

cs465

principles of user interface design, implementation and evaluation

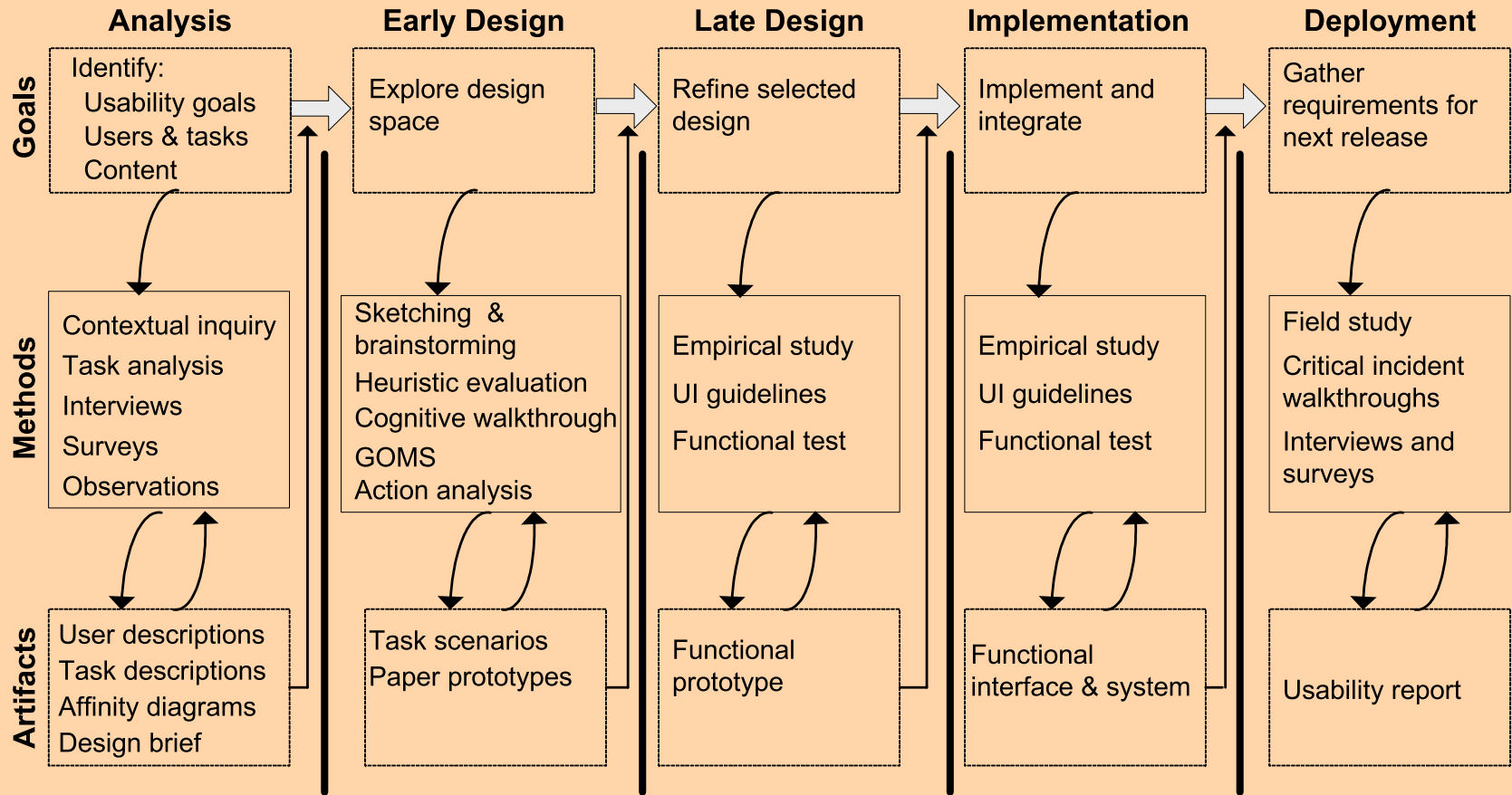
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24. September 2008

1. Heuristic Evaluation
2. Cognitive Walkthrough
3. Discuss Homework 3
4. Discuss Projects

Heuristic evaluation is a usability inspection technique developed by Jakob Nielsen.

The original set of heuristics was derived empirically from an analysis of 249 usability problems (Nielsen, 1994). -Preece et al

Context of TCUID - Task Centered User Interface Design



1. Validity of system status

- Are users kept informed about what is going on?
- Is appropriate feedback provided within reasonable time about a user's action?

2. Match between system and the real world

- Is the language used at the interface simple?
- Are the words, phrases and concepts used familiar to the user?

3. User control and freedom

- Are there ways of allowing users to easily escape from places they unexpectedly find themselves in?

4. Consistency and standards

- Are the ways of performing similar actions consistent?

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

- Are user messages helpful?
- Do they use plain language to describe the nature of the problem and suggest a way of solving it?

6. Error prevention

- Is it easy to make errors?
- If so, where and why?

7. Recognition rather than recall

- Are objects, actions and options always visible?

8. Flexibility and efficiency of use

- Have accelerators (i.e. shortcuts) been provided that allow more experienced users to carry out tasks more quickly?

9. Aesthetic and minimalist design?

- Is any unnecessary and irrelevant information provided?

10. Help and documentation

- Is help information provided that can be easily searched and easily followed?

These heuristics are too general in some cases

What about web pages? Ambient displays? Ubiquitous computing applications?

