PAPER PROTOTYPING

In paper prototyping, the screens of a digital interface are hand sketched on paper and presented to a user to quickly test interfaces.

Duration	**Preparation:** 1–2 hours to a couple of days, depending on the complexity of the prototype **Testing:** Approximately 1–2 hours per user/group
Physical requirements	Space (in context or in the studio), pens, scissors, glue, paper/cardboard, sticky notes, overhead foil, foil markers, digital camera
Energy level	Low
Researchers/Facilitators	1 or more
Participants	4–8 is a good group size
Research techniques	Use-it-yourself, participant observation
Expected output	Research data (specifically bugs, insights, and new ideas), raw video footage and photos, documentation of the tested variants, and, of course, the paper prototypes themselves

Paper prototyping is a common low-fidelity method to prototype and test software and interfaces using interactive paper mock-ups.[01] The different screens of the interface are hand sketched on paper and presented to a user. The user can then use the interface by "clicking" with her finger, indicating what she wants to do. A researcher simulates the operation of the computer or device simply by replacing the screen page with the next one or by adding details on smaller pieces of paper onto the sketch (e.g., to add pop-ups).

Paper prototyping has been part of the tool set in prototyping software and interfaces since the early 1990s and rightfully earned its place. The main reason for the success of this method is that – especially early in the process – the interfaces are much faster to build on paper than using digital mock-ups, let alone programming. Plus, they are easy to change as well, even during

01 See Snyder, C. (2003). *Paper Prototyping: The Fast and Easy Way to Design and Refine User Interfaces.* Morgan Kaufmann.

the test of the prototype itself. Try this with code.

In addition, research comparing low-fidelity paper prototyping against computer-based, high-fidelity proto-types has found that "low- and high-fidelity prototypes are equally good at uncovering usability issues."[01] Even though a paper prototype is quite lo-fi in its basic appearance, it can be high-fidelity in other aspects, like the navigational structure or the actual set of features, thus delivering deep insights for these areas early on.

Of course, there are limitations. Medium-specific problems, for example, cannot be tested. Many paper prototypes also deliberately leave out most of the look and feel. However, paper prototypes are still especially helpful when exploring different design directions. High-fidelity prototypes, on the other hand, play their strength when it comes to actual look and feel, true

01 See Walker, M., Takayama, L., & Landay, J. A. (2002). "High-fidelity or Low-Fidelity, Paper or Computer? Choosing Attributes When Testing Web Prototypes." In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 46, No. 5, pp. 661–665). SAGE Publications.

performance data (responsiveness or latency of the application), or presenting the prototype to management or other stakeholders who are not familiar with low-fidelity prototypes.

Sketches of wireframes are a great starting point for paper prototypes. Wireframes give you a good overview of the layout of the site or application – but they often do not contain real content, and instead use placeholders rather than real images or copy. This makes it harder for the audience to use them in test scenarios since a lot of (too many?) gaps are left for the user to fill in. So, start with the wireframes and quickly add key content.

Another intriguing aspect is the impact of this method on decision making. Paper prototypes are a minor investment and clearly created to be thrown away. This makes it easier for those who created the prototypes to let go and embrace necessary changes. Similarly, actual users taking part in the test tend to feel more comfortable about suggesting changes.

Step-by-step guide
PREPARATION

1 **Choose a persona or user type:** What user are you going to test this paper prototype with? Choose a persona or a specific user type.

2 **Review scope and prototyping questions:** Review the scope and the prototyping questions for this prototyping activity. What do you want to learn? Do you want to test the whole or just a part of the interface? What are the tasks that you expect the chosen user to do? How detailed do you need or want to get? Make a list of the tasks you want to test for later. Also think about who you want or need to involve. Is it just for within the project team, or are you planning to involve potential users or other stakeholders?

3 **Sketch necessary parts:** Create hand-sketched versions of

everything the user will deal with while using the interface. Make sure this includes not only windows, menus, dialog boxes, pages, pop-up windows, and the like but also actual key content and/or plausible data.

4 **Assign roles and prepare:** Split your team to take on the roles of user, (computer) operator, and observer. Apart from you as the facilitator, all roles can be played by one or more people. Give them some time to prepare and practice their roles for the test and subsequent steps. Specifically, give the person or people who will act as the user(s) a few minutes to familiarize themselves with and empathize with the needs, motivations, and context of the chosen persona or user type.

A Creating hand-sketched versions of the interface: windows, menus, dialog boxes, pages, pop-up windows, and so on.

B Conducting the test: a user "clicks" (i.e., touches the buttons with a finger). As the user starts to use the interface, the operators react and simulate the changes in the interface by replacing or adding parts of the interface.

Step-by-step guide
USE/RESEARCH

1 **Test the prototype:** Now conduct your test. Introduce the project and the context of your prototype and ask the user to perform a certain task from your list. Briefly explain how he can "click" (i.e., touching a button or a link with a finger) or "type" (i.e., writing data in appropriate fields using a pen). As the user starts to interact with the interface, the operators react and simulate the changes by replacing or adding parts of the interface. Iterate until the user has completed the task or failed horribly.

2 **Keep a list of bugs, insights, and ideas, and review issues:** During the whole test the observers will record their observations and create a list of the issues that they discover. After each testing session take a few moments to reflect on what worked, what didn't work, what you would like to change or try next. Briefly discuss the issues you discovered and prioritize them.

3 **Revise your prototype (optional):** Changes to paper prototypes can be made very easily and quickly. So, are there any changes you should make right now?

4 **Decide on the next task and iterate:** Check off the task that has just been simulated and quickly decide which you want to try next. Then go again.

Method notes

→ **Speak out loud:** Encourage users to think out loud while they go through these tasks.

→ **Silent operators:** The operators are usually silent. Ask them to refrain from explaining how the prototype should work. The rule of thumb is: if the device or computer would not say/print/bleep it, the operators should not either.[01]

→ **Discuss if necessary:** You can consciously decide to enable a team discussion if this becomes necessary during the process – for example, over a roadblock that cannot be solved right away. ◄

01 Of course, you can always temporarily lift that rule to have the operators help the user.