

Dear Diary

Using Diaries to Study UX

By Carine Lallemand

Keeping a diary is not just a hobby undertaken by teenage girls trying to make sense of life and love. Diary methods have been widely used in medical research where patients are asked to keep a diary during a clinical trial or disease treatment. In Human-Computer Interaction, a diary study is a qualitative technique for collecting data on what users have done or experienced. Much like a travel journal contains descriptions of the traveler's experiences, a UX diary contains descriptions of the user's experiences with a system.

What kind of UX research questions could diaries help answer? Depending on the design of your diary study, you may get information on the overall impression of a specific device, usage of features, technological acceptance, emotions associated with task performance, or learnability of an application. Of course you could also get this information with a survey, an interview, or a user test. But only diary methods will give you access to temporal and longitudinal information gathered in a natural context of the interaction.

Advantages of Diary Methods Studying Temporal Dynamics

As stated in "The User Experience White Paper," there are several time spans of user experience depending on the moment of usage (see Figure 1). Typical methods used to study UX shed light onto only one kind or moment of the UX. Surveys are often related to *Episodic UX*: users are asked to assess the interaction after usage. User testing helps collect data on *Momentary UX*. You may also have an idea of *Anticipated UX* by conducting focus groups.

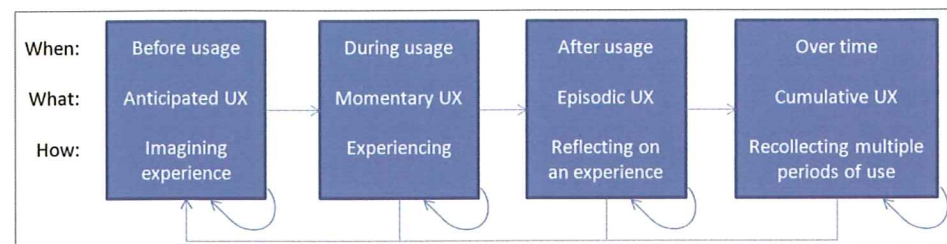


Figure 1. Time spans of user experience. (Source: "The User Experience White Paper," Dagstuhl Seminar on Demarcating User Experience, 2010)

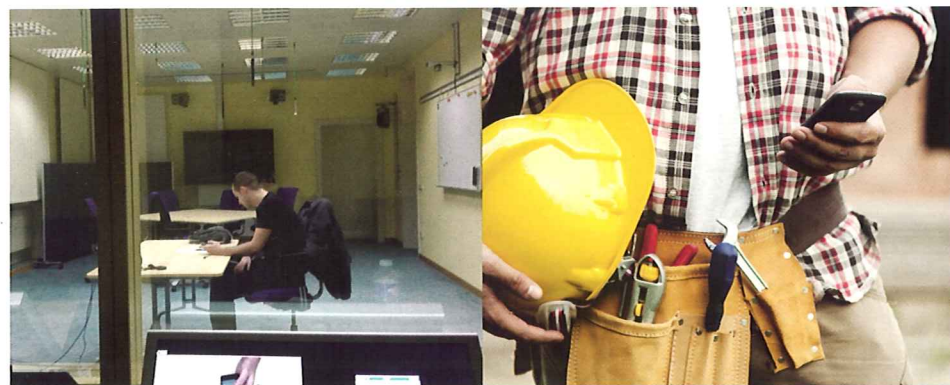


Figure 2. On the left: A participant interacting with a mobile application in a usability lab. On the right: A participant using the same application, but in a natural environment. Do you really think that the user experience is the same in both situations?

The main advantage of a diary study is that it allows collecting longitudinal information. Let's imagine you would like to assess a new mobile application. The first part of the diary study may be administered prior to usage by asking users how they imagine the application, what they would expect from it, and if they have any prior experience with similar applications. Then, you might ask them to report their everyday impressions and feelings during usage. Finally, during a debriefing interview or a post-study questionnaire, you may ask the users to reflect on their experience after usage.

Reporting Events and Experiences in Context

Another issue we should be always mindful of is the impact of context on the results. For example, when conducting a user test or an interview, the presence of the researcher may bias the results, leading to a positive evaluation of a system despite poor user performance. This is called a social desirability bias. When we know we are being watched, we will tend to behave in a way we believe is socially acceptable or desirable.

As researchers, we should want to capture life as it is and not how it looks in a controlled setting. The emergence of mobile technology especially highlights this need to study use "in the field" (see Figure 2). That's when the diary methods come in handy, as they focus on reporting events and experiences in their natural context.