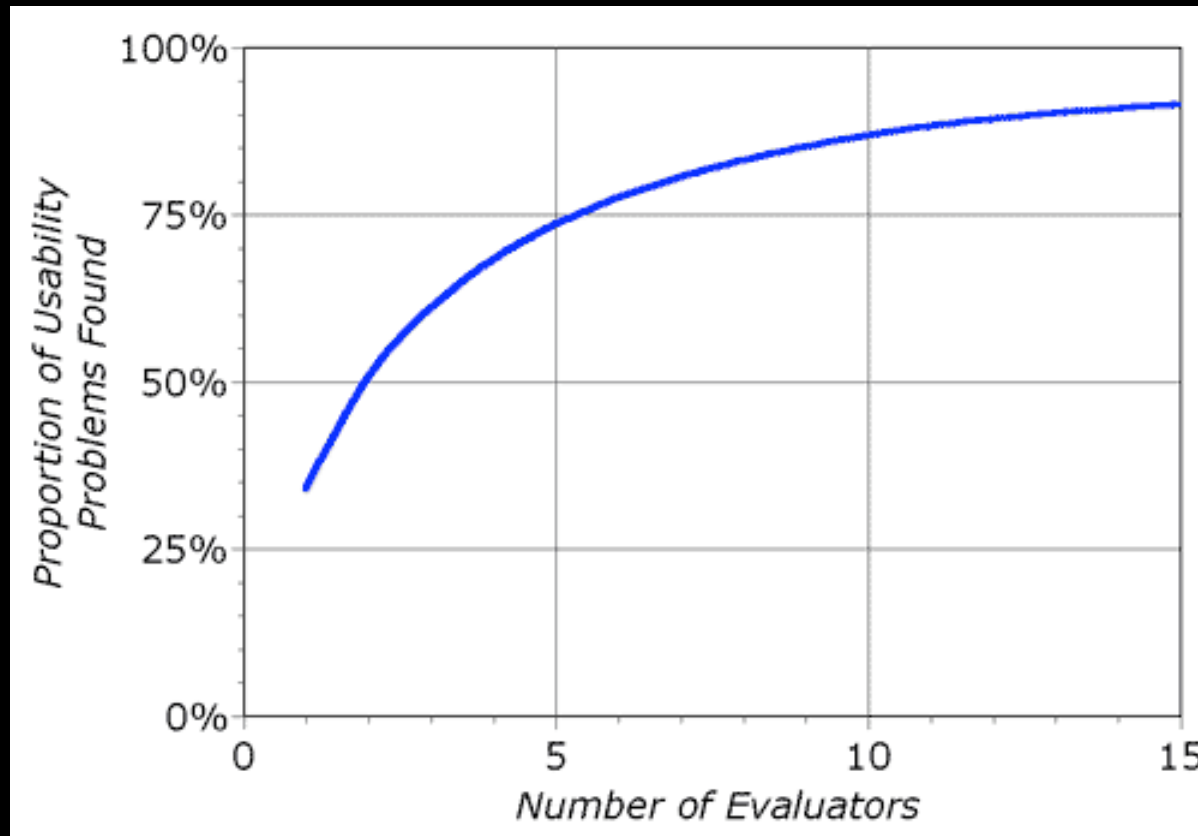
Strong need for heuristics that are tailored to specific products.

- **High quality content**
- **Often updated**
- **Minimal download time**
- **Ease of use**
- **Relevant to users' needs**
- **Unique to the online medium**
- **Netcentric corporate culture**

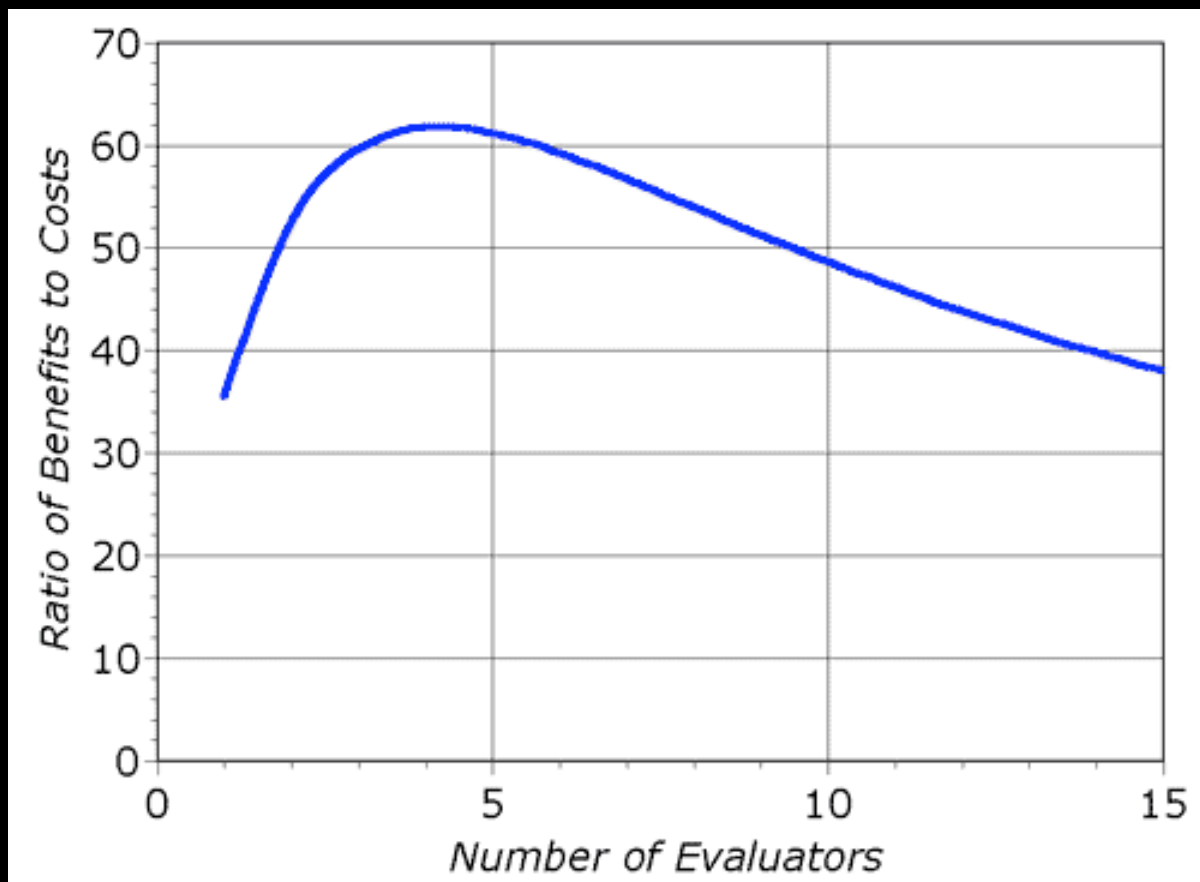
- Nielsen 1999 for commercial websites

- Heuristic evaluation enables designers to evaluate an interface *without* users
 - inspection, guided by a set of guidelines
- Economical technique to identify usability issues early in the design process
 - no implementation or users required
 - can be performed on existing interfaces

How many users?



