The Media Streaming Journal

Internet Broadcasting

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Welcome to The Media Streaming Journal

Greetings,

Properly defining a question allows a useful answer that is relevant to the question being asked. It is essential to consider all aspects of a question being posed and incorporate all relevant information that would allow an end user to enable the filtration of data that is not applicable or desired.

The key to making data or knowledge useful is not the random collection of information without the ability to define how the data can be applied to help achieve a specific goal.

Namaste

David Childers

Editor In Chief

<div align="center">

David Childers

The Grand Master of Digital Disaster

<u>Current Member</u>: International Association Of Internet Broadcasters

<u>Former Member</u>: Society of Motion Picture and Television Engineers

</div>

Published Author

Introduction To Internet Broadcasting
Amazon Publishing

Numerous Creative Commons Computer, Technical and Internet Broadcasting Guides
http://www.ScenicRadio.com/Library/BroadGuide/index.html

Newspaper Interviews

New York Times	Lagniappe - "Something Extra for Mobile"
Internet TV: Don't Touch That Mouse!	Mobile Gets Hoaxed
Tim Gnatek	Rob Holbert
July 1, 2004	Mar 16, 2016

Cited By

Five Essays on Copyright In the Digital Era	Turre Publishing
Ville Oksanen	Helsinki Finland
2009	

Open Source Developer

Developed software architecture to continuously source multimedia content to Youtube Live servers.
Scenic Television – The sights and sounds of nature on the Internet.
http://www.ScenicRadio.com

Projects

Researched and developed documentation for Peercast P2P multimedia streaming project.
http://en.wikipedia.org/wiki/PeerCast

Researched and developed technical documentation for NSV / Winamp Television.
https://web.archive.org/web/20080601000000*/http://www.scvi.net

MidSummer Eve Webfest

A virtual International festival focusing on Digital art and Free Software that was coordinated by OrganicaDTM Design Studio.

Presentation and discussion regarding Internet multimedia content distribution.
https://web.archive.org/web/20061104230522/http://www.organicadtm.com/index.php?module=articles&func=display&catid=37&aid=61

LinkedIn Contact Information

http://www.linkedin.com/pub/david-childers/4/736/72a

What is in this edition of the Media Streaming Journal

A Beginner's Guide To Finding User Needs

Jan Dittrich

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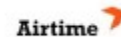
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A Beginner's Guide To Finding User Needs
Jan Dittrich

This is an introduction to understanding what users expect or what from products. These concepts can easily be applied to both the role of a stations program content director or advertising sales director. This information provides a methodology on how to gain insight as to what the station's audience wants for content and what do the potential advertisers want.

A BEGINNER'S GUIDE TO FINDING USER NEEDS

Jan Dittrich

- Consent and Release Form

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Suggestions and Feedback

This book is free/libre, if you help to improve it, it helps all other fellow readers.

To point out mistakes you can:

- file an issue *(https://github.com/jdittrich/userNeedResearchBook /issues)* (If you are on Github)
- write me a mail: dittrich.c.jan AT gmail DOT com

Introduction

Products should not only be usable but also useful. This means they satisfy a need of the people using them. But how do you discover this? By getting to know users' motivations, activities, and problems by gathering data and finding patterns. This text teaches methods for doing this.

I found it hard to start with doing research on user needs because some approaches demanded theoretical knowledge, while others assumed a large budget for research. I try to keep the barriers to doing research low by prioritizing methods that…

- are useful for design projects in business as well as in academia
- work with a small budget
- are understandable and applicable without a specific (academic) background

I provide examples to make it easy to see how methods are used. More useful than an abstract definition of methods like "asking open questions" or "clustering themes" is to see how these are put into action when doing research.

This text describes methods and tricks of the trade. They worked for me and I saw them work for others, too. However, they are not a list of rules that guarantee success if followed. Indeed, doing research this way could actually lead to useless results. Also, it would be very boring. See this book as a travel guide [1], written by a person who has already traveled a bit. As in a travel guide, it can be helpful to follow the suggestions. But if the way I suggest can't be walked, feel free to go around the obstacle. If the locals give you strange looks, maybe your current situation is one I have yet to experience. Feel free to adapt to what makes sense in your situation.

Talking about adapting to your needs: This book is open source, which means it is both free-as-in-freedom and free-as-in-free-beer. This means you can not only read it for free, but also change and adapt it (Details are in <u>the license</u>) I hope this helps to spread the knowledge and to improve this book together. So let me know of errors you find in it and tell me and others how the book is useful to you.

User research helps you to create more useful products

Without research, assumptions about the user's activities with current and to-be-created products are often shallow and do not involve the user's context. They focus on some features being used, but not much more.

> *Let's say, I want to design an app that eases collecting and organizing knowledge snippets and their references to books and websites, targeted at PhD students. This is surely a great thing to work on—but without research, I would just have some disjointed ideas in my head: It should be more visual than other, similar software and have an efficient add-new-reference function based on scanning the books barcode, because typing is not much fun… My assumptions about the context of use are very vague: The PhD students would use the application because they need to manage references.*

Instead, when you researched users' needs, you can easily think of what is important to users in rich and detailed ways, considering intertwined activities, motivations and problems of users. This will be based on data. Furthermore, it will be structured by common patterns of the users' behaviour. Analysing these patterns makes it easier to see where your research has gaps or potential. It also helps to communicate your findings to others: You can talk about the patterns and give examples, instead of detailing all single cases.

> *In my research on collecting and organizing references with some students and professors I found several patterns which can guide my ideas for future design. I might consider that disciplines have very different ways of working. Thus, it could make sense to focus to natural scientists, whose literature is mostly digital, or on liberal arts, who are more paper based. Deciding this would give the project focus. It might need more research, though. Nevertheless, even the mathematicians or physicists do not work only digitally: Paper still plays a large role in their knowledge work. Users from every discipline used paper and computer at the same time. They scribbled things down in front of the screen and alternated between printouts and digital representations. Should my product try to get rid of paper by simulating the paper-based parts digitally? Or assume strength in the differences and just bridge the gap between screen and physical world? And we have not even touched finding and using review works, writing a publication, collaborating with other researchers… all this leading to more ideas that can be discarded, build upon or feed back in further research.*

User research will help you to get a data-based, rich and conveyable image of the users motivations, activities and problems. This does help to tackle the right problems and to get new ideas of what could help the users. Without user research, you may also have assumptions about the user, but they can easily be wrong and will often be simplistic.

User need research is an iterative process, not a linear one

The process that I describe in this book may seem to be divided into clear steps, each step its own chapter. But in contrast to what the linear structure of this book suggests, it is very useful to switch between steps and also go back to previous ones:

- If I talk to three students about eLearning (Step: *Data Gathering*), and two of them mention they use Facebook discussion groups for exchanging on learning tasks with peers, I could specifically recruit additional people (Back to step *Prepare your research*) who could walk me through a few of such groups.
- If I notice in *data analysis*, that I can't make much sense of how students use different media together, I could schedule a few sessions of listening and observing and focus on how a piece of information (like "the deadline got extended") travels though different types of media (social networks, chat) and is transformed (maybe to "lets re-schedule the writing session") in its use (and by that go back to *prepare research*, *data gathering* and *analyzing data*).

User need research is an iterative process. Instead of doing all steps once, one after another, you can loop some of them before proceeding. This allows using insights from later steps (like analysis) to shape earlier steps (like data gathering).

User need research is most useful before the product is being built

User needs should be researched in *early* project stages. It is less useful when a lot of time and money has been spent already on building a particular product.

Here are some scenarios in which user need research makes sense:

There is a broad topic or problem space, but very little is known yet. Not being focused on a particular product gives you a lot of freedom. Such projects are not very common, though. A possible task would be to *"find out about people using libraries"* or even doing research on *"finding and working with information in media"*

There is an idea for a product or a service. You want to find out user motivations, activities and problems that are important to consider when building a product or service. This is the scenario in which I use user need research most often. An example task is *"The library wants to create an app for creating bibliographies. They want to find out what they need to consider for making it a useful product"*

A product is to be improved or changed. If a substantial overhaul is planned, it makes sense to observe how the product is used to find out where user needs are unmet. A task could be: *"The library already provides an app for creating bibliographies since several years. But students complain about it being useless and hard to use. Now, you should find out about the users to help the library to see how version 2.0 should be different."*

In all these examples, the outcome is not set yet: Your findings could make a difference and shape the outcome. But if the decisions are already made and your results won't make a difference, don't do the research: It will be a frustrating experience if even the most interesting results won't change the project's determined course.

Our inquiry concerns the user, not our (future) product

You now may be very motivated to start designing your future product. But if you focus on the *product* now, your research findings will be tied that specific product—which may or may not be useful for your users. If you instead focus on the *user*, your findings will be independent of a particular product implementation.

This idea seems to be hard to grasp. When I talk about user need research, a frequent assumption is, that I ask users things like this:

- What do you want?

- How should I design a product for you?

However, I don't do this: It would not tell me much about the *how* and *why* of their actions—only that they want something.

Sometimes, user need research is also confused with usability testing. In usability testing, you test a product to improve it. Usability testing is not about finding user needs that exists independent of that product.

Paradoxically, we need to *let go* of our focus on *products* to be able to understand the users and to develop products that users need.

Prepare your research

Create a user-focused how-and-why question based on the initial idea for the project

It can help a lot to have a guiding question when you start your research. This question should relate to how and why your (potential) users do what they do. In many projects, you start with ideas for a future market, product or feature. You can use these ideas as a starting point for creating a useful, user-focused research question.

First, ask yourself why the product idea would be good for something people do. Then ask, how and why they do this. The outcome can be used as research question.