My company developed a collaborative environment to address the needs of architects and engineers in the construction sector. The mobile application was tested in a usability lab, and flaws were identified and fixed. But once used on a construction site, there were more problems than expected. Effects of dust, noise, brightness, and handling were underestimated during both the design and evaluation steps. Moreover, collaborative issues in this real on-the-go setting were quite different than those simulated. The subsequent use of a diary study helped improve the system by revealing real user issues and needs in the context of their workplace.

Determining the Antecedents, Correlates, and Consequences of Daily Experiences

As mentioned before, UX is rooted in different time spans, each one being influenced by another. *Momentary UX* is colored by *Anticipated UX* in the way that user's expectations have to be met or exceeded to lead to

a positive experience. Then, *Momentary UX* will be distorted by the filter of cognitive processes when changing into *Episodic UX* and *Cumulative UX*. Expectations, mindsets, moods, and social or physical contexts all color user experiences. A diary study captures these influences, shedding light onto how the UX in each time span has formed.

For example, findings from diary studies can reveal that it was the bad mood of the user or brand criticism heard on TV that impacted the user's assessment of the interface. You may also discover that the game you are evaluating provides enjoyment only when the user interacts with close friends or family, even if the functionality supporting this was neglected by designers. Finally, you may notice that a single flaw you considered as minor discourages the user and leads to system abandonment.

Limitations of Diary Studies

Nothing is perfect! As with most methods, you need to look at the pros and cons of designing a diary study. The main disadvantages of the method are the cost and time associated with:

- **Participant recruitment.** The quality of the results depends on the participants since the diary is bound to the expressive ability of

the writer. This is especially true for a study with a lot of open-ended questions. You also have to achieve a high level of participant commitment to obtain sufficient and reliable diary entries.

- **Training or briefing sessions.** A diary study often requires detailed training sessions to ensure that participants fully understand what needs to be reported, how, and when.
- **Data analysis.** Analyzing diary entries is time consuming. This activity takes even more time in the case of a pen-and-paper diary.

Designing a Diary Study Eliciting Diary Entries

There are three categories of diary protocols based on the way in which entries are elicited:

- **Interval-contingent protocol**, in which participants have to report their experience at regular predetermined intervals (for example, every two hours or every day).
- **Signal-contingent protocol**, which uses a signaling device to prompt the participants to make an entry.
- **Event-contingent protocol**, which requires participants to report each time a specific event occurs.

Protocol selection depends on the purpose of the study and activities under investigation. The interval-contingent option, although widely used, does not help participants remember to make diary entries, which may lead to missing data. Signal-contingent protocols overcome this drawback but are intrusive. An event-contingent protocol might be used especially when you are interested in studying the experience created by a specific event, such as a system error or notification. Rate and timing of self-report have to be set up according to research needs. Do not be too demanding or your diary will become a burden to your participants; a maximum of two to three entries per day should be enough.

Involving Users

One of the major challenges in diary studies is maintaining participant commitment at a high level to ensure diary completion. You have to make sure that participants understand the scope and descriptive depth needed for the diary entries. During the study, you can remind participants of the importance of diary completion. A cash or gift incentive, or the possibility of keeping the assessed device, can be very helpful. However, be careful not to base the incentives on data quantity or you may get tangled up in irrelevant information.

Example of a Before-Usage Diary Study

A diary study of rendezvousing (described in the Proceedings of the 2001 International ACM SIGGROUP Conference on Supporting Group Work) examined how people meet up, with the goal of understanding how technology could support them.

Martin Colbert used a diary method because the events of interest were "too rare, private, and geographically dispersed for direct observation, and users too easily forget important details of their behavior to report them accurately long after the event." Participants had to report their rendezvousing behavior for fourteen days. One diary entry was made for each rendezvous event. Each entry was composed of an open-ended, narrative description in the participant's own words of what happened and why, and the participant's responses to a rendezvous questionnaire, which asked for specific details of each event (see Figure 3).

The researchers used the results to extract the overall structure of rendezvousing and to build typical rendezvousing scenarios. Eight possible causes of problematic rendezvous were identified, including transportation problems, over-running of previous activities, poor planning, lack of travel information, lack of geographical information, lack of information about other rendezvousers, spontaneous additional tasks, and failure to value success.

The study helped identify what kind of position-aware service

was likely to be most useful and how it could be designed to shape rendezvous experiences.

Complete a rendezvous diary entry each time you make an informal, personal arrangement to meet (e.g., "to have lunch with a friend" or "to collect the kids from gym club.")

Rendezvous Diary Entry

Rendezvous ID

Date and identify the rendezvous (e.g., 5/1/00 No.1):

Goals of Rendezvous

1. How many individuals met / were supposed to meet?
2. Have you rendezvoused with this person / these people before?
Yes ☐ No ☐
3. What relationship do you have with them?
Spouse / partner ☐ Son / daughter ☐ Close friend ☐ Acquaintance ☐ Other ☐
4. Where did you meet / were you supposed to meet?

