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Cognitive Walkthrough

C. Wharton, J. Rieman, C. Lewis and P. Polson, The Cognitive Walkthrough Method: A Practitioner's Guide, in J. Nielsen and R. Mack (eds.), Usability Inspection Methods, John Wiley & Sons, Inc., New York, 1994, Ch. 5.

Information Processing Theory of Human-Computer Interaction

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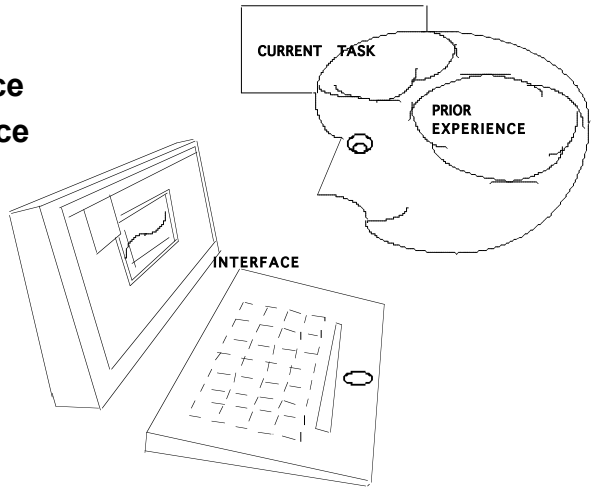
- Users' Tasks
- Users' Experience
- System's Interface



Functionality Isn't Enough

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- For an interface to be a success, it must provide the right functionality, at the right time, in the right place, and in the right form from the user's point of view.
- Such interfaces are called usable.
- Example: if we are designing an ATM, we should be able to justify each user action:
  - Insert card?
  - Enter PIN?
  - Press Quick Cash key?
  - Press Okay?
  - Remove card?
  - Remove money?
  - Remove receipt?

Cognitive Walkthrough Overview

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- The cognitive walkthrough is a way to test the usability of interactive software.
- The cognitive walkthrough focuses on
  - Task(s)
  - Interface
  - Learnability (one kind of usability)
- The cognitive walkthrough may be used
  - without "real" users
  - before a system is implemented
  - with prototypes or mockups

Cognitive Walkthrough Procedure

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- Define the inputs to the walkthrough.
- Convene the analysis.
- Walk through the action sequences for each task.
- Record critical information.
- Revise the interface to fix the problems.

Performing the Cognitive Walkthrough - Pt. 1

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- Define the inputs to the walkthrough.
  - Identification of the users.
  - Sample tasks for evaluation.
  - Description (mockups) or implementation of the interface.
  - Action sequences (scenarios) for completing the tasks.
- Convene the walkthrough.
  - The facilitator maintains the pace of the discussion.
  - A scribe keeps two lists:
    - » problems (and suggested solutions)
    - » assumptions (about tasks and users' experience)
  - The participates walk through (discuss) the tasks with respect to the interface (mockups) and action sequences (scenarios); they try to tell a credible story.

Performing the Cognitive Walkthrough - Pt. 2

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- The participants walk through (discuss) the tasks with respect to the interface (mockups) and action sequences (scenarios); they try to tell a credible story.
  - What is the user trying to achieve at this point? (What's their "goal"?) Why is it their goal?
  - What actions are obviously available in the interface?
  - Does the label for the correct action match the user's goal?
  - If the user performs the correct action, will they get good feedback and not try to undo or redo the action?

Performing the Cognitive Walkthrough - Pt. 3

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- Record critical information.
  - The credible success (or failure) story.
  - Assumptions (about tasks and users' experience).
  - Problems (and suggested solutions)
- Revise the interface to fix the problems.

"Finding Times Square" Example Getting Ready

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- **Users**
  - The users are the average tourists visiting New York City and want to use the subway directions application (http://www.brail.org/transit/nycall.html) to be able to find their way between common stops, such as Central Park and Times Square.
- **Task**
  - The user (a tourist) wants to get directions from Central Park (96th Street) to Times Square.
  - This task is taken from a real user's experience.
- **Interface (Mockups)**
  - We have the existing Web application and several Web browsers.
  - For this walkthrough, we will use the Safari Browser.
- **Action Sequences (Scenarios)**
  - Jump to http://www.brail.org/transit/nycall.html
  - Click "yes" to "Do you want to proceed?"
  - Select a resolution, e.g., "Small (600 x 400)"
  - Expand window, drag and release corner
  - Select 96th Street Stop
  - Select Times Square Stop

Action: Jump to http://www.brail.org/transit/nycall.html

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- **What's the user's goal, and why?**
  - The user (a tourist) wants to get directions from Central Park (96th Street) to Times Square.
  - This is a common question for tourists.
- **Is the action obviously available?**
  - Users have to be familiar with Web interfaces and applications, but many people use Web browsers.
  - If the user has the URL and experience with the Web browser, the action should be straightforward.
- **Does the action or label match the goal?**
  - Again, assuming the user knows the URL, there is a good match here.
- **Is there good feedback?**
  - Besides Safari's progress bar, the page loads quickly.
  - The new page's title and content clearly reiterates the selected action.

