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# DOIT: The Design of Interactive Things. Selected methods for quickly and effectively designing interactive systems from the user's perspective

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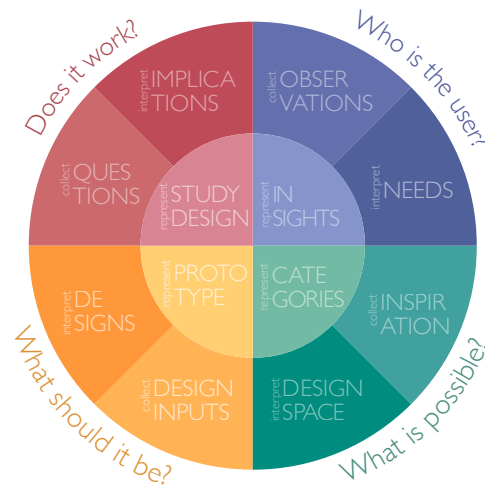


Fig. 1. User-centered, iterative design requires discovering information about users, exploring design possibilities, making specific design choices, and evaluating the results.

*The Design of Interactive Things* teaches participants how to quickly and effectively design innovative interactive systems from the user's perspective. Intended for both UX designers and HCI researchers, the course provides a coherent overview of the interaction design process, with detailed descriptions of four key design methods: *story interviews*, *video brainstorming*, *video prototyping*, and *generative walkthroughs*. Participants will apply these methods to design a novel interactive system, using materials and tools provided in the course. Each method has been tested in both industry and research settings, and is especially appropriate for participatory co-design with users.

CCS Concepts: • **Human-centered computing** → **HCI design and evaluation methods**.

Additional Key Words and Phrases: Co-Design, Participatory Design, User-Centered Design, User Experience Design

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## 1 BENEFITS

The goal of the *Design of Interactive Things* course is to provide participants with an overview of user-centered interaction design. Participants will gain practical, hands-on experience with four key design methods that are rarely explained in detail, including how to conduct an effective *story interview* that gathers concrete, relevant information about users; how to transition from static standard brainstorming to *video brainstorming* when exploring the design space; how to rapidly create three-minute scenario-based *video prototypes* that illustrate the design while highlighting design challenges; and how to conduct *generative walkthroughs* that both evaluate the existing design and generate new ideas. Both UX design practitioners and HCI researchers can use these design methods to integrate information from and about users throughout the design process.

## 2 INTENDED AUDIENCES

The audience includes both practicing UX designers and HCI researchers who would like to enhance their design skills, and novices who would like to learn the basics of interaction design methodology.

## 3 PREREQUISITES

The course does not include any prerequisites, beyond an interest in designing interactive technologies that meet the actual needs of real users in real-world contexts.

## 4 CONTENT

The course begins with a lecture on the four key phases of interaction design (see Figure 1), and a discussion of the design methods appropriate to each. Some methods focus on the user, some focus on the system, and some focus on the interaction between users and the system. Some methods expand the design space of possibilities, while others help select among options. Some methods are generative, others are evaluative. Yet all these methods all involve creating design artifacts that inform the design, helping designers delve into design details and make design choices. Participants will gain an overview of the design process, with explanations of how to perform key methods.

After the initial lecture, participants will work in groups to apply these design methods to create an original design, which will be shared with the rest of the class. The first exercise describes how to conduct a *story interview*, initially inspired by Flanagan's [2] *Critical Incident Technique*, then revised to be relevant to UX designers and HCI researchers [4, 5]. Story interviews capture a detailed description of how a user interacted with a particular system at a particular time. Each interview produces a step-by-step account of what happened, with as much detail about the user's interaction as possible. Instead of asking general questions about the user's opinions of the system, participants will learn how to extract stories about recent, memorable situations, and ask follow-up questions that probe for more details. They will distinguish between story interviews, tutorials and opinion interviews, and learn when each is relevant. They will also identify when an interview is veering off course, and learn how to fix the interview to obtain the maximum amount of detail relevant to the design brief.