Empirical evidence suggests that five evaluators usually identify around 75% of total usability problems.



- Helps identify usability problems in UI
 - [Nielsen and Mohlich, 1990]
- HE = heuristics + procedure
 - about 5 evaluators
 - each evaluates UI against heuristics
 - rate severity of each issue
 - aggregate results
 - devise design solutions

Phases of Evaluation

- Briefing
 - teach to evaluators; ensure each person receives same briefing.
 - become familiar with the UI and domain
- Evaluation period
 - compare UI against heuristics
 - spend 1-2 hours with interface; minimal 2 interface passes
 - take notes
- Debriefing session
 - Prioritize problems; rate severity
 - aggregate results
 - discuss outcomes with design/development team

Severity Ratings

0 – this is not a usability problem

1 – cosmetic problem only

2 – minor usability problem

3 – major usability problem

4 – usability catastrophe; imperative to fix

Combination of frequency and impact

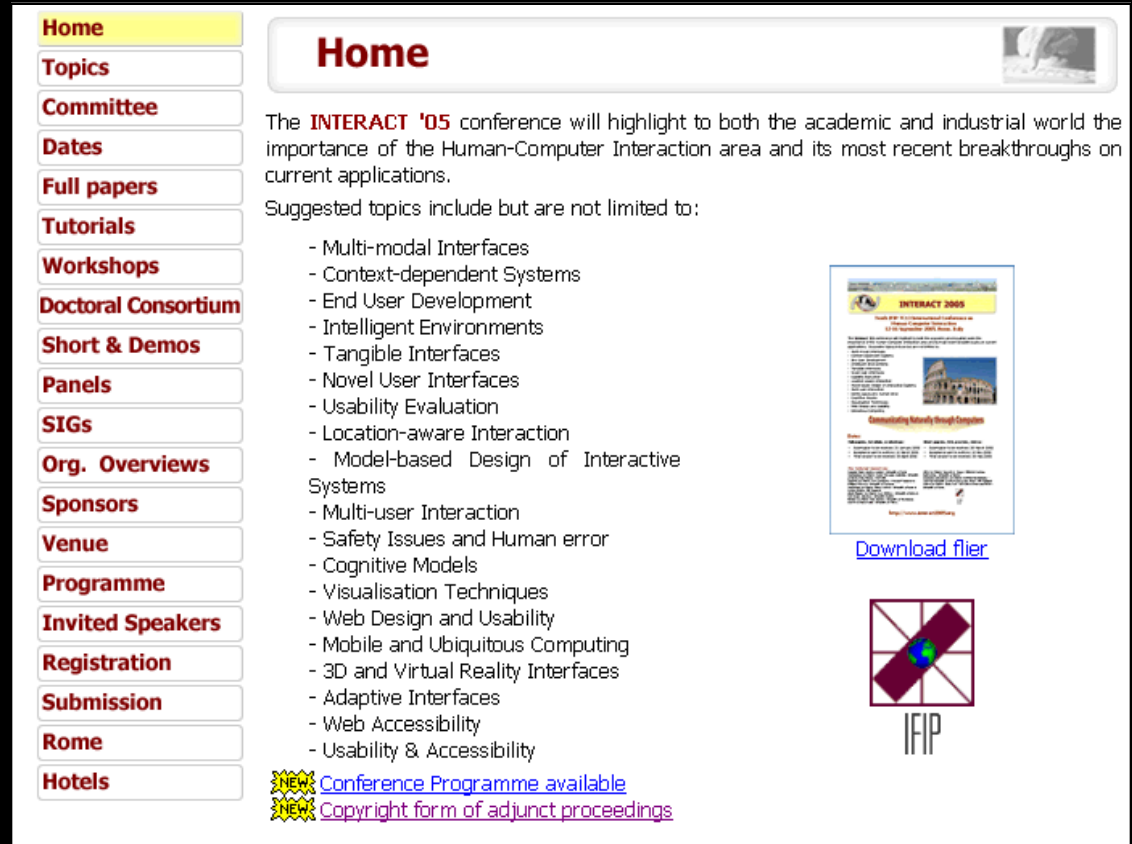
Examples

Simple and Natural Dialog

- Derive from user's conceptual model
- No irrelevant or rarely relevant info.
 - “less is more” attitude
- Order of dialog should match logical order of the task

Does navigation reflect logical order of tasks?

Is flier necessary on the home page?



The screenshot shows the home page of the INTERACT '05 conference website. On the left is a vertical navigation menu with buttons for Home, Topics, Committee, Dates, Full papers, Tutorials, Workshops, Doctoral Consortium, Short & Demos, Panels, SIGs, Org. Overviews, Sponsors, Venue, Programme, Invited Speakers, Registration, Submission, Rome, and Hotels. The 'Home' button is highlighted in yellow. The main content area features a 'Home' header, a paragraph about the conference's focus on Human-Computer Interaction, a list of suggested topics, a 'Download flier' link, and the IFIP logo. Two 'NEW' starburst icons highlight new announcements: 'Conference Programme available' and 'Copyright form of adjunct proceedings'.


Home

The **INTERACT '05** conference will highlight to both the academic and industrial world the importance of the Human-Computer Interaction area and its most recent breakthroughs on current applications.

Suggested topics include but are not limited to:

- Multi-modal Interfaces
- Context-dependent Systems
- End User Development
- Intelligent Environments
- Tangible Interfaces
- Novel User Interfaces
- Usability Evaluation
- Location-aware Interaction
- Model-based Design of Interactive Systems
- Multi-user Interaction
- Safety Issues and Human error
- Cognitive Models
- Visualisation Techniques
- Web Design and Usability
- Mobile and Ubiquitous Computing
- 3D and Virtual Reality Interfaces
- Adaptive Interfaces
- Web Accessibility
- Usability & Accessibility

Download flier



NEW [Conference Programme available](#)

