

Interaction Design

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Note: this document is based on a tutorial presented by Wendy MacKay ("Using Video to Support Interaction Design")

1. introduction

Video is an extremely flexible tool that can capture real-world events as they occur, either "staged" or "live". Video can illustrate ideas and concepts, and especially dynamic events such as how people interact with objects and computers. Video is a creative tool for exploring new ideas, simulating new technology and allowing users to experience technology that does not yet exist. Finally, video is a powerful communication tool, as part of a presentation, in a design workshop, or standing alone, enabling you to share results, discuss ideas and envision future designs.

Designing involves making decisions; pursuing some directions and omitting others. Unlike the idea generation phase, the design phase involves choosing a particular direction and narrowing the range of possibilities. The goal is to explore a more restricted design space, creating a grounded design that is both innovative and still makes sense to real users in the contexts in which it will be used. The purpose of these exercises is to create an innovative design, in the context of how it might really be used, using scenarios and video prototypes.

Participatory design has borrowed or developed a wide variety of methods for evaluating interactive systems. A key strategy is to involve users in the evaluation process. In addition to standard usability studies and data analysis techniques, design walkthroughs provide an easily-accessible way for users to participate in evaluation and give feedback that is directly relevant to the design early in the process.

The objective of this session is to conduct a participatory design process, illustrate several functions of the software by means of a video and develop a high-fidelity and informal prototype.

2. use scenario

We distinguish between *use scenarios*, which are a form of analysis of interviews and represent what happens today in real-world settings, and *design scenarios*, which are revised versions of use scenarios that illustrate how a new technology might be used. The following is an example of a use scenario derived from several interviews. The names and details of the setting have been changed, but the basic events are real.

Scenarios describe a sequence of events, illustrating the activities of one or more people in a real-world setting. The goals are to be realistic, detailed and concise. Since this is difficult to do quickly, it is best to cover only a limited period of time in the scenario. Unlike a task analysis, we are not interested in an idealized description of discrete tasks, nor should the activities be separated into "functions" that can be later be supported by technology. Instead, the goal is to provide a very specific description of what happens, including when interruptions and breakdowns occur. In real product development (and also in research settings), it is essential that people who actually perform these tasks are involved in the discussion: they are the only ones who can provide realistic details about how the work actually proceeds.

Example of Use Scenario:

Robert works as a researcher for a university. It is 9:15 on Tuesday morning and he is reading his electronic mail. He is responsible of the CS department as well as his staff (5 people). Several of the group that he works with regularly has been moved into a new building across the campus and they have all changed their telephone numbers and emails.

He finds a message from Manuel, one of his colleagues and notes the new phone number. Manuel asks for a PowerPoint presentation. He gives Robert the file name and his current email at the hotel (He cannot connect with his new login from the hotel). Robert returns to Manuel email with the document. Manuel replies all it is ok. Robert finds a message he sent himself about a document he needs to edit because of huge mistakes. Unfortunately, it's the PowerPoint he just sent to Manuel. Robert call Manuel to say that document must be replaced. Then, Robert sends the new PowerPoint presentation and asks for an acknowledgment.

... (to be continued)

3. STEP 1 - brainstorming

Techniques such as brainstorming are designed to expand the design space and encourage you to consider new options and new directions. They also help to determine and redefine the problem, rather than simply solving the first problem that appears. The purpose of this session is to explore the design space and generate as many new ideas as possible, in a form that is concretely and directly relevant to the design project.

Brainstorming refers to strategies for generating innovative ideas. The basic procedure involves 3-7 people who are given a topic and a limited period of time. One person writes down every idea on a blackboard or flip chart. Another variation has everyone write down ideas individually, then shares them with the group. The moderator ensures that comments are constructive and that the time is spent generating ideas, not evaluating them. The moderator is also responsible for ensuring that the session finishes on time. The time limit is very important: brainstorming is very intense and, if done well, will leave everyone energized and excited by the ideas, not tired and bored. Brainstorming usually has two phases: the first for generating ideas and the second for reflecting upon them.

*In phase 1, everyone suggests ideas, no matter how impractical or silly they seem at the time. The most important rule is: **DO NOT EVALUATE THE IDEAS.*** Statements such as "that's stupid" or "they already did that" are forbidden. What makes brainstorming sessions interesting and fun is the way in which ideas spark other ideas, which is why the rule is so important. To help make people more comfortable and to encourage people to offer unfinished ideas, insist that everyone put in at least one "stupid" idea (without identifying which one it is).