Effectiveness of Rendezvous

5. Did you all meet up successfully at the agreed place and time?
Yes ☐ No ☐ If Yes, go to question 9.
6. What caused the problem(s)?
7. How much stress / anxiety was created for yourself and others?
1 (none) ☐ 2 ☐ 3 ☐ 4 ☐ 5 (a lot) ☐
8. What opportunities were lost by yourself and/or by others?

Figure 3. A diary entry participants were supposed to complete following each rendezvous.

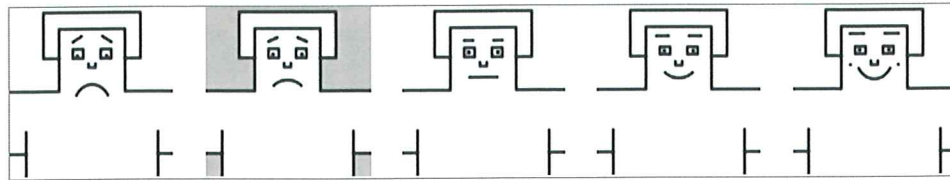


Figure 4. The Self-Assessment Manikin is a non-verbal scale to measure emotions.

Pen and Paper vs. Electronic Diaries

Because UX studies are often related to the use of technological devices, the choice of an electronic report is often judicious. It simplifies data analysis and gives the opportunity to combine diary entries and log files (for example, date, time, and task performed). E-diaries also provide participants with innovative forms of reporting. Imagine a diary study through voice-mail entries, text messages, video, or pictures!

However, you should always try to adjust the method to the target users. If you are conducting a study with elderly people, a pen and paper diary will probably be more appropriate. Your participants should feel comfortable with the process of keeping a diary.

Diary Structure

Diaries may be open format (users record activities and events in their own words) or highly structured (where closed-ended questions are pre-categorized). Do you wish to

encourage general reflection or need precise information? A mixed approach is often adopted to collect both qualitative and quantitative data. Do not forget to add a clear set of instructions on how to complete the diary, and stress the importance of recording events as soon as possible after they occur. You may also use non-verbal tools to facilitate completion (see Figure 4), especially for specific target users such as children or people with a disability.

Collecting and Analyzing Data

After designing your diary, do not forget to pilot-test it before the study launches. Participants should keep the diary for a maximum of two weeks, as people's commitment quickly decreases over time. If the diary is electronic, you should monitor its completion for each participant. Do not hesitate to contact participants during the study to ensure that everything is going well.

Quantifying UX Over Time

I have used the abridged AttrakDiff tool (www.attrakdiff.de) to evaluate the hedonic and pragmatic quality of a mobile application (see Figure 5). By asking participants to report their feelings and impressions using a short survey, I was able to draw a UX chart representing the evolution of UX over time (see Figure 6).



Figure 5. AttrakDiff survey on a mobile phone.

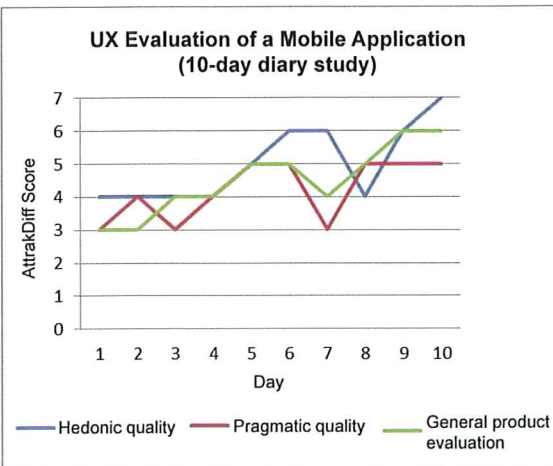


Figure 6. AttrakDiff scores illustrating how the UX of a mobile application changed over a period of ten days.

At the end of the study, conduct follow-up interviews with your participants. That's your opportunity to have them explain some of their entries. A good understanding of participants' qualitative answers is required to correctly interpret the data.

The analysis of diary entries depends on how structured the diary is. Quantitative data may be analyzed using any statistical analysis software. Dealing with qualitative data is more challenging but certainly worth the effort because these will provide you with valuable information on subjective experience. **UX**

About the Author



Carine Lallemand is a research engineer in psychology, ergonomics and human-computer interaction at the Public Research Centre Henri Tudor in Luxembourg, where she focuses on defining, scoping, and modeling user experience at a scientific level. Because she lives for promoting UX and loves to share ideas with fellow UX professionals, she is also vice president of France-Luxembourg UXPA Chapter.