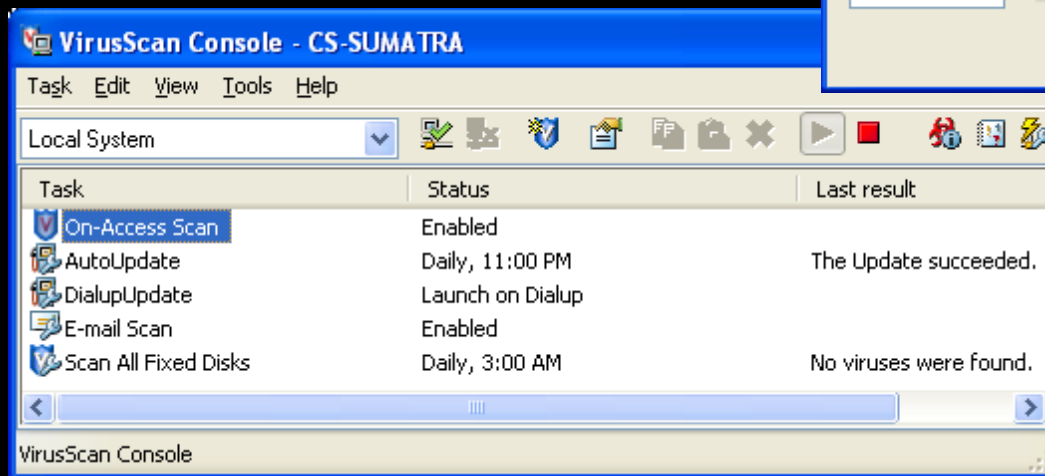
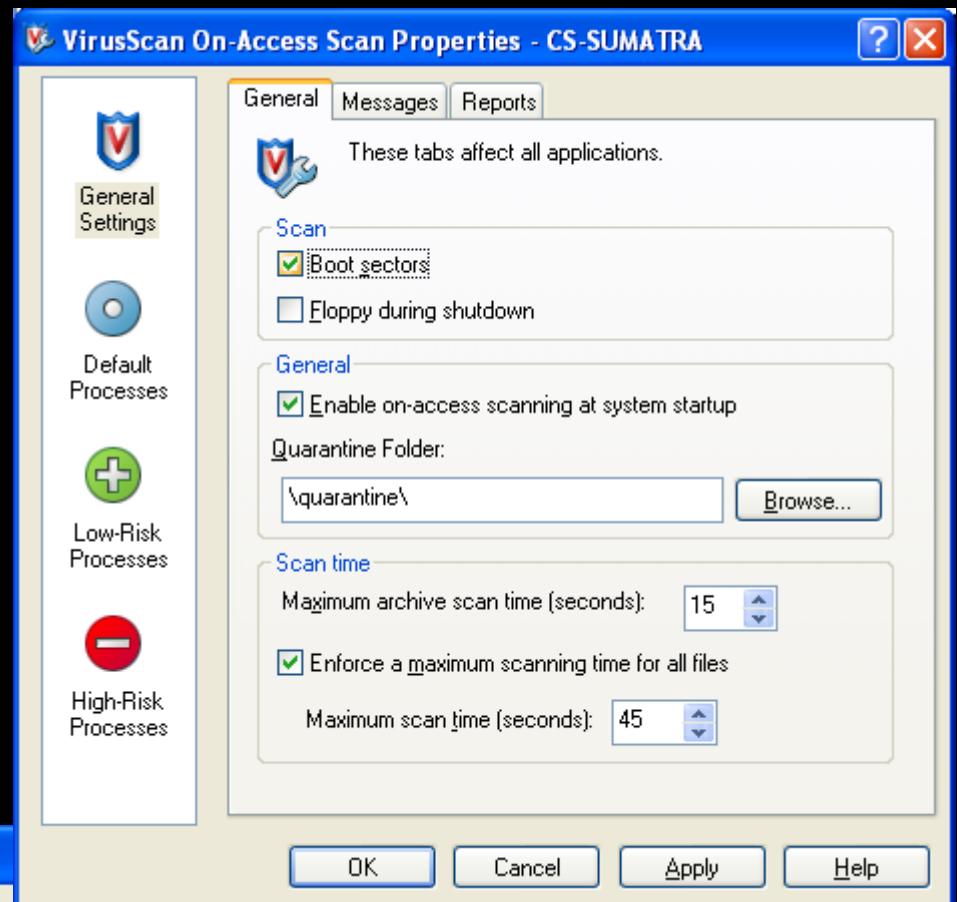
NEW [Copyright form of adjunct proceedings](#)

Task: Set scan properties

Effective order?

Simple dialog?

Natural dialog?



Speak the User's Language

- Words and concepts from user's world
- Don't use specific engineering terms
- Focus on user's point of view

Results - Microsoft Internet Explorer

Address: its.cfm?coll=Portal&dl=Portal&CFID=431431&CFTOKEN=82708146

Search: [\[Advanced Search\]](#) [\[Search Help/Tips\]](#)

Nothing Found

Your search for **[interface user evaluation heuristic]** did not return any results.

You may also revise it and try your search again below or click advanced search for more options.

The following characters have specialized meaning:

Special Characters	Description
, () [These characters end a text token.
= > < !	These characters end a text token because they signify the start of a field operator. (! is special: != ends a token.)
` @ \Q < { [!	These characters signify the start of a delimited token. These are terminated by the end character associated with the start character.



Minimize User Memory Load

- Show range or sample inputs
- Use generic actions across application
- Don't make user remember things between actions
- Leave information on screen until not needed

Fidelity: Customer Service: Find a Form - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Favorites Media Search Print Mail Stop

Address http://personal.fidelity.com/accounts/services/findaform.shtml Go

Links ABC News CNN MarketWatch Merriam-Webster OnLine Google

Fidelity.com LOGIN/LOGOUT Home | Open an Account | Help SEARCH GET QUOTE

My Fidelity Accounts & Trade Quotes & Research Planning & Retirement Products Customer Service

Sunday, September 21, 2003

Customer Service
Find a Form

List By Category

- [Most Requested](#)
- [Alphabetical List](#)
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Find a Form >

List By Category

Use Find a Form to quickly locate forms and instructions in the Customer Service area. You can search by category, most requested, or alphabetically by selecting your choice on the left.