Here is an example:

- The initial idea is *"build a learning platform for university students"*

- The meaningful activity connected to it can be *"using digital media in order to learn better for university"*
- Asking *how* and *why* I come to *"How and why do students use computers in order to learn better for university?"*
- I then refined the question a bit, since *in order to learn better* is often understood as remembering facts or passing exams. Also, "use computers" sounded like if I am not interested e.g. in smartphones or use of social networks. In the end, I used "How and why do students use digital media related to their studies".

The research question is a help for you to form more detailed questions and to communicate your aims. It does not need to be the *one true question*. Thus, it can also be refined later after you gained a better understanding of the matter.

Find participants

In user research you want to find out what our users do and how and why they do it. If you know this, you can design our products accordingly.

To be able to do research on the "how" and "why" of users' work, you need to find people who would like to answer your questions and would show you what they do. These people are our (research) *participants*.

Potential participants do the activity that is in your research question

Research participants should be able to talk about what they do and demonstrate it. Because of this, it makes sense to focus on activities

when you recruit.

Since they are not about behavior, demographics are not very useful: "30-40-year-old male, making more than $50k/year and being interested in technology" does not relate much to motivations, activities and problems of users. Instead, base your recruiting on the activity that is part of your research question:

- If, for example, you have the research question *"How and why do students use computers to learn for university?"* the activity is "learning for university". This is what you should focus on: Find people, who learn for university.

- If your question is "How and why do small business owners keep track of their bills?", the activity is "keeping track of bills", additionally constraint by the role: "Small business owners".

I don't exclude the roles ("Student", "Owner of a small business"), but I focus on the activities first. In the question "How and why do small business owners keep track of their bills", the essential part is keeping track of bills. This is also what people can tell you about and what they can demonstrate. If I talk to an owner of a small business and they do not take care of the bills themselves, I would ask why they do so and who is doing it instead—and then ask whoever is doing the "keeping track of bills"-activity if they want to participate.

Inform potential participants

The easy way to get participants is via an recruiting agency: You pay them and they will get you participants. But since that might not be possible for you, here is how you do it yourself. Two conditions need to be satisfied in order to convince people to participate in your research: They need to know about the possibility and that it is rewarding to

participate.

It is motivating for potential participants if the research improves their life: A shopkeeper will likely be interested if you work on making it easier to keep track of bills and taxes, neighbors, if you try to make living in the neighborhood better. People will also be happy to participant, if they like your product and/or organization e.g. because your work is not-for profit and supports a good cause.

Incentives are a simple, but effective motivation for participants. If you have the funds and particularly, if your project will earn you (or your employer) money, you should pay a fair sum for your participants' time. If your funds are small and people like to support you and your cause, you could also offer something other than money: Something that people like, but would usually not "just" buy seems to work well— e.g. really good chocolate or a voucher for a nice local restaurant.

When you know what you can offer to potential participants, you can write down what participants can expect if they participate. This includes:

- What the research will be about
- How much time it will take to participate
- What the research will be like/what you will do
- Why they might want to participate, including
    - How the research results might benefit them and/or others
    - What they get as an incentive

You can use this information to create paper notes or posts to social media—This is how it could look like as a slightly formal note for a notice board at university:

> *Are you a designer?*
>
> *The universty library would like to improve the LibApp to support you better in useing our library and digital services. Therefore, we would like to gather*

> *some insights into the way you work in the library and with our services. If you would like to support us, someone from our team ask you some questions and look over your shoulder while you work. This would take approximately 1h and take place in the library or some other place where you use our services from. All participants get a $10 voucher for the university's cafeteria. If you would like to participate (or have further questions) please write an email to jan.dittrich@example.com*

In some cases, finding participants is easy, because participants are motivated and you can easily reach out to them, as in this example:

> *Let's say, you are working for the university library. They have acquired a grant for their "digital infrastructure" and now have the task to find out how their services could be improved. You can easily use the library's notice board, and also ask the "how-to-use-the-library" trainers to mention the project. Students might even be motivated enough to just join out of interest and because they want to contribute to improving their own life – but since it is possible and fair, you should pay them for their time.*

In above example, it was easy to reach out to participants because you were already close to them, spatially as well as socially. But sometimes, field access is more difficult than just putting up some notes. Often, this is because you actually don't know who or where possible participants can be found, and so you can't ask them. This means you need to get to them in a step-by-step process. The following example outlines this:

> *You want to find out how people use open data on air pollution which is published by cities. You don't know anyone who does this work. Since the project is not secret, you give it a try and post about it on Facebook. You are lucky, and a friend of yours happens to know that a local hackspace is hosting a bi-weekly "data hackers" meeting. So you write an email and ask if you could join the meeting and introduce your project.*
> *In parallel, you have also searched the web, and by trying "[next largest city]*

> *open data" you found out that the infrastructure department of the city has given an award to the best data project some weeks ago. You could reach out to the staff member who awarded the price. They might be able to refer you to some people who are interested in the topic, since they needed to get in contact with them when advertising the competition for the award.*

In the scenario above, I described a step-by-step process of reaching out: In each step, you try to be referred to a next person who is more knowledgeable and familiar with the people you want to do research with. You do this, until you are referred to possible participants.

At each step, you can learn about how to approach the next: If your friend refers you to a meeting of data hackers, that friend can probably also tell you if you should behave in a particular way if you are going there. For the hacker meeting, it might make sense to NOT be wearing a suit. In other places, the smart clothes might be essential. The more formal and seggregated a setting is, the more important it is to not violate its customs: Hospitals, churches and bureaucracies are tough to research if you don't behave the "right" way.

Some people who might help you are in a core position to regulate access to potential participants. The ethnographical jargon for them is "Gatekeepers". They can decide to help you and let you through the metaphorical "gate" behind which your participants are waiting – or they can hinder your access if they find reasons to not help you. In the example above, a gatekeeper could be the person who runs the "data hackers"-meetup or the city's digital infrastructure person.

If you have found people who like to be your research participants, you can ask them if they know others who might like to participate. It works like the step-by-step recruiting process, but instead of moving towards your participants, you now can go from one to another by being referred.

In any case, it is useful to consider different ways to get to your participants. If one way fails (e.g. friends of friends), you may be successful in another (e.g. writing a mail to a "gatekeeper"). In case

several approaches work, you get more potential participants. But even more important is that you now have a more diverse set of people, which leads to richer results.

Make compromises, if needed

Especially if you are short on money and/or time, you may need to compromise and do research with participants that don't match your intended users exactly. When doing this, keep in mind to check for similarity of tasks, problems and motivations. These checks don't ensure that the participants are exactly the ones who may use your final product. But you can be rather sure that they can tell you something which is of interest for you.

   If you design an app for people to create bibliographies and you can only get some bachelor's and master's students, but no professors, your results will still reveal a lot about the processes of creating bibliographies. The student's motivation is probably writing final term papers and the professors would like to write journal papers. This is a possible difference — as long as you aware of it, you are probably fine. But if you want to design a skateboard and the only participants you can get are elderly people who enjoy hiking, you are in trouble (if you find elderly people who enjoy skating, go for it).

A small number of participants is fine

There are no clear cut rules of how many participants are enough. However, most of my projects have between 3 and 8 participants. If I really need to be sure I would do research with 10, but that is about the limit I can manage on my own.

   You may think that conducting user research with more participants is generally better; you just could shorten each session, ask fewer

questions and skip observing the participants. But you need time with each participant if you want to find out about the "how" and "why" of the participants' work. Several sessions in hurry will lead to less useful results than research with one participant done right.

Nevertheless, only doing research on very few users will restrict the variance of data — like noticing that there may be several ways to do something. As well, you might not see which patterns are consistent among several people and which vary—which would certainly be impossible if you only had one or two participants. However, despite the constraints of such small samples they can still lead the helpful insights.

When estimating how many participants you need, consider how much time or money you can spend on doing the research. Each additional participant gives you additional data and a broader view on your possible users. However, each research session needs time do and adds to the amount of data to be analyzed—so plan accordingly.

An efficient way of involving the "right" amount of participants is doing your research iteratively: start with two or three participants and analyze the data (how this is done is described in the section on Analyzing Data)

Take a look at the (preliminary) findings: If the results seem clear and consistent, you may do research with few additional participants to refine and check and to explore details — or, if time is up, leave it the way it is.

If preliminary findings are unclear or contradictory, you may need to involve more participants.

Reasons for the such unsatisfactory results could be:

- Your research encompasses different groups of people with different needs — For example the groups "students" and "professors" share some traits, but many characteristics will vary.
- The topic of your research is too broad — for example, "How do people do design" is very broad, "How do interface designers

> involve specifications of user research and engineers in their designs" is more specific.
>
> - Even if your research is focused and there is only one group of people involved, the actual patterns just vary.

In all these cases you can involve more participants — but before you do, try to check if you…

- …need to clarify your research topic (to focus your efforts)
- …need to specify the involved groups (to recruit the right participants)

Prepare the research session

The "Research session" is your time with the participant in which you listen to them and observe their activities. If you are prepared, it helps you to focus on the tasks at hand.

Think of possible topics and questions for your research

Before the research session, I try to get an overview of what I want to explore. I usually structure this along three topics: The **Motivations**, **Activities** and **Problems** of the participants.

These topics are relevant for design, and they can be easily remembered even in the midst of research: Three points are few and you can use the mnemonic M-A-P: Motivations, Activities, Problems.

Motivations — what does the participant want to achieve? What is important for them? Motivations can give you context to what the participant's do.