In phase 2, everyone begins to evaluate the ideas. A number of strategies can work, depending upon the goal of the session. If it is important to thoroughly investigate all possibilities, then each idea can be discussed in turn. If it is important to select a small set of ideas that will become the basis for further work, the group can vote on the ideas. Each person goes up to the blackboard or the Flipchart sheets and puts a check mark next to the best (or the top three) ideas. After everyone has voted, the ideas with the highest scores can be discussed. Do not worry about ideas that are not at the top of the list; everyone has been influenced by all the ideas that have been generated, so even minor ideas may become incorporated into the final project. Video brainstorming is a variation that involves demonstrating ideas for interaction in front of a video camera. The goal is to simulate a wide variety of ideas very quickly and capture them in a way that is easier to understand (and remember) than text notes. In general, raw notes from brainstorming sessions tend not to be very useful after a certain amount of time has passed because the participants no longer remember the context in which the ideas were created. Video brainstorming generates fewer ideas, but they are much easier to recall, since more of the context is captured. Video brainstorming is more likely to be useful at later stages in project design.

Standard Brainstorming:

The moderator is responsible for starting the session, ensuring that everyone participates, keeping the tone positive, and ending on time. The goal is to generate as many ideas as possible including basic simple functions as well as new ideas. Be creative and do not forget to include "stupid" ideas. Spend 20-30 minutes generating as many ideas as possible. Do not worry about whether or not it is a "good idea"; quantity, not quality, is the goal. Then, re-read the list of ideas out loud and each person should individually select the three most interesting ideas to pursue. When everyone has voted, check to see if there are any clusters of votes. The purpose of the vote is not really to evaluate the ideas. Instead, the goal is to encourage you to reflect on them to help you in the design phase of the project.

Roles:

Choose a moderator who will direct the discussion and a (different) scribe to take notes. Everyone in the group is responsible for generating ideas.

Duration:

about 1 hour (45 minutes for brainstorming, 10 minutes for evaluation)

4. STEP 2 - creating a design scenario

Design scenarios are essentially enhanced versions of use scenarios, providing an envisionment of how a user's work will change when new technology is introduced.

The design scenario should specify both how the users will interact with the new technology in the course of their work and illustrate how it might change their current activities. Just as in a use scenario, it is important that the discussion include people who actually perform the work, since they are most likely to be able to identify problems or unrealistic uses of the new technology. You may wish to evaluate the scenario against a checklist to ensure that no important issues have been left out. Design scenarios usually begin on paper as text and sketches. They can then be formalized into storyboards, which will help in future videotaping or design workshops. Videotaping the storyboard directly, with a voice-over to explain the action, provides the simplest form of presentation of the ideas. Some film-makers do this, inserting background scenes, music, soundtracks, and actual scenes as they are filmed, to create an evolving document of the state of the project. You can do the same thing as you experiment with implementing different aspects of the scenario, using it as a springboard discussion among designers, users and management. Note that design prototypes can be developed directly from the video prototypes and tested with users in the same way

Today, most artists and designers who work with temporal information, including cinematographers, video producers, animators, and multimedia producers, "sketch" their ideas with *storyboards*, proving a spatial representation of (usually) linear, temporal information. Storyboards outline the action and capture the key elements of the story. Like a comic book, the storyboard shows a sequence of rough sketches of each action or event, with accompanying dialog (or subtitles) and related annotations including notes about the scene, type of shot, or type of edit. Storyboards help designers refine their ideas, generate 'what if' scenarios for different approaches to a story, and communicate with the other people in the production (camera, sound and actors or 'talent'). Storyboards can be informal "sketches" of ideas with partial information, created before any video has been shot. Other storyboards follow a pre-defined format and are used to direct the production and editing of the final material. Storyboards make it easy to jot down notes and get a quick overview of a lengthy visual presentation. If the elements of the storyboard are placed on separate cards, the designer can easily experiment with different linear sequences and insert or delete video clips with ease. You can provide a quick overview of what a presentation will look like if you videotape the sketches in your storyboard, with a voice-over explaining the intended action in each clip.

Roles:

Choose a moderator who will direct the discussion and a (different) scribe to take notes. Everyone in the group is responsible for writing the scenario.

Duration:

about 1 hour

Result:

the design scenario (1 to 2 pages max)

5. STEP 3 - rapid prototyping

Developing software is time-consuming and expensive, particularly software that is robust. Several techniques can be used to “show” results of the design process.