- [New Account Applications](#)
- [Account Features](#)
- [Retirement Account Forms](#)
- [Moving Money To/From Your Fidelity Account](#)
- [Account Mailings](#)
- [Making Changes to Your Account](#)
- [Tax and Legal Forms](#)
- [Giving Access to Someone Other Than Yourself](#)
- [Stock Plan Services Forms](#)
- [College Investing Plan \(529\) Forms](#)
- [Portfolio Advisory ServiceSM Forms](#)
- [Annuity Forms](#)

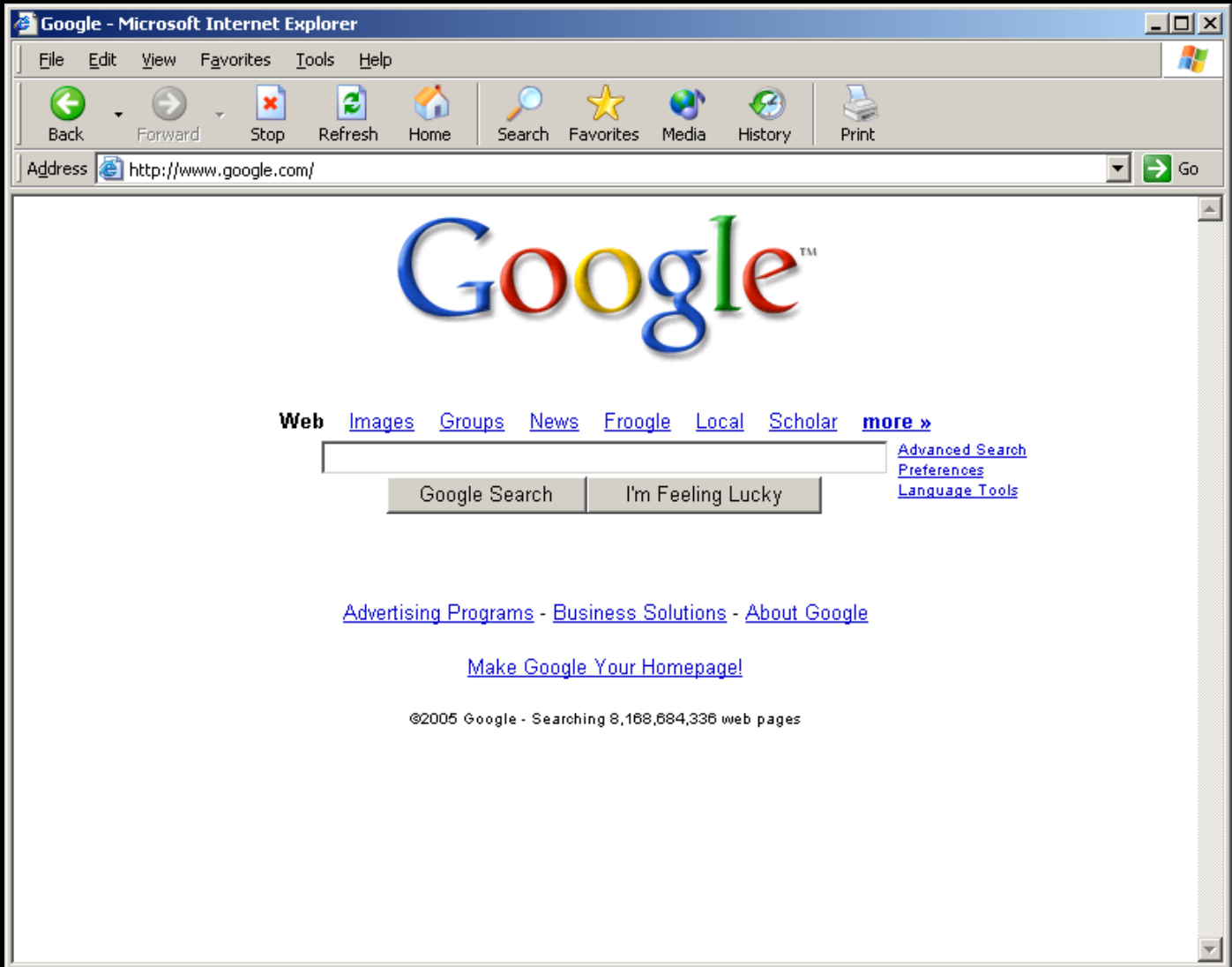
New Account Applications

Many new account applications can be completed online. In some situations you can [open your brokerage account](#) online and receive your account number today. If you prefer to apply by mail,

Internet

Be Consistent

- Consistent with user's mental model
- Consistent with tasks
- Consistent with experience/expectations
- Consistent within and between apps
- Similar information in similar locations
- Use the same action sequence in different parts of the interface to get similar results



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Address http://www.wellsfargoadvantagefunds.com/html/welcome/search.htm

Go

WELLS FARGO ADVANTAGE FUNDS



Home About Us Press Room Policies & Conditions Fund Holdings Search

Individual Investors Search

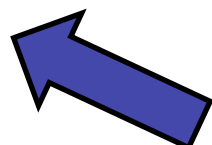
Find results

with **all** of the words 10 results

with the **exact phrase**

with **any** of the words

without the words



This Web site is accompanied by [current prospectuses](#) for the Wells Fargo Advantage FundsSM and a [current program description](#) for EdVest[®]. Consider the investment objectives, risks, charges and expenses of the investment carefully before investing. This and other information can be found in [current prospectuses](#) for the Wells Fargo Advantage Funds and a [current program description](#) for EdVest. Please read it carefully before investing.