- *"Can you describe the worst experience in your day so far?"*
- *"Which tasks in your job do you like the most?"*
- *"Can you show me a piece of work you are proud of?"*

Activities — what does the participant do? How do they do it? What are solutions, procesures, "hacks" do they use? Activities are the core part of reserach: This is what can be observed and where things happen.

- *"Can you describe the task you are currently working on?"*
- *"Can you show me how you use the application?"*

Problems — what is in the way of the participant getting to their goals? Problems can make you and the participant aware of motivations and activities that are so familiar, that you don't think of them—until something gets in the way.

- *"When do you feel hindered or slowed down?"*
- *"Can you show me how you circumvent this from happening?"*
- *"What will happen if you can't solve this problem?"*

List the topics you want to explore and structure them in a way that is meaningful to you. This list of topics can then be used to create a cheat sheet for the research session.

Write a cheat sheet to use in the research session

A cheat sheet is a little memory aid that you can take with you when you collect data.

What goes into such a sheet? The biggest part will be topics you want to explore and the **questions** that you want to ask for this.

When you write the questions on the cheat sheet, start with the

general topics and progress towards more specific ones. This is the order that makes sense in the course of a research session. Nevertheless, that order is only a helpful guess. You will usually deviate a bit (or a lot) from your cheat sheet.

Often I include some kind of **checklist** on the top, especially if there are legal matters involved, such as signing a consent form. Thus, I can tick off what we already dealt with and immediately see if I forgot something.

The cheat sheet is a tool to support you during the interview and help you along when your mind goes blank for a moment. It is not for ensuring that you ask all questions in the same way and in the same order. Instead of controlling the situation user need research emphasizes the importance of exploring a given situation and it's peculiarities. It is totally OK and even beneficial to come up with new questions which are not on the cheat sheet, or to react towards a new topic the participant brings up if you have the impression that this will give you new and interesting insights.

Take along tools that help you to record data easily

With a participant talks about new and interesting things you want to be able to remember what was said. Thus, we record the interview — and we will need some equipment for doing that:
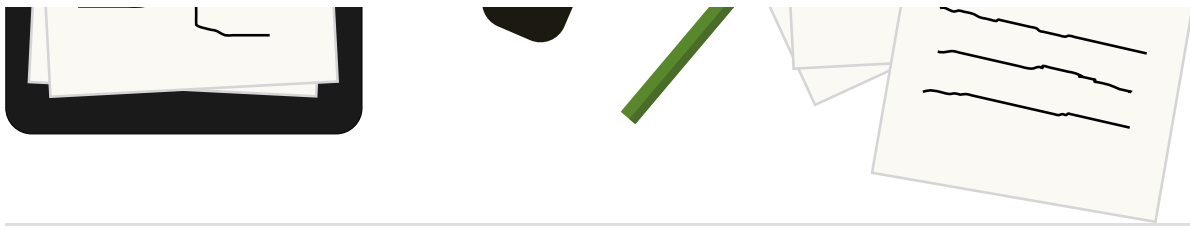
Equipment for user research: paper, pen, audio recorder

- for note taking and sketching
  - Paper, lined or blank (15 or more sheets, just to be safe)
  - Pencil or Pen (Don't forget to bring backups!)
  - Something to write on. A clipboard is great.
- Audio Recording (recommended)
  - audio recorder or smartphone
- Photos and video (recommended)
  - a digital camera or smartphone
- for drawing diagrams with the participant
  - templates
  - pencils and/or pens in different colors

You should get to know your equipment before you start the actual data collection. So be sure to know the essential operations to actually make a photo and start and stop the recording. Check the audio quality by putting the phone/recorder roughly a meter away from you and saying some sentences in your normal voice. Listen to the recording to test if you can (easily) understand what you said.

When your equipment is ready and checked, you can start to collect your data.

Data Gathering

In this chapter, I will show how to gather data on the activities, motivations and problems of our research participants. The data is gathered by listening to descriptions and explanations of our participants and by observing them working. The resulting data will be text, photos and diagrams.

Contrary to a common misconception of user need research, your inquiry will not be (directly) about future ideas and design—you are not going to ask "do you think that a [gadget] would help you?". It is hard to guess if an imagined thing would be great to have in the future. Instead of dealing with ideas directly, you will find out about the *how* and *why* of our participant's activities. This will allow to evaluate your ideas ("do my ideas match what they consider essential?") and to get inspiration for new ideas ("how can I support this activity?")

To make this work, see your participants as competent in what they do: they are experts in their fields and in their daily work. This is contrary to the idea that people "don't get it" and need to be helped by designers and programmers. Instead of this, assume that the participants have a reason of doing their work the way they do it.

Modes of data gathering

Listening and asking questions

A common way to gather data is asking questions and listening to the participant's answers. Asking questions may seem familiar from questionnaires. However, the use of questions and answers in user needfinding is different. Questionnaires often aimed for short, definitive answers which need to be selected from of a set of possibilities ("on a 4 point scale: how much do you agree with…"). In user needfinding, you aim for longer answers which are not from a determined set of possible answers. Thus, you are more likely to get

rich, story-like descriptions, telling about the user's motivations, activities and their context. To encourage the participant to give such story-like answers, you often need to ask for descriptions of activities and the reasons for doing them.

> *"Can you describe me how you decided to use this layout?"*
>
> *OR*
>
> *"You said that you need to look that color model up. Why?"*

Asking questions and getting answers from a participant is a very versatile tool. It can be done without many resources. Furthermore, you are not tied to a specific place and you can talk about past events as well as future plans.

But because of this, it can happen that you hardly focus on actual experiences and instead talk about abstract events. Observations are thus a good supplement to asking questions and listening, since observations are concerned with actual actions you can see happening at the very moment.

Observe

What Participants describe is not always the ideal way to convey the information. Just like a picture can be worth a thousand words, it makes often sense to ask participants to show what they mean and to demonstrate how they work. It can also be easier compared to describing to.

When you observe, you will even notice things your participants would never consider mentioning: It may have gotten second nature for them which tools they use, how they apply these tools to their work and which problems they meet, so they won't mention it. But you can observe it. You also can gain information about the context, like means

of communicating with co-workers or cues in the environment that point out problems—for example quick fixes on devices using tape and cardboard, or added instructions on devices and machines.

It is not needed to have observation as a separate step in the research process. It makes great sense to interweave observation with asking questions and listening. For examples, you can ask for a demonstration instead of a description.

> Participant: "So I got this image and now I would try to get a suitable crop for that brochure" Researcher: "Can you show me how you do it?"

Think of yourself as an apprentice of the participant. The participant is the expert who can teach you some of their skills. This means that understanding the user by observing is not a passive process. Like an apprentice, you can and should ask questions.

> Ask about reasons: "You drew that object and changed it size, then you deleted it again… what was the reason behind this?" Ask about things you notice in the environment: "Can you tell me what these markings are for?"

Teaching an apprentice is not a theoretical or artificially set up process: The tasks you observe should be tasks the participant is actually doing (and not something set up for you):

> Participant: "What should I do now?" You: "What would you do if I would not be here?"

Of course, they should be relevant to your interests as well:

> [continuing the conversation above] Participant: "I would either crop this bunch of images or I'd try to find a suitable font for the headlines in this document You: "If the tasks are equally relevant to you, I'd be more interested in watching you choosing the fonts"

Avoid positioning yourself as the expert in the participant's domain by

suggesting procedures and by telling the participant how and why something should be done. If the participant would just look up to you and your concept of how work should be done we would not get to know anything.
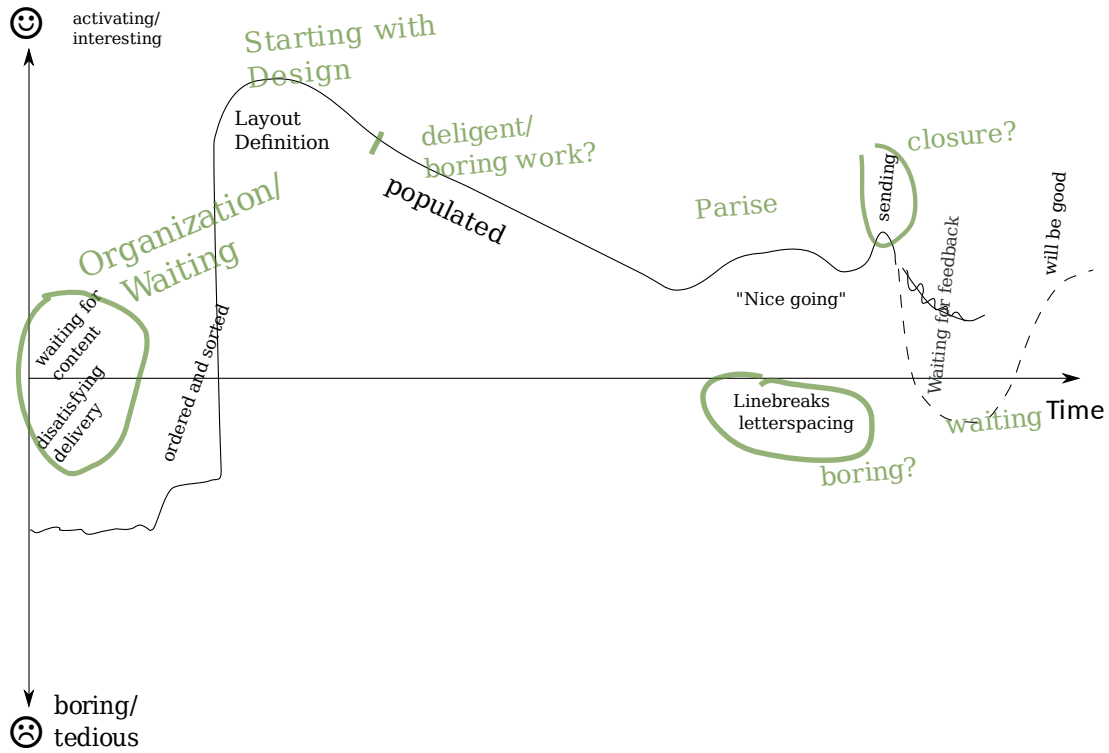

Observing the user's work

Co-Document in diagrams and lists

In co-documentation, the participant and you record the data together by drawing and writing. This can be as simple as asking the participant: *"Draw a simple floorplan of your office. Mark what is important to your work and write why"*.

