WALKTHROUGHS: EFFICIENT COLLABORATIVE TESTING

How can you test the usability of a user interface design before you write the software or build a prototype? The usability walkthrough may be just the tool for you, as Randolph Bias describes in the following essay. At IBM-Austin, Bias uses this method to evaluate seven panels, which may include pull-down menus, dialogue boxes, palettes, and other interface elements. Bias is an advisory human factors scientist in the Personnel Systems Programming Center at IBM-Austin, where he provides early usability support for user interface development.

IN SOFTWARE DEVELOPMENT, A USABILITY WALKTHROUGH IS A SYSTEMATIC REVIEW OF A DESIGN ON PAPER. YOU CAN ANSWER MANY DESIGN QUESTIONS EFFICIENTLY WITH USABILITY WALKTHROUGHS. IS THERE A LOGICAL SEQUENCE THROUGH THE SCREEN PANELS? IS THE SEQUENCE DISCERNIBLE BY THE USER FROM THE INFORMATION IN THE INTERFACE ALONE? IS EACH PANEL USEABLE? ARE THE PANELS CONSISTENT?

USABILITY WALKTHROUGHS HAVE BEEN IN THE HUMAN FACTORS PRACTITIONER’S TOOL CHEST FOR MANY YEARS, PROVIDING USABILITY DATA ON TASKS FOR WHICH NO SIMULATION OR PROTOTYPE IS AVAILABLE. THEY ALSO ARE A FORUM FOR A STRUCTURED DISCUSSION OF THE USABILITY OF PANELS AND PANEL SEQUENCES.

DOES SUCH A LOW-TECH TECHNIQUE HAVE A ROLE IN THIS AGE OF RAPID PROTOTYPING? AT IBM-AUSTIN, WE HAVE FOUND THAT A MODIFICATION OF THIS TECHNIQUE IS IDEALLY A VALUABLE SUPPLEMENT TO ONLINE PROTOTYPE TESTING.

MODIFIED APPROACH. THE PRACTICE OF STEPPING THROUGH HARD COPY PANELS DATES FROM THE EARLY DAYS OF USER INTERFACE DESIGN. WE MODIFIED THE TRADITIONAL WALKTHROUGH METHOD TO IMPROVE TESTING EFFICIENCY AND IN THE PROCESS HAVE REAPED REWARDS BEYOND ADDITIONAL EFFICIENCY.


PREPARED MATERIALS. WE GIVE PARTICIPANTS WRITTEN RULES FOR THE WALKTHROUGH THAT ASK THEM TO INQUIRE THE ROLE OF THE USER, WRITE ON THE PANELS WHAT ACTIONS THEY WOULD TAKE IN THE TASK AND ANY ADDITIONAL COMMENTS, REFRAIN FROM GOING AHEAD TO OTHER PANELS UNTIL THEY ARE TOLD, AND HOLD DISCUSSION ON EACH PANEL UNTIL THE WALKTHROUGH ADMINISTRATOR CALLS FOR IT. WE ASK PARTICIPANTS TO WRITE THEIR ACTIONS IN AS MUCH DETAIL AS POSSIBLE. INSTEAD OF WRITING “SELECT ITEM #3,” THEY ARE ENCOURAGED TO WRITE “PUSH THE DOWN ARROW KEY TWO TIMES THEN PUSH ENTER.”

FOR EACH TASK WE ARE GOING TO EXPLORE IN THE WALKTHROUGH, WE DEFINE A SCENARIO (ONE LINEAR PATH THROUGH THE INTERFACE) TO ACCOMPLISH THAT TASK, COMPLETE WITH THE DATA TO BE MANIPULATED. WE GENERATE HARD COPY OF THE PANELS AND PACKAGE THEM, ONE PANEL PER PAGE. EACH PARTICIPANT RECEIVES A PACKAGE, WHICH LETS THEM WRITE DIRECTLY ON THE PAGE WHAT ACTION THEY WOULD TAKE ON THAT PANEL TO PERFORM THE TASK.

THE TASK DESCRIPTIONS ARE SHORT, DIRECTIVE STATEMENTS OF EACH TASK AND INCLUDE ANY DATA THE USERS NEED (SUCH AS SYSTEM PARAMETERS).

BECAUSE THE USABILITY WALKTHROUGH IS USUALLY CONDUCTED EARLY IN THE DEVELOPMENT CYCLE, INFORMATION LIKE ON-LINE HELP AND/OR PRINTED DOCUMENTATION SOMETIMES IS NOT AVAILABLE. TO MAXIMIZE THE SIMILARITY OF THE TEST ENVIRONMENT TO THE REAL WORLD, WE SOMETIMES SIMULATE PRINTED DOCUMENTATION TO THE BEST OF OUR ABILITY, JUST FOR WALKTHROUGH PURPOSES. WE HAVE ALSO HAD DESIGNERS AND DEVELOPERS SERVE AS “LIVING PUBLICATIONS.” WHEN PARTICIPANTS HAVE QUESTIONS THEY WOULD NORMALLY TUNE TO THE DOCUMENTATION TO ANSWER, INSTEAD THEY ASK THE “LIVING PUBLICATIONS.”