NOT FDIC INSURED • NO BANK GUARANTEE • MAY LOSE VALUE

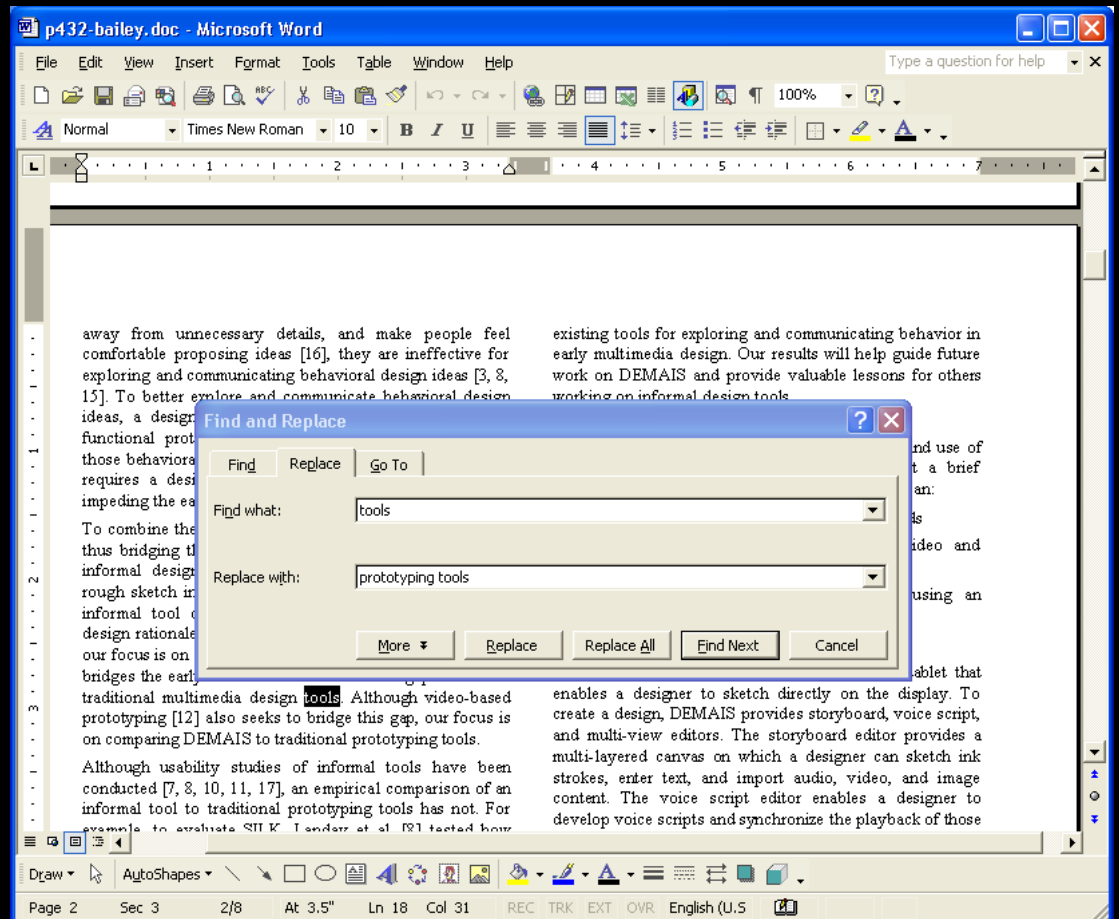
Provide Feedback

- User should clearly see effects of action
 - Obvious: do not hide or make results subtle
 - Immediate: within a few seconds
 - Valid: convey the right information
 - Persistent: show as long as it is needed
 - Speak the user's language
- Response times
 - want less than 500 ms
 - otherwise, use “reassurance” displays

Dialog box moves
out of the way

But...

How many more
changes and where?



Provide Clearly Marked Exits

- Don't trap users in a certain location
- Allow users to get back quickly and easily
 - support exploration
 - support undo consistently
 - support interruption of long-lived events

College of Engineering - University of Illinois at Urbana-Champaign - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Favorites Media Search Print Stop