Here are some examples of co-documentation results:

Timeline diagram. If the graph goes up, the mood gets better, if it goes down, the participant feels bad, bored or annoyed

Draw a diagramm of the people you work with, what you work on and how!
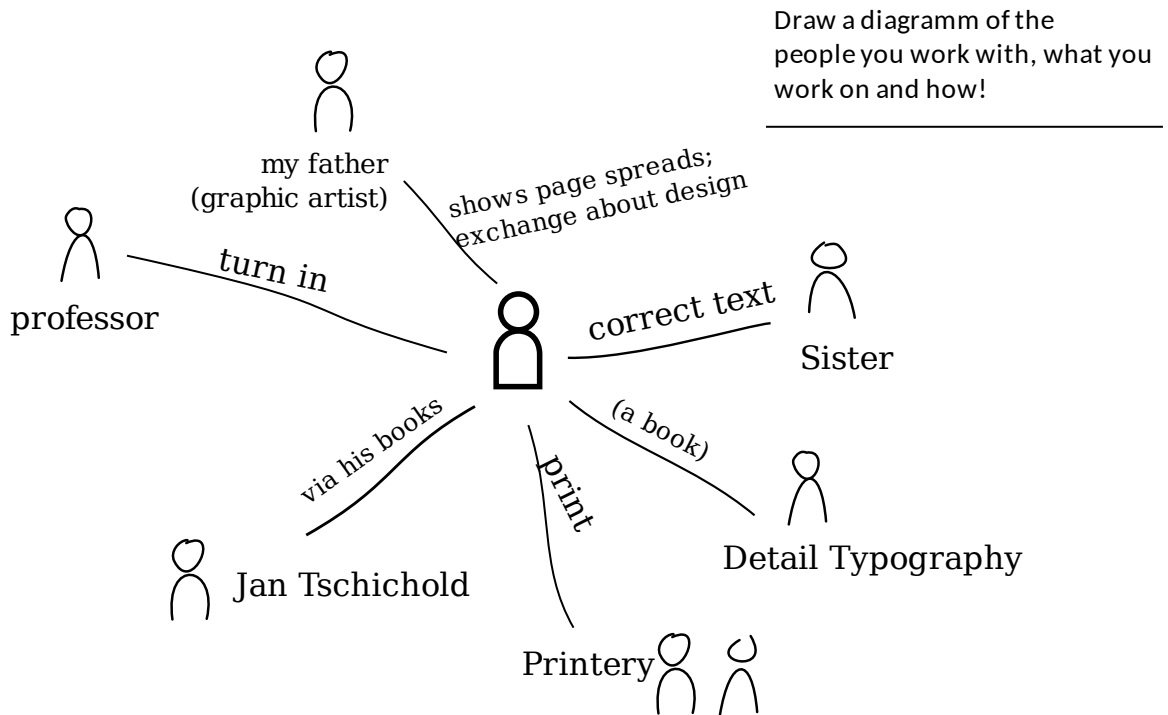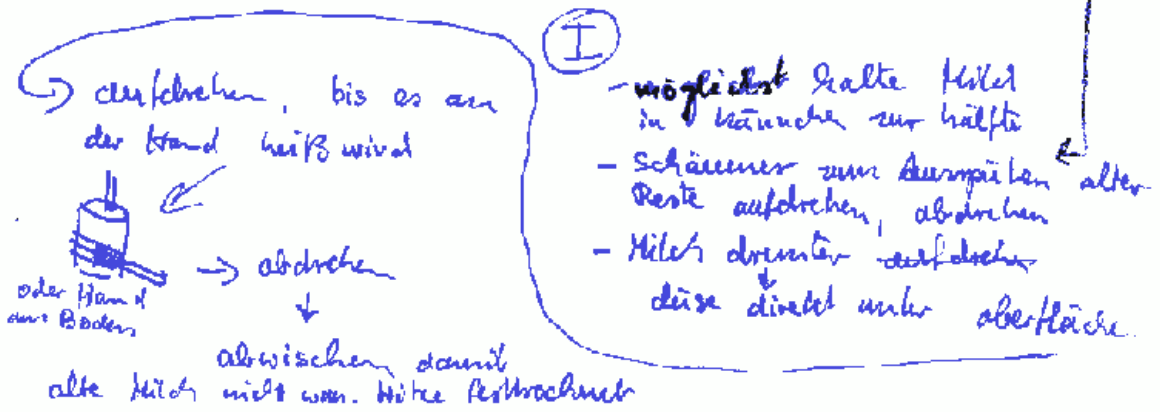

Social space map: The participant is in the center. They draw people (or whatever else they think matters) around them and write the nature of the connection on the

arrows

List with workflow steps

Having the documentation in front of you and the participant eases improving it directly while it is being created. You, the researcher, can refer to it to ask for elaboration (*"Is this the photocopying machine, that you said gets stuck so often?"*). Their answer should be added to the documentation. The participant can use the shared documentation to extend already documented things (*"One other thing I add is that I can get paper for the xerox here [writes comment on the paper]"*).

The fact that researcher and participant need to understand the documentation is a check against unclear terms, references and also just sloppy handwriting. This makes the results often very accessible and useful.

> *"The line here seems to indicate that you were very happy at the beginning of the project…" Participant: "Yes, I'm looking forward to doing it and there are so many ideas" You: "Can you write this in the diagram, so I can understand it later?" Participant: [Writes as comment in the diagram] Looking forward, Many Ideas: Good*

Who does the recording—drawing and/or writing—depends on what is more practical and gives more interesting data. When researching workflows, *I* write the documentation as a researcher, since participants should be able to demonstrate their tasks directly which is hard when you need to switch between demonstrating and writing all the time. When the participants document a project on a timeline, *they* draw it directly and I only ask questions.

On way to ease the documenting for the participant is showing a simple example of what the result of a co-documentation can look like. An example is helpful, if the participant has no clear idea of what they should do. It can also reduce anxiety in drawing related tasks—some people assume they need to produce an artwork and showing that a rough sketch is fine.

It can be easier for the participant if you provide a template instead of a blank page: This gives a basic structure. Provide fields for name, date, title and space for the participant's diagram. I also sometimes print a small example in a corner of the template. Templates work very well for chart-like types of diagrams, since the participant can draw on top of elements that are already there, like the diagrams' axis.

☺ **activating/ interesting**
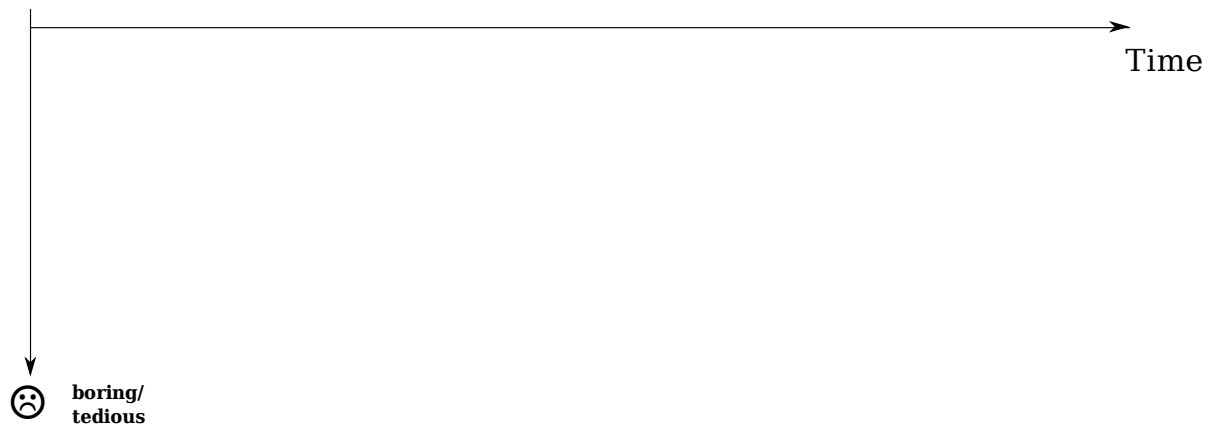
Example template for mood-timeline-diagrams

Co-Documentation works well in combination with interviewing and observation: You can co-document workflows combined with observing them and you can also go from an interview to co-documenting a specific aspect (*"That is interesting! I would like to remember it clarly later on, so I would like to write the steps down with you"*) or use a documentation to refer back to in an interview (*"You wrote… How does relate to…"*) and add further details to it.

Co-documenting via lists, diagrams and drawings may seem unusual in the beginning. But they produce very useful and graspable data by having the researcher and the participant work together. The participant's active part in documenting and the possibility to see directly what is recorded can empower participants: They are not just passive sources but actively create data.

Start the research session

Explain the research project and methods

When you have found a participant, a place, a time and have your equipment ready, you can start with the research session.

My advice is simple: Be friendly. If you come to their place (which is preferable, since you can observe the actual context) be a nice guest;

if they come to your place or you meet in some "neutral space" (which includes online conversations), be a nice host.