The Snippet Technique

The snippet technique developed by the Stanford HCI Group aims at overcoming the limitations of diary studies performed under mobile or active conditions, where there is no time to make thorough entries. Participants capture text, MMS, or voice snippets when on the go and later annotate the snippets on the web (see Figure 7).

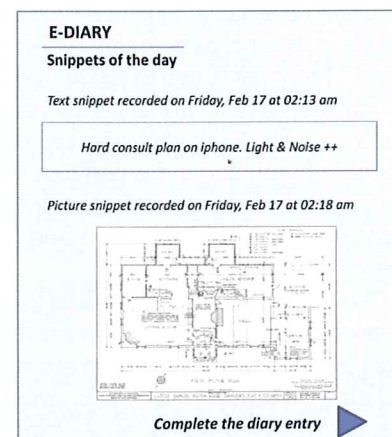


Figure 7. Snippets captured during the day serve as memory aides for full diary entries in the evening.

Simplicity, Not So Simple

Embracing Deep Gradual Engagement

By Christian Manzella

Making an experience simple doesn't have to be about reducing complexity for the users; it's about attempting to stay within what the users are initially capable of managing, and providing them increasing options as their familiarity increases. The user experience field has matured enough to recognize what those user states are across applications, devices, and even environments, but is just scratching the surface when it comes to taking advantage of the users' evolution within applications and websites.

Classic Persona Modeling Is Only a First Step

Persona development has enabled UX to take a more human-centered approach to building a website and meeting the largest percentage of users' needs. While this works for simple sites with little depth, a more complex site requires a more complex approach to identifying and facilitating users' needs. Personas are a necessary step in our process, but can now branch out to match users' needs, as users become more advanced in their interactions. For a very long time, technology limited presentation to anonymous users and, perhaps, alternate states with different and additional content once a user voluntarily authenticated with a username, tying the session to a specific identity.

In recent years, the Internet changed; it became more complex by degrees. The hardware and infrastructure became more sophisticated. Sites today have access to more information, in real time, about the browsing session, without violating the privacy of individual users. Sites have discrete access to social infrastructures when explicitly provided by the user. Sites can receive data from third-party sources, by user permission, and respond

to information that never has to be accessed or stored by the site providing the interface.

Instead of the simple model of "click, request, respond," there is now a complex series of options and possibilities; a tangled and complicated journey with every click, previously limited by users' ability to use the technology. Conversely, as designers, we tend to limit users by what we offer them. There are still some who assume that sites should be built to the least common denominator throughout, instead of just initially, and in treating every user as if they have a sixth grade reading level, an introductory understanding of computers, and the attention span of a gnat.

The users of the Internet have become more familiar with standard web browsing techniques and user interfaces. Some of them started to trust the websites they used. And some of them got really good at using them. So good that they are often able to learn faster ways of using websites and inform designers how to better design. Those users are ready for additional functionality and have the current capacity to learn new methods associated with using it.

Parallels to Progressive Disclosure

This idea isn't new; designers practice progressive disclosure, based on interface restrictions and/or amount of data, relative to the needs of the user. Edward Tufte's visualization theories have allowed designers to explore this concept, through the lens of partitioning information, presenting it in pieces that create a new whole to assist users in better understanding interfaces. Typically, this disclosure state is made based on a single set of user requirements and rarely revisited for those users who are engaged with the interface at deeper levels. By taking the feedback gathered from that initially identified user state, an interface is engineered that presents just the right amount of information within each set of choices, being careful not to exceed users' ability to comfortably make a decision.

Louis Rosenfeld expanded on this concept with a blog post in which he compared users' capacitive levels to an onion. On the surface, the initial disclosures hold true. As the layers of the onion are peeled, the number of users diminishes, but they become more skilled, engaged, and trusting of the interfaces they're interacting with, along different segments of their journey. This model allows for a quick, simple overview of how you can segment users into more complex personas that allow you to respond to multiple sets of needs.

The fear of a user struggling with the way forward can create an unintended oversimplification of interfaces. Opportunities are missed by remaining on the outer peel of the onion. It's easy to identify a user who has been to a website seven times in a month. Once a user has been to a website multiple times, it becomes likely that more of your interface has become resident in their long-term memory. You can then offer additional content, helpful to a more advanced user; you can provide shorter ways of navigating sets of functionality, previously complex to the user's novice state. Recognizing and emphasizing the facets of your site that will have become a part of long-term memory will allow you to avoid potential information overload.

Target.com provides a good example of this with their latest website. Upon initially visiting the site, you're presented with essential navigation and promotional material. However, after browsing through several products, a new widget appears in the bottom-left of the pages, granting you quick, easier access to previously viewed products. They do this based on a cookie, without logging you in. While the feature itself is simple, the revelation of that feature matches the user state in that the