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 Brian P Bailey

History Ctrl+H

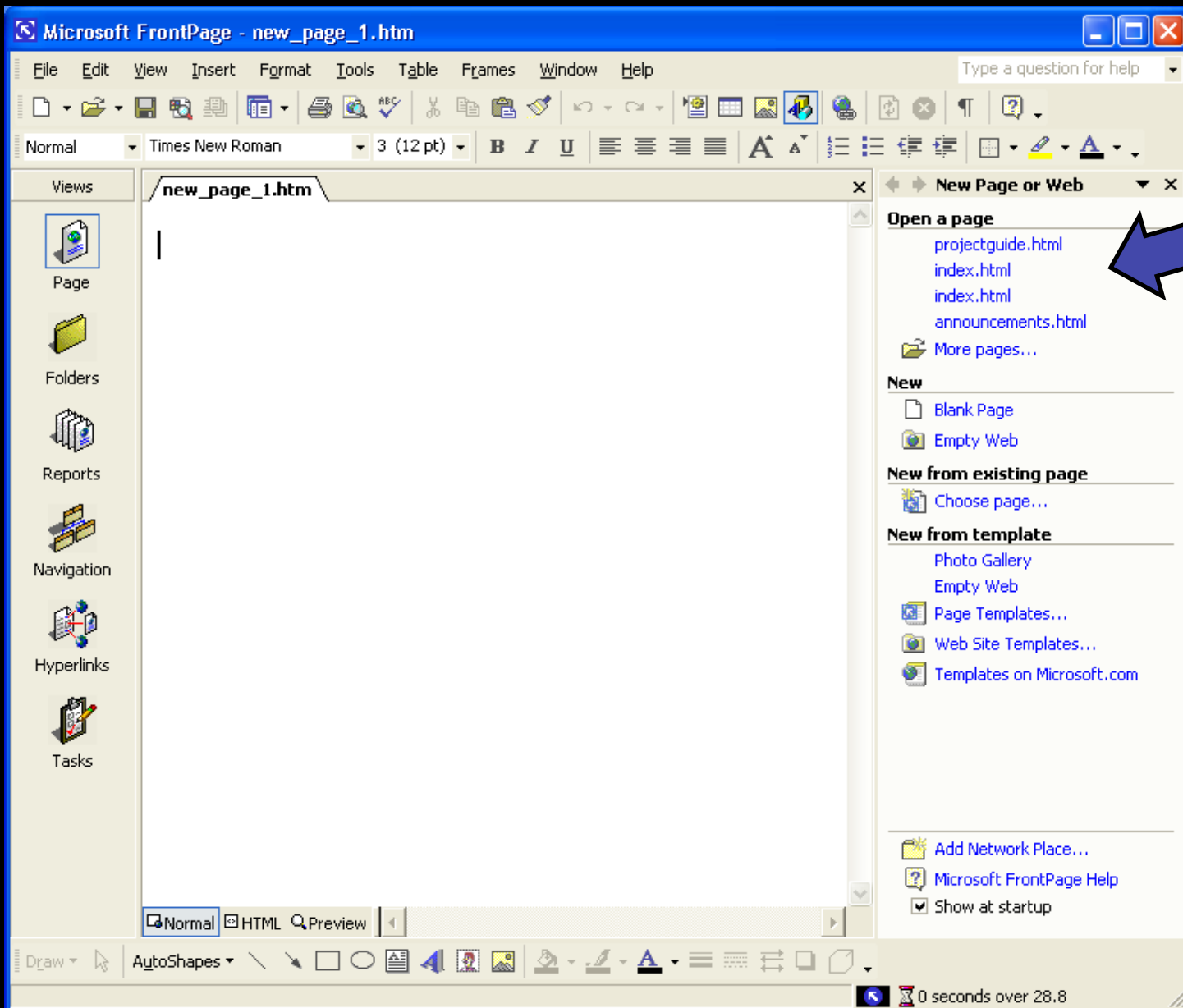
directory.php?alpha=c-d

CNN MarketWatch Merriam-Webster OnLine Google

David E.	Civil Engineering	Directory
Jonathan A.	Mechanical & Industrial Engineering	Directory
Michael I.	Civil Engineering	Directory
DAVIS, Wayne J.	General Engineering	Directory
Davis, Jay	Agricultural Engineering	Directory
Dawson, Joan	Bioengineering	Directory
de Sturler, Eric	Computer Science	Directory
Debevec, Paul T.	Physics	Directory
DeJong, Gerald F.	Computer Science	Directory
Dempsey, Barry J.	Civil Engineering	Directory
DeTemple, Thomas A.	Electrical and Computer Engineering	Directory
DeVor, Richard E.	Mechanical & Industrial Engineering	Directory
Dodd, Robert H.	Civil Engineering	Directory

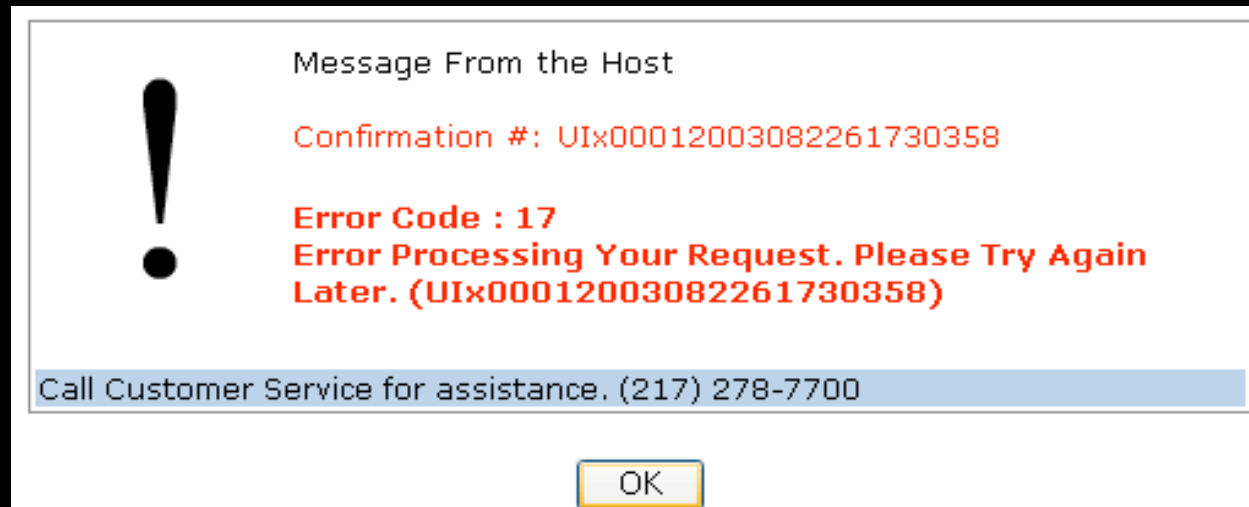
Provide Shortcuts

- Help experienced users avoid long dialogs or messages that they don't need
- Strategies include:
 - type- and click-ahead
 - keyboard shortcuts
 - good default values
 - macros and scripting
 - reuse/edit history



Provide Good Error Messages

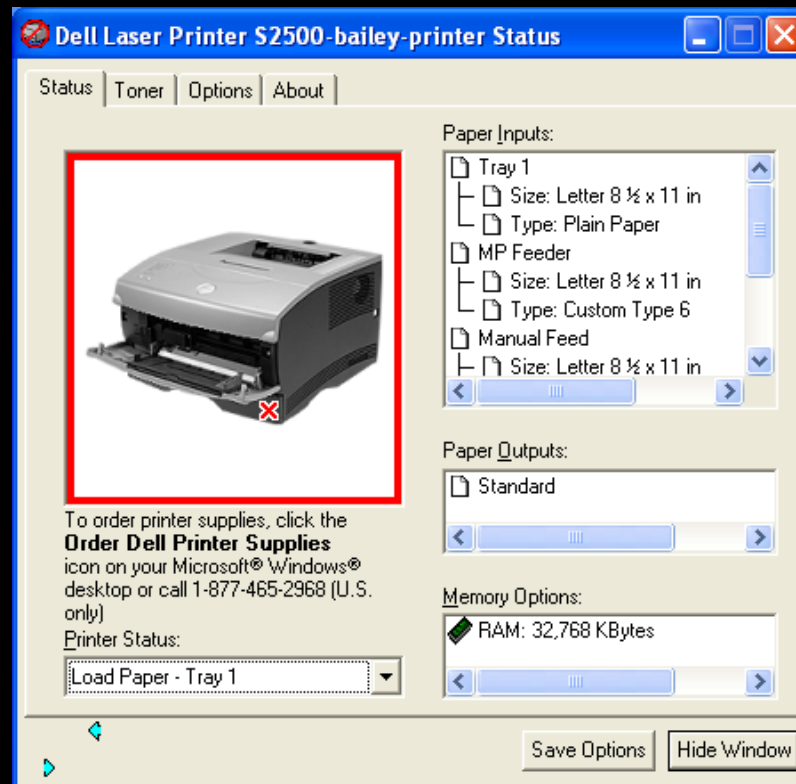
- Clear and in simple language
 - user can dig deeper to get obscure details
- State the problem / suggest solutions
 - give links to the solutions, if possible
- Use a positive, non-accusatory tone
- Graceful error behavior