Greet the participant and thank for their time:

> *Hello Lisa, great to meet you. I'm pleased that you could free some time for showing and telling me how you work.*

You may sprinkle in a bit of smalltalk:

> *Did you have a good start into the day?*

Participants should at least roughly know what the research is about. You don't need to reveal all your questions and topics, but the general topic should be described

> *This research helps us to improve the workflow in the design process to design solutions for people who do graphic design.*

Make clear that you are here to learn—and not an evaluator of the quality of the participant's work.

> *…Therefore, we'd like to get to know how you work. You are an expert in that field and we'd like to learn from you. This is not some kind of test—when I ask questions, there are no wrong answers.*

Although you may have described the time frame and the method already when recruiting the participant, tell again what you are going to do:

> *We will have a conversation about your work and I'll be asking some questions. In addition, I'm interested in watching you when you do your work. The whole process will take about an hour.*

The participant must know how you record data and who will see it. So tell the Participant:

> *I'd like to take notes, and, in addition, record audio—if that is OK with you. The audio recording helps me to focus on your work as I don't need to concentrate as much on writing notes, if I have the recording as backup. Me and a colleague will listen to the audio; we will anonymize and transcribe the data before we share it with the product design team.*
>
> *If you feel uncomfortable with being recorded at any time, we can pause the recording.*
>
> *You can cancel the interview at any time if you feel it is needed.*

It rarely happened to me that someone did not agree to being recorded. If that happens to you, you can ask if they have any specific worries—possibly you can inform them about that specific aspect, and they might agree when they have additional information.

> *[Example from an in-house research project] "Audio recording… I'm not sure about this…" "That's fine with me. Though, may I ask what worries are?" "Hmm…yeah, I don't like, you know, human resources to get that data"*
>
> *"I understand your concern. It is fine if you don't agree but I can assure you that Human Resources is a separate section. We don't share personal data and what we record today is not accessible to them. Also, all data that leaves my computer or the one of my colleague is being anonymized and we remove all data that points to you as person, including names, workplace and so on."*

If they don't agree, just stick with writing notes.

Consider summarizing the information about the research and the use of the participant's data in a consent form that the user signs. In this case keep the signed form, but hand the participant a copy of the form. Thus, the agreement is clear for both sides. See in the Appendix for an <u>example of such a form</u>.

After the participant has given their consent, you can start the

research session.

Start simple

Start with some easy-to-answer questions—like: "Lets start with some simple questions about your job". You can ask "What is your job title" and maybe follow "How do you name your Job when friends ask you what you do?". As well, it might be interesting how experienced the person is: "How long have you been working in your current occupation?" These examples are tied to work related studies—for doing research with university students I tie the questions to their particular context and ask, for example, how long they have been studying so far.

These questions will help you to get to know some context of the participant's work. But there is another advantage: Such questions are easy to answer. This gets the participants used to answering questions and opening up towards you. After a brief section with these easy-to-answer questions, you can transition to questions that demand more elaborate answers.

Assure and encourage

Affirm that you listen

You will ask questions aiming for descriptions and longer answers. So you will be listening to the participant most of the time. You probably have some ways to intuitively show that you listen—like nodding with the head or saying "yes" or "mm-mhh". This is an important way to ensure the participant that their information is listened to and valued.

However, when giving this kind of feedback you should be careful. You could easily skew the answers by indicating that some information

is better than other. If you throw in a "yes, great" combined with nodding (as if you prefer what the participant did in comparison to something else) or if you just make a rather unmotivated "mm" and frown (as if what is told does not match your hopes), the participant will get selective about their answers and focus on what you seem to like. Try to keep the reassuring sounds or gestures neutral.

> A negative example of feedback would be: "It was great to hear that you say you have some trouble exchanging files by mail!" (Since you may have already thought of a feature that might be helpful in that case)

The participant will try to be a nice person try to make you happy by going on about the problems with files in mails even if sending files per mail is possibly not that bad in the participant's view. Instead of reassuring the participant using judgments and emotions, focus on the fact that you got information you that helps you:

> "That was interesting to hear –"

You could even wrap the information up—"So, you said that…"—and/or refer to an area you like further information about. It will be clear, that you care for the information and listened well—without casting some judgment on what was told to you.

Make a friendly impression by using body language.

Probably, you would not make a bad impression anyway, but let's go through it nevertheless: Don't give an angry or stern impression by frowning and crossing arms and legs. Don't look careless by leaning back and looking to the ceiling. During the interview, show reactions to what the participant says or does and look him/her in the eyes (at least for members of western culture). When taking notes, maintaining eye

contact is not possible all the time—but keep eye contact when you can.

Not-so-good posture

Much better posture

Don't skew the results

Ask open questions

You may have noticed that the suggested questions from the previous section are not aiming for specific, short answers. In daily life, you often want answers to be short and precise: "Are you a graphic designer?" "No, I am a programmer" / "How much do you like your Job? Give a mark" "B!" / "Please name your Tools –" "I use InDesign, Photoshop and Sketch".

    If you would diagram who speaks for how long when we ask for specific information with a "closed" range of possibilities, it would look like this:

You	User	You	User	You	User	You	User	You	User

short closed questions

These questions demand very specific answers from a determined set: Yes or no, marks from A-F, a list of nouns. They would be useful if you would want to do statistics, for analysis that allows us to give results like "56.3% agreed strongly on Question X". However, we want to find out about the *why* and *how* of the participant's work here [2].

    Imagine, in contrast to the research session outlined above (short answers, short questions) a day-to-day situation, in which you get to know about somebody else's experiences: A conversation with a friend. In such an exchange you will tell each other about your experiences, what you felt, why you did this and that etc. In a diagram it would look like this:

You	Friend	You	Friend
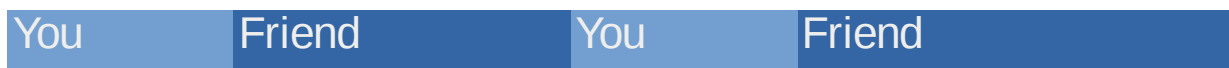
giving longer answers, equal share

In contrast to a conversation, our main goal is to collect data; we don't

want to tell about our Job as a user researcher, but hear answers from the participant. Thus asking questions and getting answers in a user needs research session look like this:

You	User	You	User

participant gives long answers, researcher asks short, open questions

The questions we want to ask should encourage answers which describe experiences and give some insight into the "why" and "how" of the users activities and motivations. This type of question is called "open question" since these questions don't have a determined ("closed") set of answers.

> Open questions would be: "Describe how you started your work today" or "Why did you copy that page?"

Using such open questions encourage telling longer, story-like answers. These answers will even contain information you did *not expect* to get.

> A participant is describing me the printing process: "…then I look up which color specification the print shop needs…"
>
> That is a new step in the workflow I did not expect (Naively, I thought that you just send the document to the print shop, like you would when you print it on your desktop printer—have a file, print it).
>
> Thus, I discovered a step in the workflow and a potential field of work (taking care of color spaces and profiles), of which I did not know that it even exists!

The information you get will not be abstract as in answers like "good" or "I dislike it", but tied to a situation. This is preferable, because a future product will be used in real situations and not in an abstract space of thought.

> "I like it when the feedback [to the design] comes quickly. No annoying

> waiting… it always makes me nervous. Do they [the client] like it or do I need to throw out work?"
>
> —this tells us more about the situation than a client's feedback being just described as "I feel good".

If you look back to the questions already mentioned, they will share some characteristics.

> Here are some possible questions
>
> - Can you describe the worst experience in your day so far?
> - Can you tell me how you create a layout?
> - Can you tell me what makes a client "difficult"
> - Can you describe how do you get new ideas?

All these questions start with "…can you describe" or "…can you tell me", which encourages a longer answer (since "describing" or "telling" demands more than one word). In addition, all sentences contain a *Why-*, *What-* or *How-*. These question words, again, suggest an elaborate answer.

Thus, a template for such questions would look like *"Please tell me [how/why/what] + [researcher's interest]"*

Contrast this with questions like

> You: "Is this a good design?"
>
> Participant: "yes!"

"Is…" -questions will be answered with "yes" or "no"—but we don't get to know *why* the participant approves or disapproves. In addition, "Is…"-Questions are a subtle form or influence [3] : In case of doubt, it is likely that are participant just agrees to the suggestion you give by asking "Is…"

Sometimes, "Is"-Questions will come in a disguised form—as an

addition, which is made to an open question:

> You: *"Can you tell me how you solve this problem? …Do you do it by just calling the client and resolving the issue?"*
>
> Participant: *"Yes, I do"*
>
> The first part was fine, but the *"Do you…"*-addition turned it into a closed question.

Avoiding closed questions is actually harder than one thinks. We intuitively try to make answering easier with such additions like "Do you…".

When you create your questions, check if they demand some predetermined outcomes—if they do, they are closed questions. In this case reformulate the questions in a way that allows and "open", non-restricted, story-like answers.

Be aware of your influence

A very obvious problem is influencing the participant. One way to minimize this would be making all research sessions alike—just like you would do when using a standardized questionnaire. But by doing this, you would lose the very strengths of the methods described here: Being able to find out about new and unexpected things, reacting to them and gaining understanding of the "how" and "why" by reacting on the situation.

Each participant and their context is different and you can accommodate this by adjusting the research session to the context and the activities of the participant. This would not be possible when asking the same questions each time.

So you neither can't nor should take yourself out of the research session—you will *always* have some sort of effect on the participant

when you do the research.

What you should avoid, though, is influencing the participant by "suggesting" favorable answers or actions. Some sorts of this type of influence are obvious, others are not.