The second exercise describes how extend a standard brainstorming session into *video brainstorming* session [4, 5]. Participants not only write or draw their ideas, they act them out 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 hand-written notes. In general, raw notes from brainstorming sessions are rarely useful after a few weeks because participants forget the context in which the ideas were created. Although video brainstorming generates fewer ideas in

the same amount of time, each idea is easier to understand and recall. Video brainstorming is particularly appropriate when the goal is to create ideas for how users will interact with a new system, especially early in the design process.

The third exercise describes how to create *video prototypes* [1, 6] based on story interviews and video brainstormed ideas. Video prototypes act as interactive sketches that illustrate how users will interact with and control the new system in a real-world setting, and let designers quickly explore various design alternative and refine their concepts. Video prototypes offer a quick, easy and inexpensive method for communicating ideas, not only within the design team, but also with users, management, and other stakeholders. Course participants will have access to *Video Clipper*, a specialized app we developed that helps designers create interactive storyboards and incorporate video clips of users interacting with paper prototypes. The resulting video prototypes do not require post-hoc video editing.

The final exercise demonstrates *generative walkthroughs* [3], which combine the step-by-step analysis of a design walkthrough to evaluate the system, and brainstorming based on socio-technical design principles to generate new ideas. Participants will examine each other's video prototypes, proceeding step-by-step through each interaction to critique and generate new ideas that benefit from key findings in the social science literature. The final exercise will be conducted with the full class, so that everyone can see what each group created.

## 5 PRACTICAL WORK

This is an intensive, hands-on course designed to expose students to design and evaluation techniques useful for developing interactive software. After listening to an interactive lecture about interaction design, participants will work in groups to design and video prototype an interactive system. Each group will conduct story interviews to obtain grounded information about what their target users need, and then will video brainstorm ideas that show how a user would interact with a paper-based mockup of each idea, thus creating a design space of possibilities. Each group will then create a scenario based on the results of the interviews and the ideas they have generated, and develop it into a three-minute video prototype to show how future users will interact with their system. The course concludes with a generative walkthrough of each video prototype, where the whole class both critiques the ideas and generates new ideas. By the end of the course, participants will have learned how much they can accomplish with minimal materials—paper, pens, sticky notes and a camera—in an extremely short period of time, and develop skills that will help them work effectively in groups as they explore design possibilities.

## 6 INSTRUCTOR BACKGROUND

Wendy E. Mackay is a Research Director, Classe Exceptionnelle at Inria, the French National Research Organization for Computer Science, and Professor of Computer Science at the Collège de France (2021-2022 Annual Chair). She holds a Ph.D. in the Management of Technological Innovation from MIT, as well as degrees in Computer Science and Experimental Psychology. Formerly Vice President of Research for Computer Science at the Université Paris-Sud (Saclay campus), she is an ACM Fellow and member of the ACM CHI academy. She has over 200 publications in Human-Computer Interaction, and has developed over 30 software products, including first interactive video on a computer. She has been teaching these methods at the Université Paris-Saclay for two decades, as well as at Stanford University, Aarhus University, and for a variety of corporate audiences. The methods in this class will be covered in a forth-coming book entitled: *The Design of Interactive Things*.

## 7 RESOURCES

The course is based on the *Design of Interactive Systems* course at the Université Paris-Saclay. The CHI'23 course website will be open to participants during the CHI'23 conference, and includes handouts, worksheets and access to dedicated software tools. (Link: <https://ex-situ.lri.fr/workshops/doi-the-design-of-interactive-things-chi23>.)

The course will provide paper-prototyping materials (sticky notes, paper, pens, and transparencies). Participants will also have access to *Video Clipper*, which they can upload on their own phones or tablets, for the video brainstorming and video prototyping exercises.

## 8 ACCESSIBILITY

This course is fully accessible for people with motor impairments. Participants with either visual or auditory impairments will be able to influence the design of the system being prototyped. For example, a visually impaired participant could influence the creation of an interactive system that uses audio and/or touch as the interface. Similarly, a hearing impaired participant could help their group re-envision their system to handle other interaction modes.

## ACKNOWLEDGMENTS

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