SELECTING PARTICIPANTS. TO ASSEMBLE WALKTHROUGH PARTICIPANTS, WE CONSULT OUR PRODUCT AUDIENCE DESCRIPTIONS AND FIND USERS REPRESENTATIVE OF THE PROJECTED USER POPULATION. THESE REPRESENTATIVES ARE OUR GUESTS OF HONOR — THE DATA WE COLLECT
from them is the most important data we gather.

In our pluralistic walkthroughs, we also solicit the participation of key development people: architects, product designers, programmers, and publication writers. We believe this is a win-win situation: These technical experts provide support for the walkthroughs and they gain first-hand knowledge of the users' reactions to their product. Furthermore, having technical experts attend facilitates good design and shared ownership. Collaborative, on-the-fly redesign is a welcome and not uncommon benefit of this technique.

We human factors professionals play a role in the walkthrough beyond an administrative one. We help express the representative users' comments as cogent suggestions that will help guide the developers toward a particular usability improvement. We also act as user advocates, preventing the technical experts from explaining away their concerns.

**A GROUP ACTIVITY.** The walkthrough is a group activity. Users are given instructions, ground rules, a task description, and a scenario packet. A technical expert then gives a brief overview of key concepts, simulating the written overview that would accompany the ultimate product.

Next participants are asked to write on the hard copy of the first panel, the action they would take to perform the task. After all the users have written their independent responses on the first panel, we discuss the panel. The walkthrough administrator first tells what the "right" actions are and the users then tell what their responses were. Discussion of potential usability problems ensue.

The reason we ask for written responses first followed immediately by user discussion is so we can collect, in a single session: data on the actual actions taken by representative users (without their being biased by the technical experts); data on the problems the representative users perceive; and data on the opinions of usability experts. Although we don't always take the time to derive a solution to every identified usability problem, the presence of the various participants creates a synergy that often leads to some creative, collaborative solutions.

After the first panel has been discussed all users turn the page and the process is repeated for the second panel, and so forth.

Typically, when an on-line simulation is available, we use it. We also will use a simulation in a walkthrough in parallel with hard copy to display some generic screens. Although the screens may not match the hard-copy panels exactly, the simulation gives the user a feel for what the panels look like, monitors and conveys some information (like color and cursor movement) the hard copy can't.

At the end of each task scenario, participants complete a questionnaire about the usability of various aspects of the interface they have just seen.

**LIMITATIONS.** Although they do give you an early, systematic look at the user interface, usability walkthroughs do have some limitations. It's a little awkward to require the group to go as slow as the slowest respondent. It's hard for the participants to get an overall view of the flow when they are asked to methodically step through the panels one at a time. Finally, you can't simulate all actions in a walkthrough like this—users can't explore, browse, and change paths as they might on-line. (We could produce multiple branches of a simulated interface, with separate packages for each branch, but this would be impractical.)

These limitations do not obviate the findings; they only require that we interpret the results with care. Some findings, like those regarding terminology and panel design, are much as they would be in end-user testing of an on-line prototype. Other findings, like those regarding panel flow, are interpreted more guardedly. Still other findings, like the time to perform the task, are not considered representative of the ultimate system at all.

**BENEFITS.** In the face of all the work done in rapid prototyping, why use a paper-and-pencil evaluation? Simply and empirically, we find we get valuable design data with this method—some of which we tend not to get when testing users individually on on-line prototypes. A walkthrough lets us gather written data on each user's actions on each panel, plus questionnaire data on perceived usability, plus data on specific problem areas exposed by the discussion.

The pluralistic usability walkthrough reduces to minutes the test-redesign-retest cycle time. A design is put to the test in a pluralistic usability walkthrough, with representative users offering aloud their views on the usability of the design. The developers and the human factors professionals (and the representative users) can come up with a redesign during the discussion time, and the representative users can give their opinions of the new design immediately.

It is not uncommon for representative users to reveal that we have selected terminology that is misleading, or have missed a widely accepted word for a particular concept. Also, we often learn of common work flows that our interface needs to support.

Recently, many of the "results" from a usability walkthrough are found by us when we generate the materials.

Recent work on collaborative design and on tools for collaborative work has validated why our walkthroughs have been as productive as they have been. Research on design has shown the value of incorporating many viewpoints in early design stages. As Jonathan Grudin and Steve Poltrock report in their paper on user interface design in large corporations, "...User interface design has become a multidisciplinary activity [and] ... successful design requires coordination among these disciplines." (Proc. Human Factors in Computing Systems, ACM, New York, pp. 197-203.)

Of course, usability walkthroughs and rapid prototyping are not mutually exclusive. Some recent work on groupware combines the usability walkthrough technology with on-line prototyping, allowing similar systematic group evaluations on-line. However, when budget or time constraints are tight, the pluralistic usability walkthrough has proven to be very cost-effective.

Human factors support of software development can take many forms. Sometimes it involves an empirical evaluation of the user interface and timely reporting of potential usability problems and recommended solutions to developers. Although usability walkthroughs demand that developers be thick-skinned, it is an efficient way to generating timely results.

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