UIECU - server error

Negative tone

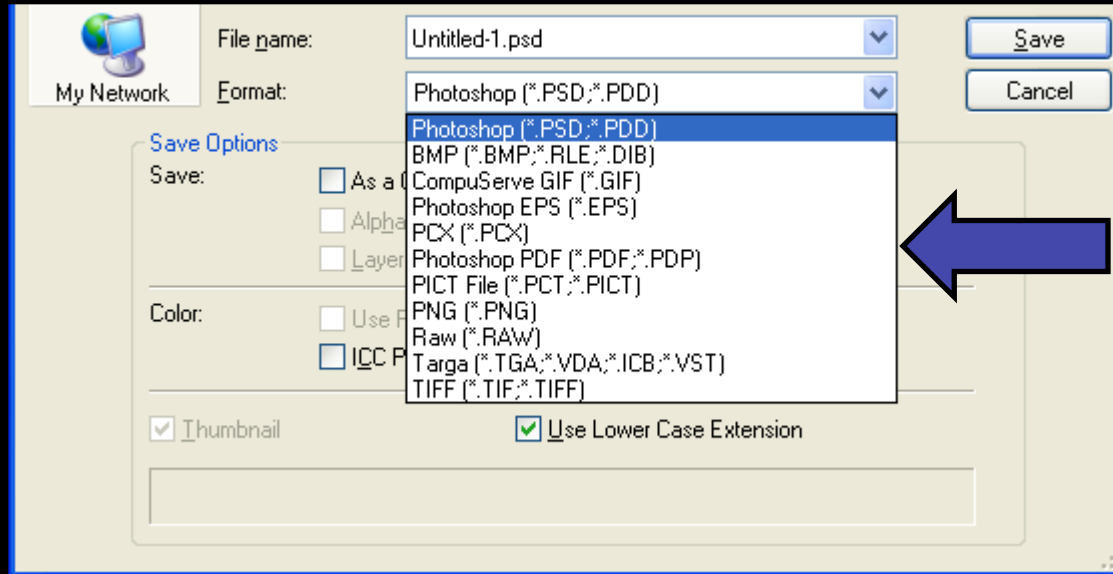
Useless error codes



Printer error - what's wrong?

Prevent Errors

- Scrutinize every error message
- Can the error be prevented?
 - allow recognition over recall when possible
 - confirm risky operations
 - avoid use of modes as much as possible
 - use clear status indicators
- Detect when error occurs
- Allow user to recover from the error



What happened to JPEG?

Help and Documentation

- Best if system can be used w/o manuals
 - but may not be possible
- Documentation should be
 - easy to search
 - focused on the user's task
 - list concrete steps to be carried out

Microsoft PowerPoint Help


Contents | Answer Wizard | Index

1. Type keywords
import;graphic;
Clear Search

2. Or choose keywords
access
activate
addition
aggregate
alignment
angle
animation

3. Choose a topic (20 found)
Troubleshoot drawing objects
Graphics file types and filters
Add a picture
Troubleshoot pictures
Add data to a chart
Troubleshoot clips
File formats for saving presentations
Modify clip art
Change the slide background
About changing the background
Reduce the file size of your pictures
About reducing a picture's file size
Troubleshoot tables

Reduce the file size of your pictures

1. Select one or more **pictures** in a file.
2. On the **Picture toolbar**, click **Compress Picture** .
3. Select the options you want.

Note Selecting the **Delete cropped areas of pictures** check box discards the parts of the picture that were hidden during **cropping**.

HE – Pros and Cons

- Pros
 - Very cost effective
 - Identifies many usability issues
- Cons
 - relies on interpretation of guidelines
 - guidelines may be too generic
 - needs more than one evaluator to be effective

Cognitive walkthrough involve simulating a user's problem-solving process at each step in the human-computer dialog, checking to see if the user's goals and memory for actions can be assumed to lead to the next correct action. –Nielsen and Mack, 1994

Why we use it

- Cognitive walkthrough enables a designer to evaluate an interface *without* users
 - a designer attempts to see the interface from the perspective of a user
- Low-investment technique to identify task-related usability issues early on
 - no implementation or users required
 - can be performed on existing interfaces

- Identify task-related problems before implementation
 - invest a little now, save a lot later
- Enables rapid iteration early in design
 - can do several evaluations of trouble points
- Evaluations are only effective if your team
 - has the right skill set
 - *wants to improve the design, not defend it*

Walkthrough Basics

- Imagine how well a user could perform tasks with your low-fidelity prototype
- Manipulate prototype as you go
 - evaluate choice-points in the interface
 - evaluate labels or options
 - evaluate likely user navigation errors
- Revise prototype and perform again

When to do the Walkthrough

- Have a low-fidelity prototype of the interface
- Know who the users are
- Have task descriptions
- Have scenarios designed to complete the task
 - you have a “functional” paper prototype
- Viable once the scenario and paper prototype are complete

What You Need

- Task descriptions
- Low-fidelity prototype with enough “functionality” for several tasks
- Evaluation team:
 - design team
 - design team and users together
 - design team and other skilled designers

For Each Action in a Task:

- Tell a story of why a user would perform it
- Critique the story by asking critical questions
 - is the control for the desired action visible?
 - will a user see that the control produces the desired effect?
 - will a user select a different control instead?
 - will the action have the effect that the user intends?
 - will a user understand the feedback and proceed correctly?

More on Questions

- Some extra questions can help
 - what happens if the user is wrong? Is there feedback to correct the error?
 - how would a user of <interface> react here?
- Questions help you see problems
 - they are a focus, not a blindfold

Walkthrough Pros

- Easy to learn
- Can perform early in the design process
- Questions assumptions about what a user may be thinking
- Helps identify controls obvious to the designer but not a user
- Helps identify difficulties with labels and prompts
- Helps identify inadequate feedback

Walkthrough Cons

- Is diagnostic, not prescriptive
- Focuses mostly on novice users
- Designers must put themselves in users mind
- Focus specifically on task-related issues
- The interactions are slower and not real
- Does not provide quantitative results

- A useful tool in conjunction with others

Walkthrough Example

- I have a library book that needs to be returned today. To help me remember, I want to set a reminder on my PDA. The reminder should display and beep at 5:00pm to remind me to return the book.
- Let's walkthrough this task on my PDA and identify usability issues, if any

Walkthrough Example, cont.

- Will a user try to produce the effect that the action has?
- Will a user see the control for the action?
- Will a user see that the control produces the desired effect?
- Will a user select a different control instead?
- Will a user understand the feedback to proceed correctly?

Exercises

- Compare and contrast a cognitive walkthrough with a heuristic evaluation
- Apply Heuristic Evaluation to an existing [electronic voting interface](http://www.vtintl.com/new/demo/)
<http://www.vtintl.com/new/demo/>