> *"This is good, isn't it?!"*

Is a very obvious influence, since it blatantly states what you think the answer should be: A "yes".

There are less obvious influences as well:

> *"Would you like a better version of this?"*

In this example, a positive word ("better") and a suggestion go together. Who would not like an improvement?! A "yes" is guaranteed—as well as a meaningless finding which would be "people want improvements".

Aside from your questions, you could influence the user with your feedback since it might suggest that there are "good" and "bad" answers. For example, it may be tempting to correct users and show the "right way" of doing something:

> *If you know, that there is a "change color"-function in the application and the user says: "Well; I am annoyed by that application—I'd like to change the colors but that is impossible!" It may be tempting to say: "No, you can change it!"*

Remember, that you want to find out what your participant does and why. To correct the participant is not very useful. If the participant would clearly benefit from knowing some technical detail, just give the crucial information after the session. But for now, use the possibility to further explore the topic without correcting the user.

> *You can just ask "what's the reason for you doing it this way?", or, if talking about the function itself is really important to you, you can ask "How did you*

> *expect to do the color change if there would be such a function?"*

You may also be surprised or even annoyed by steps or actions in a workflow of the user which seem outright superfluous.

> *"When I write a text I write a draft and then send it to my colleague via mail as an attached .doc file. My colleague comments on it and returns the mail to me"*
>
> *You may think that this is rather inefficient and be tempted to say "Why don't you paste the text in the mail and comment directly? Or write it live on Etherpad? This would be far quicker!"*

Remember that nobody does inefficient things by purpose. Assume that the user has a reason. Try to find out what this reason may be.

> *Again you could ask: "what's the reason for you to do it this way"—and remember to ask follow-up questions to further explore the issue. In the example of the attached file it may be the case that the rich formatting functions of a word processor are needed or that such documents are used for just everything in this office, so that switching to a "better" solution would impose mental costs of switching to and operating in an unusual context.*

Your influence could be non-verbal as well. Like in everyday conversations, you may shrug or frown if you disagree with an utterance or an action. Even if you don't say "this is wrong", frowning or shaking your head may have the same results.

So: don't be afraid to react towards the participant—reacting towards the participant is essential in our research. But don't suggest "good" or "bad" answers or "good" or "bad" ways of doing things by using words, gestures or facial expressions.

Silence feels strange but is okay

Sometimes, the participant will take time to think before answering. Intuitively, you may want to fill the silence to help the participant along.

> *"Can you describe me what happened after you were finished with creating the print-ready-file? [1 sec] Was it all well?" "Yeah, sort of well, I think"*

It is tempting to fill the silence with suggestions for the answer. But it can turn an open question ("can you describe…?") into a closed question ("can you describe… was it…?"/"yes") or prevent the participant coming up with their answer on their own.

Try to tolerate the silence. Usually, the participant will answer within a few seconds. If you notice silence which you want to fill, count to 3 or 5 before probing further. When the set time is up, you can ask about the question rather than giving suggestions, like

> *What makes the question hard to answer?*

Or

> *Can you tell me what you are thinking about?*

By asking these questions, you can help the participant to continue with elaborating on the question you asked, even if they need some thinking to answer it.

Take a closer look

Probing

You got some valuable information, but there seems to be even more interesting things you may get to know about that topic. In this case you can "probe" for further information.

We already know one way to do this: Silence. The participant may

just jump in and fill the silence with further information.

> *Participant: "So I had it finished and send it away to the client and then almost nothing…" [Pause, Researcher nods] Participant: "This is difficult, then. I mean, I got a brief mail that they got the design, but […]"*

If leaving a pause does not make sense, you can achieve a similar outcome by repeating the most recent statement or words the participant has said.

> *Participant: "So I had it finished and send it away to the client and then almost nothing…" Researcher: "almost nothing?"*

This way, you can help participants to carry on without actually adding any information yourself.

> *Researcher: "almost nothing?" Participant: "Yes, there was a brief mail that they got the design but I was unsure if that person actually gave it to the people who can decide something. That waiting just sucks."*

If you would like to know more about something particular, you can also ask directly:

> *Researcher: Can you tell me what you do in such a ›waiting‹ situation?*

Asking directly can be particularly useful if the participant gave a rather vague answer:

> *Participant: Well, I try to get some more information and try to find out where it got stuck Researcher: Could you describe me how you would do that?*

When you gather your data by observing or drawing diagrams with the participant, direct questions are very useful to explore the work:

> *Researcher: "I saw there was a warning in this pop-up-window. You wanted to avoid these warnings before—why would you now print the document in*

> *spite of it?"*

Or, in the case of drawing:

> *This graph seems to indicate you were in quite a good mood here. Could you explain me a bit why you seem to be less happy here [Points]?*

By using these probing methods you can get additional information and show the participant that you are carefully listening and observing.

Check your understanding

You can refer back to answers to check your grasp of what the participant talked about. In this case, even closed (yes/no) questions are OK.

> *"I saw you choose the color from that palette down there—is this the same palette you choose the background color from?" "No, it is not—the palette I am using here is…"*

There are several advantages of checking:

- Avoid confusions and misinterpreted research due to misunderstandings
- Show that you care for the participant's expertise.
- Encourage participants to continue and tell you more.

For checking, you always need to refer to something that you want to check. You often need to describe it to the participant:

> *[Researcher] "So: If I want to print something first I need to ask for their color profile, when I have this, I load it in InDesign, choose the profile in the pdf dialog and then export it?" [Participant] "Yes. I usually to a test afterwards by opening the pdf in addition"*

For this, you and the participant need to remember much at the same time. If possible, you can aid your memory by pointing to a device or part of a drawing or just demonstrating something. Don't only rely on talking.

> *Can you tell me more about the function behind this button?*

OR

> *Here [Points to diagram] your motivation seemed to change quite quickly— can you tell me more about this?*
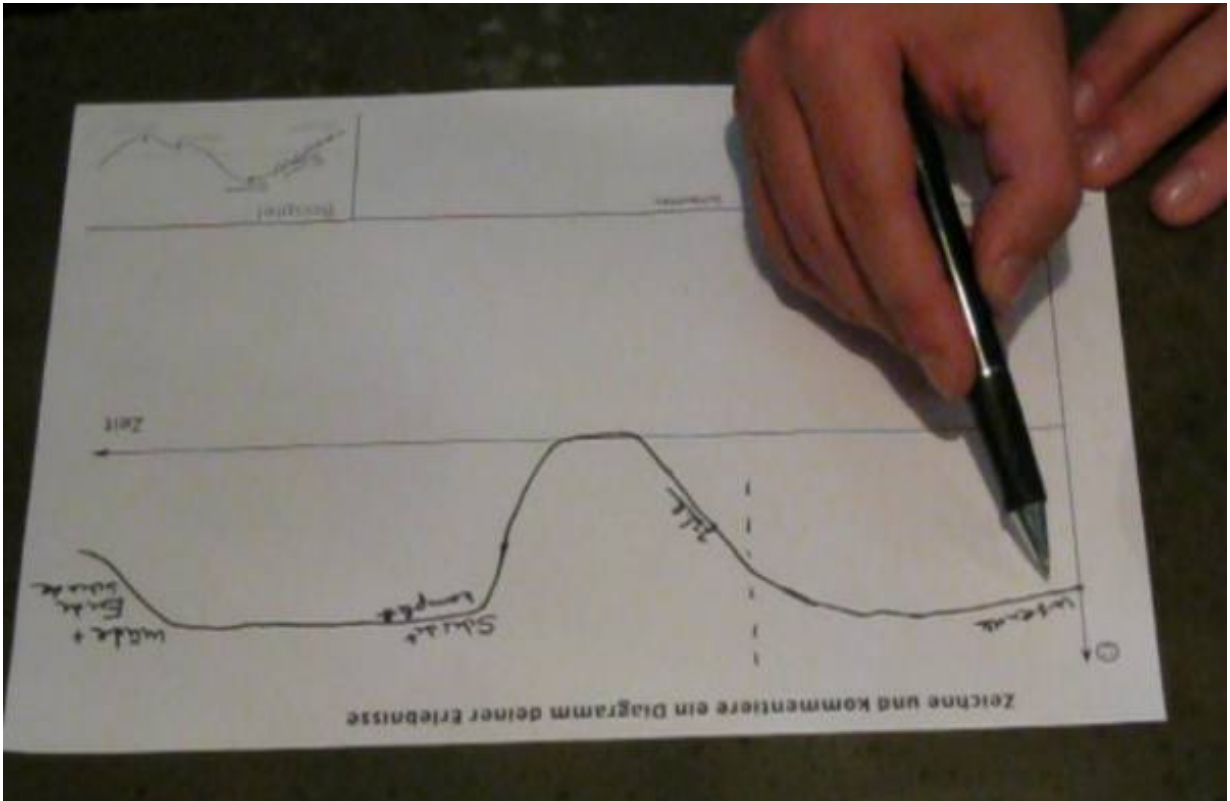
Researcher points to a part of the diagram

By checking your interpretations of the participants descriptions and activities, you can avoid misunderstandings and gain additional insights.

Ask for examples

Seeing an actual example avoids misunderstandings and gives rich opportunities for further insights: If possible, ask for an example, when participants mention activities or tools they use.

> *Participant: …so I would use the thing here. Researcher: The thing?*
> *Participant: Yes, it is a little icon on my desktop that does help me, when*
> *things go wrong! Researcher: Can you show me how you use it?*

This avoids misunderstandings. The "thing" could be a script that fixes a setting. Or something else. We don't know, and it is easier for researcher and participant to look at it together.

Steer the course of research

Switch topics

Over the course of your research you will cover different topics. Some may be set beforehand because you think they ought to be covered; other, new topics will reveal itself during the session.