Screen before Action:
Jump to http://www.brail.org/transit/nycall.html

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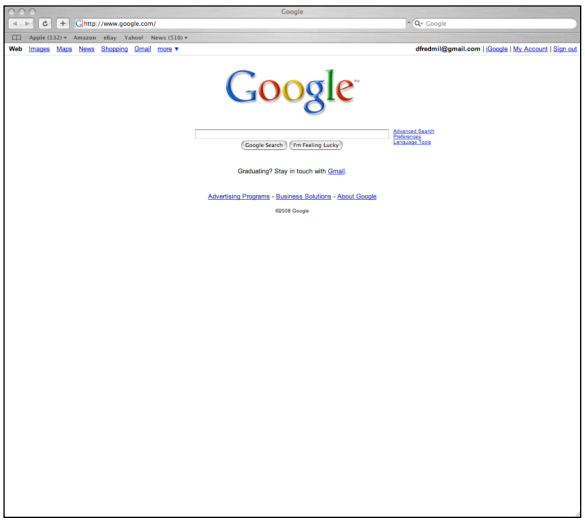

Screen after Action:
Jump to http://www.brail.org/transit/nycall.html

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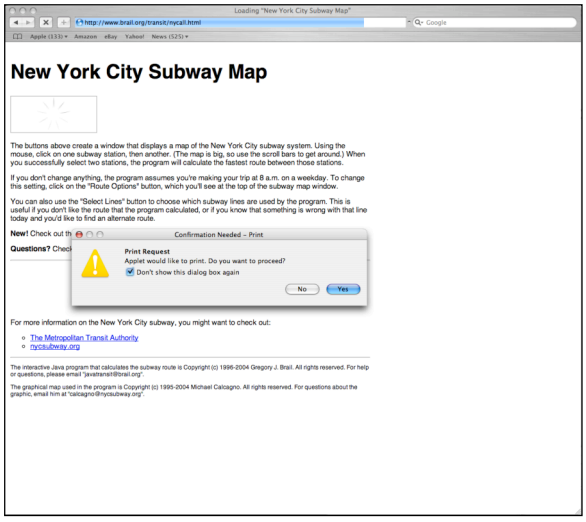

Action: Click “yes” to “Do you want to proceed?”

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- What’s the user’s goal, and why?
  - The user (a tourist) wants to get directions from Central Park (96th Street) to Times Square.
  - This is a common question for tourists.
  - This goal was unsatisfied by the previous action.
- Is the action obviously available?
  - A pop-up dialog box makes the action unavoidable, at least the selection of yes or no.
- Does the action or label match the goal?
  - The action does not match the goal at all. The goal is to get directions and has nothing to do at this point with printing, yet the application is mentioning printing.
  - An experienced user would recognize this sort of oddity as incidental to an action and without much regard, click “yes.” After all, they do want to “proceed.”
- Is there good feedback?
  - Besides Safari’s progress bar and an animated busy icon, the dialog box disappears and the next page loads quickly.
  - The new page’s title and content clearly reiterates the selected action.

Screen after Action: Click “yes” to “Do you want to proceed?”

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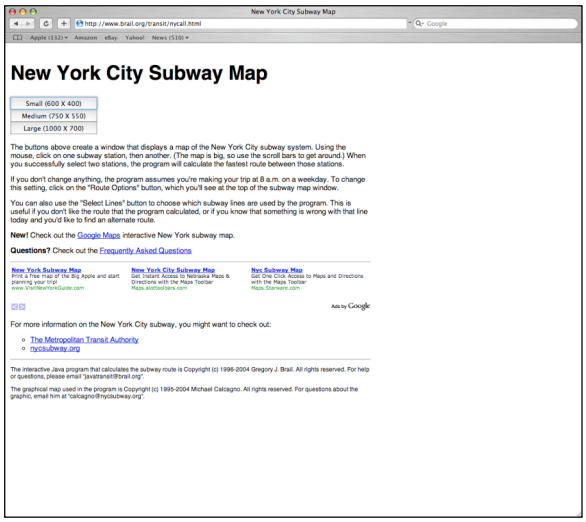

Action: Select a resolution, e.g., “Small (600 x 400)”

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- What’s the user’s goal, and why?
  - The user (a tourist) wants to get directions from Central Park (96th Street) to Times Square.
  - This is a common question for tourists.
  - This goal was unsatisfied by the previous action.
- Is the action obviously available?
  - Three resolutions for maps are plainly visible.
  - The listing is at the top of the page.
  - Users of Web browsers should recognize the selection as a button that is selectable.
- Does the action or label match the goal?
  - The action does not match the goal exactly but there is some relevance. The users are thinking about directions, so viewing a map is not unrelated.
  - Users would need some experience with different hardware resolutions to make a reasoned selection.
- Is there good feedback?
  - The new page pops up instantly.

