 13. Fulfillment
- 14. Cultural Propriety
- 15. Suitable Tempo
- 16. Consistency
- 17. User support
- 18. Precision
- 19. Forgiveness
- 20. Responsiveness

Nielsen, 1994

Nielsen's heuristics for Web

- 1. Bad search
- 2. PDF Files for Online Reading
- 3. Not Changing the Color of Visited Links
- 4. Non-Scannable Text
- 5. Fixed Font Size
- 6. Page Titles With Low Search Engine Visibility
- 7. Anything That Looks Like an Advertisement
- 8. Violating Design Conventions
- 9. Opening New Browser Windows 10.Not Answering Users' Questions



Budd, 2007

Website heuristics

1. Design for User Expectations

- Choose features that will help users achieve their goals
- Use common web conventions
- Make online processes work in a similar way to their offline equivalents
- Don't use misleading labels or buttons

2. Clarity

- Write clear, concise copy
- Only use technical language for a technical audience
- Write clear and meaningful labels
- Use meaningful icons


Website heuristics

3. Minimize Unnecessary Complexity and Cognitive Load

- Remove unnecessary functionality, process steps and visual clutter
- Use progressive disclosure to hide advanced features
- Break down complicated processes into multiple steps
- Prioritise using size, shape, colour, alignment and proximity

4. Efficiency and Task Completion

- Provide quick links to common features/functions
- Provide advanced features like the ability to delete multiple messages
- Pre-check common options, like opt-out of marketing emails
- Allow defaults to be changed, cancelled or overridden.
- Remove unnecessary steps

Budd, 2007

Website heuristics

5. Provide Users with Context

- Provide a clear site name and purpose
- Highlight the current section in the navigation
- Provide a breadcrumb trail
- Appropriate feedback messages
- Show number of steps in a process
- Reduce perception of latency by providing visual cues (e.g. progress indicator) or by allowing users to complete other tasks while waiting.

6. Consistency and Standards

- Use common naming conventions such as "log in"?
- Place items in standard locations like search boxes at the top right of the screen
- Use the right interface element or form widget for the job
- Create a system that behaves in a predictable way
- Use standard processes and web patterns

Budd, 2007

Website heuristics

7. Prevent Errors

- Disable irrelevant options
- Accept both local and international dialling codes
- Provide examples and contextual help
- Check if a username is already being used before the user registers

8. Help users notice, understand and recover from errors

- Visually highlight errors
- Provide feedback close to where the error occurred
- Use clear messages and avoid technical jargon

9. Promote a pleasurable and positive user experience

- Create a pleasurable and attractive design
- Provide easily attainable goals
- Provide rewards for usage and progression



Heuristics for websites

• Internal consistency

- The user should not have to speculate whether different phrases or actions carry the same meaning.?
- Simple dialog
 - Terms should be familiar and not be system-oriented.
- Shortcuts
- Minimizing the user's memory load
- Preventing errors
- Feedback
- Internal locus of control "Emergency exits"

Turning Design Guidelines into
HeuristicsPreece, 2001

Heuristics for social network websites

- Dialog & social interaction support
 - The prompts and feedback that support interaction, the ease with which commands can be executed, the ease with which avatars can be moved, spatial relationships in the environment, etc.
- Information design
 - How easy to read, understandable and aesthetically pleasing information associated with the community is, etc.
- Navigation
 - The ease with user can move around and find what they want in the community and associated website. Many online community users have suffered from the inconsistencies of data transfer and differences in interaction style between imported software modules and the website housing the community.

• Access

Requirements to download and run online community software must be clear.

Heuristics for web-based communities

Sociability

- Why should I join?
- What are the rules?
- Is the community safe?
- Can I express myself as I wish?
- Do people reciprocate?
- Why should I come back?

Usability

- How do you join?
- How do I get, read, and send messages?
- Can I do what I want to do easlity?

Mankoff et al. (2003)

Ambient display heuristics

- Useful and relevant information
- Peripherality of display
- Match between design of ambient display and environments
- Sufficient information design
- Consistent and intuitive mapping
- Easy transition to more in-depth information
- Visibility of state
- Aesthetic and Pleasing Design

Mankoff ir kiti (2003)

Ambient display heuristics





BusMobile.

Daylight display

Discount Usability Engineering

Cheap

98

- no special labs or equipment needed
- the more careful you are, the better it gets
- Fast
 - on order of 1 day to apply
 - standard usability testing may take a week
- Easy to use

- can be taught in 2-4 hours

Discount evaluation

 Heuristic evaluation is referred to as discount evaluation when 3-5 evaluators are used.

 Empirical evidence suggests that on average 5 evaluators identify 75-80% of usability problems.

Why Multiple Evaluators?

- Every evaluator doesn't find every problem
- Good evaluators find both easy & hard ones



No. of evaluators & problems



Heuristic Evaluation Process

- Evaluators go through UI several times
 - inspect various dialogue elements
 - compare with list of usability principles
 - consider other principles/results that come to mind
- Usability principles
 - Nielsen's "heuristics"
 - supplementary list of category-specific heuristics
 - competitive analysis & user testing of existing products
- Use violations to redesign/fix problems

Phases of Heuristic Evaluation

1) Pre-evaluation training

- give evaluators needed domain knowledge and information on the scenario
- 2) Evaluation
 - individuals evaluate and then aggregate results
- 3) Severity rating
 - determine how severe each problem is (priority)
 - can do this first individually & then as a group
- 4) Debriefing
 - discuss the outcome with design team

How to Perform Evaluation

- At least two passes for each evaluator
 first to get feel for flow and scope of system
 - second to focus on specific elements
- If system is walk-up-and-use or evaluators are domain experts, no assistance needed
 - otherwise might supply evaluators with scenarios
- Each evaluator produces list of problems
 - explain why with reference to heuristic or other information
 - be specific and list each problem separately

Severity Rating

- Used to allocate resources to fix problems
- Estimates of need for more usability efforts
- Combination of
 - frequency
 - impact

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- persistence (one time or repeating)
- Should be calculated after all evals. are in
- Should be done independently by all judges

Severity Ratings (cont.)

- 0 don't agree that this is a usability problem
- 1 cosmetic problem

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- 2 minor usability problem
- 3 major usability problem; important to fix
- 4 usability catastrophe; imperative to fix

Debriefing

- Conduct with evaluators, observers, and development team members
- Discuss general characteristics of UI
- Suggest potential improvements to address major usability problems
- Dev. team rates how hard things are to fix
- Make it a brainstorming session
 little criticism until end of session

Severity Ratings Example

1. [H1-4 Consistency] [Severity 3][Fix 0]

The interface used the string "Save" on the first screen for saving the user's file, but used the string "Write file" on the second screen. Users may be confused by this different terminology for the same function.

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