There are several reasons to actively switch topics:

- There is (seemingly) nothing more to be found out.
- You covered enough and need to switch to another topic before time runs out (In this case, plan in more time in the future)
- The participant is focusing on a topic that is not in the focus of your research.

To switch topics, you can voice your interest in the next topic:

> *Could you tell me more about agreeing on a payment with the client?*

If possible, you can end the block by rephrasing what you learned before moving to the next topic.

> *"Let me briefly summarize: […]. Next, could you tell me more about agreeing on a payment with the client?"*

Referring to the previous topic can also help to give a sense of closure for the previous topic.

> *Thanks for telling me about specifying the task together with the client. What is also of interest for me: How do you agree on payment for your design work?*

This can be particularly useful if a participant is carried away by a topic that is not relevant for you.

> *So, knowing about lead typesetting is important for design work… There is another topic that might seem very different, but it is important to me: Could you tell me more about agreeing on a payment with the client?*

To make the topic changes less abrupt, and to show that you listened carefully, you can refer to a topic which was mentioned but not explored yet:

> *In the diagram, you drew a blob for "printery"—can you tell be a bit more about how do you get the design printed?*

or:

> *You mentioned that the application needs to have the correct file format when you collaborate with someone. Could you tell me a bit more about your collaboration process?*

By altering the topic you can cover the issues you need to know about and, if needed, bring your research back on course. But do it considerate—each topic needs time to unfold.

Switch methods

Every method has its strength and weaknesses. So it makes sense to transition between methods in your research

By using different methods on the same topic, you can gain new perspectives on it.

> Here a possible switch from interview to observation: "You told me your general process of setting up a document for your designs. Could you show me how you do this for your current project?"
>
> In this case, you already have a description of the activity. By observing the process, you can gain a less general, more specific and contextual view on it.

The methods you use on the same topic can be intertwined: During the demonstration of the activity, the participant may add to their description.

> The participant explains while demonstrating: "So, I write a brief sticky note with what I think is important. I actually do this fairly often. I think I did not mention it before!"

Often, methods are switched together with the topic. You may have heard about motivations of the participant and now would like to explore an activity:

> You said that collecting inspiration on the web is fun for you. Could you show me how you do that? Just do what you would do if I would not be here—and if possible, tell me what you are thinking while doing it.

Or you might want to talk in depth about the project structure that a participant just sketched in a diagram:

> In this diagram you wrote that you have some conflicts with the client. Could you tell me a bit more about this?

Again, the methods can be intertwined:

> *You said that the client is often unclear in what he wants and says things like*
> *"it should pop more". I write that here in the diagram, so I can remember it.*

Using different methods and switching between them may seem like additional work. However, it can ease your work and, at the same time, improve its outcomes—just like choosing the right tools in manual crafts.

Recording data

Notes

making notes on a clipboard

While you observe or listen to the participant you will take brief notes. This is rather similar like taking notes in school or university: You go for the gist of what was said but you don't write down the exact words (Except in the case you find a particular expression itself important). One utterance or observation concerning one topic goes in one line, bullet-point style.

When you look down at your notes and think about what to write, listening and observing don't work well. Try to keep it as unobtrusive as possible.
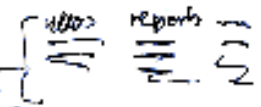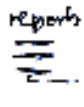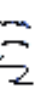
- If you don't care too much about your handwriting you can write notes without much looking at the paper except for some occasional glances (the method has its limits, though)
- Because of the difficulties of balancing observing, listening and note taking, there are obvious benefits of a partner who does the research with you. One person can ask questions and guide through the research, the other person takes notes. Both observe and listen.

- If you record audio in parallel, you can be more relaxed when writing what was *said*. However, you still need to take notes to keep what you observed. This can also be very useful when you listen to the audio later and wonder what was referred to when the participant refers to things as "it" and "that"—without notes it can be hard to reconstruct what the participant was talking about.

When I take notes in research I often write about 1 A4 page each 15min., sometimes more, sometimes less. So it does not make sense to try to write everything on one sheet or even in some space left on the cheat-sheet with your questions on it.

Example for a sheet with research notes, written ca. over 20min

You will supplement, transcribe and analyze your notes after the data gathering. Thus you need to be able to make sense of them later. Between collecting the data and reviewing your notes, the *context* is easily forgotten: If you just write "empty page" it may make totally sense at the moment you write that, seeing what is happening and knowing what happened before and after. But without that implicit knowledge "empty page" does not make much sense.

> *Rather than "creates empty page" write "creates empty pages to organize drafts"*
>
> *Instead of "changes objects" write "Changes object size to match grid"*

Audio

Unlike making notes on paper, making an audio recording is a rather passive process except for pressing the record button.
    I recommend using audio recordings—it is a useful supplement to your notes. It will record the audio during the research session so that

you can listen to what was said hereafter. Note that it is not a perfect capture of all that happened: It records only sound, so if the participant points to the screen and refers to "this", the recording is not much of help.

Photos

Making photos is rather easy and can capture lots of information. For example, you can photograph the participant's desk to aid your memory. Later, you can go back and see what was on it: Paper, pens, computer; were there tidy looking stacks and containers for all the utensils? Or was it seemingly messy?

You can photograph the users screen if your research involves computers and gadgets. Tech savvy users may cringe since a software based screenshot is technically superior—but if the user does not know you to make a screenshot, a camera is a handy way to capture the screen.

You should be able to make photos with your camera quickly and reliably. Thus, use a device you know and which has a good auto-mode. The only setting that I use beyond that is the exposure compensation in case an important part of the image totally dark or disappears in light. Exposure compensation allows adjusting for that.

Avoid complicated set-ups or even arranging the participant and his/her tools. Arranging the participant and his/her tools would change the data you record.

Photographing the working user

Photographing a screen instead of using screenshots

Sketches

The Observations you make are, by nature, visual and concerned with

processes. Make sketches or even little storyboards to capture what you see.

It is very useful that you can choose what to draw: highlight what is important, leave out what is irrelevant and make annotations to ease understanding the sketches later.

I mostly use my sketches the same way I use notes: Notes and sketches are made on a common sheet of paper; one sketched observation goes in one line, if possible
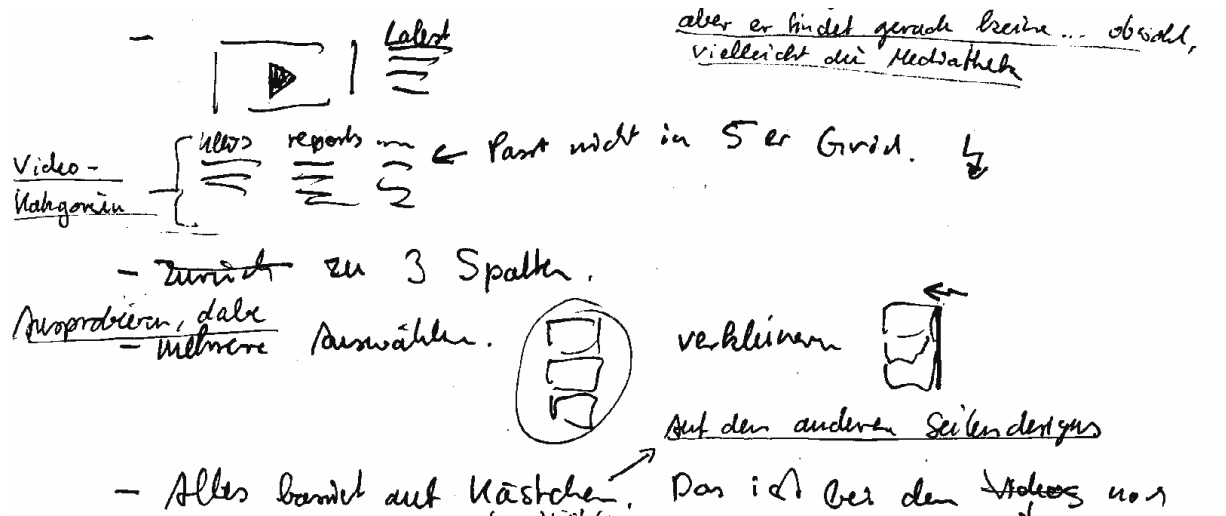
Sketches on the note sheet

Diagrams

A big advantage of diagrams are that the data gathering and documentation happen at the same time. So, there is not much to add. Happy diagramming!.

Review your data

After gathering data, we need to take care that we can use the rich data in our later analysis.

When collecting the data with the participant you will be very busy listening and thinking of following questions. So you may not be able to keep up with writing notes and drawing sketches. To make the most of our data, we supplement our notes, sketches and diagrams and add some information about the context of the data gathering to close gaps and to help us to keep all the data ordered.

There are two ways to supplement your data: From memory and from additional recordings, like an audio recording.

Supplementing your data should be done as soon as possible after the research session. I recommend to scheduling the data gathering in a way that you have some time directly after the session to supplement and order your data.