Screen after Action: Select a resolution, e.g., “Small (600 x 400)”

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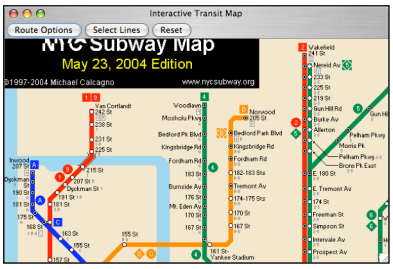

Action: Expand window, drag and release corner

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- What's the user's goal, and why?
  - The user (a tourist) wants to get directions from Central Park (96th Street) to Times Square.
  - This is a common question for tourists.
  - This goal was unsatisfied by the previous action.
- Is the action obviously available?
  - The corner is decorated with an affordance that might help users recognize the action.
- Does the action or label match the goal?
  - Not really. The locations in question are not visible on the map. A user experienced with windows might realize that they could drag and release the corner to expand the window.
  - On the Safari browser, no scroll bars appeared (though they did on Explorer).
- Is there good feedback?
  - Depending on the speed of the system, the screen expands immediately and the locations in question become visible.

Screen after Action: Expand window, drag and release corner

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Action: Select 96th Street Stop

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- What's the user's goal, and why?
  - The user (a tourist) wants to get directions from Central Park (96th Street) to Times Square.
  - This is a common question for tourists.
  - This goal was unsatisfied by the previous action.
- Is the action obviously available?
  - Again, if the user has experience with interactive applications, it is not unreasonable for them to recognize the subway stop icon as a button to depress.
- Does the action or label match the goal?
  - The action exactly matches the goal. (The selectable icon is right at the subway stop).
- Is there good feedback?
  - After selection (click) the stop icon blinks on.

Screen after action: Select 96th Street Stop

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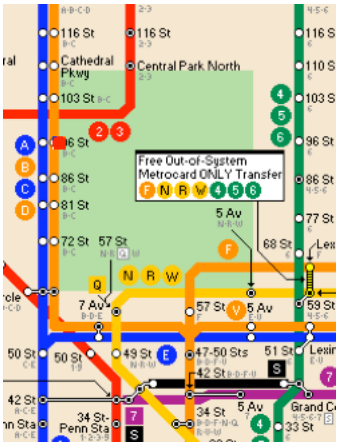

Action: Select Times Square Stop

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- What's the user's goal, and why?
  - The user (a tourist) wants to get directions from Central Park (96th Street) to Times Square.
  - This is a common question for tourists.
  - This goal was unsatisfied by the previous action.
- Is the action obviously available?
  - Again, if the user has experience with interactive applications, it is not unreasonable for them to recognize the subway stop icon as a button to depress.
- Does the action or label match the goal?
  - The action fails to match the user's goal unless they know which stop is Times Square.
- Is there good feedback?
  - After selection (click) the stop icon blinks on, the source and destination are connected by a path, and the directions appear.

Screen after Action: Select Times Square Stop

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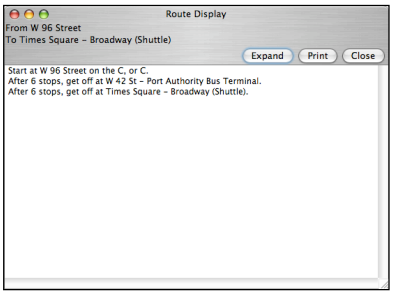

Example Wrapup

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- Jump to http://www.brail.org/transit/nycall.html
  - The users need to know the URL. This is a big assumption. Certainly its relevance in Google searchers should be checked.
- Allow application to print, click "ok"
  - This action should be programmed around. This is neither the users' goal at the time, nor would an average user understand the question.
- Select a resolution, e.g., "Small (600 x 400)"
  - Again, this is an action that assumes a great deal of familiarity with computer systems. Since the actual selection makes little difference, perhaps the choice could be eliminated.
- Expand window, drag and release corner
  - Some typical scrolling option should be supported in addition to the option of enlarging the window. Loss of scrolling under certain browsers should be explored as a bug.
- Select 96th Street Stop
  - This action matches the user's goal and has good feedback. It's a success!
- Select Times Square Stop
  - Assuming the user knows exactly which stop is Times Square, this action is also a success.
  - If users are not familiar with what attractions are at which stops, the map could be augmented with attraction identifiers. Having streets listed may also be a good option (and some competing applications do show streets as well as subway stops).
  - Although beyond the scope of the usability feature analysis, it seems the returned data giving the directions is ambiguous. The natural language / explanation generator algorithm needs to be tested and improved.

Final Comments

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- Goals, objectives, and meanderings …
  - The cognitive walkthrough is framed in terms of users having a goal always.
  - Goals may be interpreted liberally for purposes of evaluating interfaces. E.g., "passing time with a fun application on the Web" is acceptable as a goal. (This is an open research area).
- User interfaces versus information interfaces
  - Traditional "user interfaces" consist of a workspace and pull down menus. Many visual interfaces allow action through the representation in the workspace, allowing more of an "information interface." (This is just a note on terminology).
- Larger scale walkthroughs
  - The example in this lecture followed only one goal.
  - More complex tasks would consist of goals and subgoals.