- **Video Prototyping:** In a participatory design process, users of the new system actively participate in prototyping exercises. However, most users are not trained designers. Video prototyping and related methods help users and designers with different skills, interests and responsibilities communicate with each other in a productive way. Video prototyping scenarios show situations that are relevant to users, while providing a concrete specification of what to build. Video is very useful for creating a more complex or sophisticated simulation of an interaction. Here, we're using **video not as a way to capture events in the real world or to capture design ideas, but as a tool for sketching and visualizing interaction.**

This technique works best if the video can be projected, either by hooking it up to a monitor or to a video projector. But you can also do it “live” with the tiny screen in the camera. Set up the video camera so that it points either to paper or a partially working software simulation. Connect the output of the camera to a monitor, seen by a person acting as the user.

As the developer, you can present information to the user on their monitor, observe their actions, and respond accordingly. This is most effective if the developer is well prepared for a variety of events and can present semi-automated information.

- **Wizard of Oz:** Sometimes, it is useful to give users the impression that they are working with a real system, even before it exists. The “Wizard-of-Oz” technique lets users interact with partially-functional computer systems. Whenever they encounter something that has not been implemented (or there is a bug), a human developer who is watching the interaction overrides the prototype system and plays the role destined to eventually be played by the computer. A combination of video and software works well, depending upon what you wish to simulate.
- **Rapid Prototyping:** Prototyping is a way of exploring different design approaches and evaluating specific alternatives. (In this course, we are concentrating on prototyping as a way of exploring design from a user's perspective. But prototyping is, of course, also useful in any aspect of system development.) Prototypes can take many forms, from very informal paper prototypes, to very elaborate video prototypes with special effects, to working systems. The goal is to create the illusion of real interaction between users and the future system. A good prototype need not be realistic in every detail, but it should be sufficiently detailed so that users (and developers) can judge what a “real” version of the system would look like. Note that the problem here is generally to discover what the interesting questions are, not necessarily the solutions. Prototypes allow you to explore a design space and try out different ideas, to better understand what the issues are. Implementing an efficient and effective solution can only occur when you have a clear idea of what it is that you are trying to develop. Prototypes are developed for a variety of different purposes. If the goal is to present information or see how a user will follow a particular procedure, it is often possible to start with just paper. The designer can present screen dumps or sketches to the user and react based on the user's responses to the information on the screens.

Work:

Decide ideas to explore in video. Instead of describing the idea in words or with sketches, you demonstrate or act out what it would be like to interact with the new system. Concentrate on the software. The presenters should explain, but not defend, their design choices

Then, prototype the software with every language you need.

Duration:

- about 1 hour for the video prototype
- 6 hours for the hi-fi prototype

In order to facilitate our work, you will use the ivy middleware with the use of previous developed modules to develop your system.

Video Tips

Think before you shoot!

Editing is time-consuming and often frustrating, so organize your shots before you shoot. (You will also get better footage this way.) Also, think about who will view the video and plan accordingly. It is far better to record a little video that you will actually watch rather than record large quantities of video that will never be viewed. This is not to say that you should be trying to make a Hollywood movie. You are, however, collecting data and it is important to think about the ways in which you will analyze it later, before you start. Remember that the camera person is responsible for deciding what to shoot, which means that he or she will not be able to pay close attention to everything that is happening. If you cannot have a separate camera person, do not assume that a camera on a tripod sitting in the corner is just as good. You will have to make an explicit trade-off between a distracted, but intelligent camera person and an undistracted, but non-intelligent camera.

Keeping track:

Prepare a label for the tape case and the tape itself. Also, pre-print other title cards so you can use them as needed.

Tape Case: Title, date, activity, participants

Tape label: Title, date, activity, sticker ("original", not "dub" or "master")

Preparing the tape:

Shoot a title card to provide an internal label for your tape, in case the case or external label are lost. Shoot the initial title card for at least 20 seconds with a voice-over identifying the project name, date, activity and participants. You can preprint title cards in advance or hand-write them at the moment, but do not forget!

Setting up the camera:

Always try out the camera in advance and be sure you understand how the basic functions work. Most special settings degrade the image, so use them only if necessary. Otherwise, turn them off.

if you can see, so can the camera.

Quick tips:

- For interviews and observations, start with an "establishing shot", to show the general layout of the office/setting then focuses on the activity itself.
- Shoot over the user's shoulder so you can see what he/she is discussing.
- Avoid shooting towards a window or strong light source.
- Limit zooming and panning as much as possible.