Supplement data from memory

I add data that I did not write down yet. In this case I *add* them, like

> *[ADDITION]:*
>
> *She looks at her sketches before she starts working*

or I supplement some *existing* point with additional information:

> *Sketching paper kept ready. [ADDITION]: In transit: in the backpack; at the workplace: right on the desk*

You can give brief notes more meaning by adding context from your memory:

> *She saves old ideas [ADDITION]: For later inspiration in other projects*
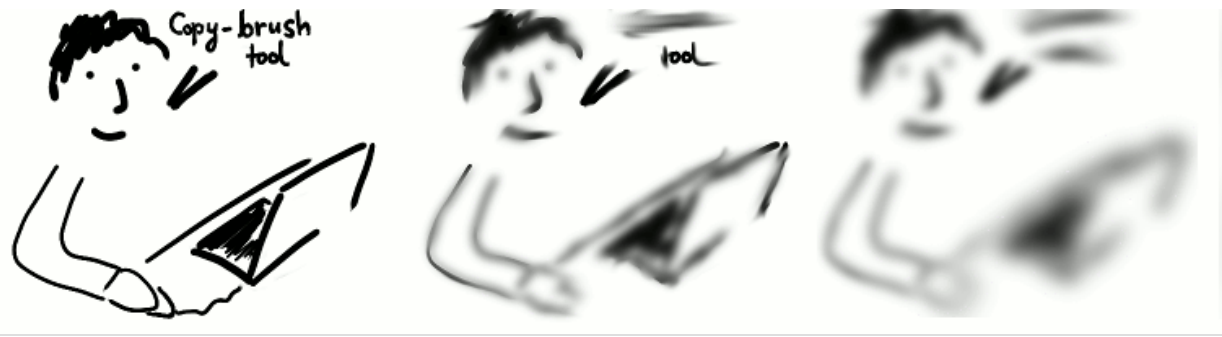
memory fades quickly

When revising your sketches, redraw the lines if the sketch is ambiguous otherwise and add annotations if you think that they might ease interpreting the sketch later on.

Think of your future self: Some notes may make perfect sense to you now but since memory fades, they will seem cryptic later. So supplement and clarify your sketches and notes so you can comprehend them after your memories of the experience have faded.

> *I have line "Big changes" in my Notes. I remember that I made this note when the participant told me that her colleagues make bigger changes between to two versions of their designs than she does. I added this information to the notes, since it provided a way to understand what the "big changes" actually refer to.*

Similarly, if my writing is rather messy, I rewrite some words to ensure that I can later decipher what I wrote.

I write and draw my supplements in another color than the color of the original notes. When I wrote my notes during the interview with a blue pen I use black for the supplements or vice versa, since I like to be able to keep track of what I did in which step of the process.
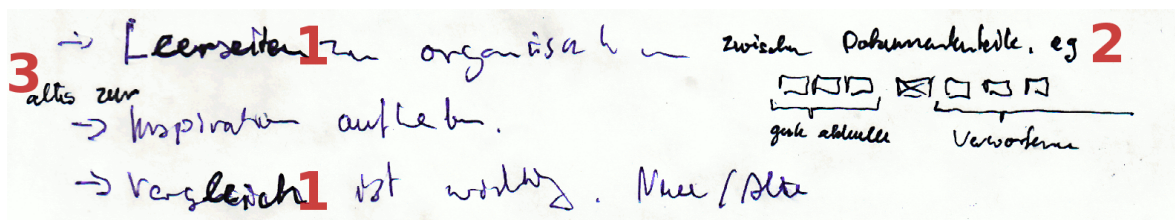
> *In this scanned part of a note sheet you see how the supplements are used:*
>
> ***1)*** *These parts have been partly rewritten in black as it was too messy before.*
> ***2)*** *At the right you see a newly drawn annotated sketch that provides a visual representation (how the document is organized by inserting empty pages).* ***3.)*** *More information has been provided. It was "keeping for inspiration", now its "keeping old stuff for inspiration"*

Using different colors is useful for another type of supplement: Ideas or remarks in connection to your notes. When I go through the notes I often have some ideas for a design or a question which I would like to further explore in a future interview. I write them down in a third color or I prefix the note with *"IDEA:"* or *"QUESTION"* in order to prevent myself of mixing ideas with empirical data.

Transcribe your notes

Since they are often written quickly, your notes will usually be rather incoherent: Single words, small sketches, and longer sentences will all be scattered on the paper. Tidy your data and transcribe the notes in a digital document.

Before transcription

- Brought old editions of the calender to the first planning meeting

- Discussed: What was good about the previous editions, what was not

- Discussed: What are our requirements? What do we need, and what do we want to avoid?

- We decided on a page format, since it determines much of the design and is very hard to change later.

After transcription

In your digital transcript, put one statement (or whatever you consider to make sense on its own) in each line. Avoid tying together two separate statements on one line and, on the other hand, make sure that the data you put into one line is meaningful on its own and is not just a single word or a description which is free of any context and thus hard to set in relation to other data. This is a simple way of ensuring that we chunk our data in a way we can later use for the analysis.

To make this reasoning more clear, here are some examples:

> **Not meaningful on its own (means mostly: too short):**
>
> - *duplicate objects*
> - *making space*

If there is any way to add the actual context (out of the memory or using other notes) these notes should be supplemented with that context which hopefully helps us to get to know why are objects are duplicated and for which purpose is the space is made.

> **Too many statements in one line (means as well: too long):**
>
> - *Duplicating pages to save old ideas is common. Later she goes back to the duplicates and looks at them when she needs inspiration*
> - *She tries to have enough space for the margins to write comments in; to do so, she shrinks the main text area. She says, she could as well try to make space at the bottom of the page, and use footnotes for the comments.*

> **Reasonable (each line can stand on its own and does not to cover multiple issues at once)**
>
> - *Duplicating objects to save old ideas for later inspiration*
> - *Make space for additional comments by shrinking main text area.*
> - *Alternative places for additional comments: Either right margin or bottom.*

The notes from the research session and later added supplements from my memory get the same formatting in my documents since they are all data I gathered by listening or observing the participant. But I take care that later added design ideas and research questions are still easily distinguishable from the actual data that I gathered in the research session.

Possibly supplement from audio recordings

If you made a recording of your research session, use it to supplement and check data.

When the audio contains information which is not in the document or if it supplements information that is already there, I pause the playback and write the additional information in the document. So the process is very similar to supplementing your notes from memory.

> *Audio recording: "…hmm I send it to my boss. She will check it. Now I go to that other document, and see…"*
>
> *The notes say: "Send document via mail"*
>
> *So I add the information about the cause of sending the mail: "Send document via mail to the boss for checking."*

If you need to save time, go through your notes and see where they

lack information. Then just jump to the parts of the audio that might complement these sections.

Order and archive your data

It should be easy to find out later which data was from which participant and how notes, sketches, diagrams and possible audio recordings fit together.

Take care that all sheets of paper and files have…:

- A participant code like P1 for the first, P2 for the second participant etc. This way you can later trace back which data belongs together
- The name of the project and the date. In your next or even a parallel project, you may have another "first" participant, and you don't want to mix them up
- The filenames (or the names of the folders they are in) should carry the participant code, project name and possibly the method too, which may lead to lengthy filenames like: LMS_P1_diagram-sharingprocess.png ("LMS" being "Learning Management Systems", the project name, "P1" is the participant code, "diagram" is the method and "sharingprocess" is the topic)
- You should look for possible interconnections between different kinds of data. Maybe the participant mentioned his messy desk and you have a photo of it? Add a line in your transcript, referring to the photo. Or the participant talks about the problems of sending data to the print shop and the printing process was part of a workflow diagram you both created? Write a brief line in your notes and the diagram to connect both.

If you take these steps you can still match project and participants later so you don't loose time or data because of mixups.

As a result of these steps you your now have a transcript of your

notes, diagrams, sketches and photos with possible cross-referencing annotations, participant codes, and descriptive filenames.

Analysis

The data you gathered can't be used for supporting design decisions: It consists of many unstructured small pieces. Now you need to structure and analyse the data—similar as writing a summary and interpretation of a long and complex book. Analysis is not a passive process: Making sense of data requires taking different perspectives and trying them out to see how the data can be interpreted.

Doing the "right" Analysis

The data analysis is done by inferring themes from data points. Thus, the process is empirical (as it is based on gathered data). But even if the same data is used, different people will create different analysis. This is because the result of the analysis depends on the reasonable, but still individual and debatable, interpretation of the data. You could say that *"looking at last years design to quickly reuse elements"* belongs to a theme concerned with *"I want to save time"* or to a theme related to the topic of *"reviewing designs for inspiration"* (given that it could serve both from the user's perspective).

There is no clear-cut "right" or "wrong", when you interpret your data. Most important is that your analysis is plausible and based on the data you collected. I compare the process of analysis to building a house from a pile of Lego® bricks. These bricks are like the not-yet-

analyzed data you start with. When you build a house out of these bricks, there is no single "right" building. But neither is it a process which is arbitrary.

Possible arrangement of bricks—but not a house

One way to build a house

There are many, many ways to stack up the bricks *somehow*—but only a few of these possible ways will result in something that can be plausibly called a house.

How your final Lego® house will look is not determined from the beginning. You will change designs, move walls and sometimes try to use the same piece in different parts of the building to try out and improve. The same things will happen when you analyze data: There are many possible ways to structure the data, but only some of them will create something that is meaningful to you and others. This creation of a meaningful structure is not determined at the beginning, but a process, just like building your Lego® house, in which you try, fail, find improvements and—step by step—come closer to a structure you are satisfied with.

How to make sense of diagrams and lists

I will explain how to analyze diagrams and lists. This can be:

- Lists and flowcharts, e.g. the steps needed to print a document.
- Charts, e.g. how the mood changes over the day,
- Maps of places, e.g. where is what located in your office,
- Maps of relations, e.g. on what and with whom are your working

In our analysis, we will compare and summarize the collected data and bring it into an easy-to-grasp form.

Prepare the diagrams for analysis

To prepare the analysis, you write annotations on the diagrams. For this, you can photocopy the diagrams and write on the copies. If you like to keep it digital, you can use any application which can add text over images (e.g. the free _Inkscape (https://inkscape.org/en/)_).
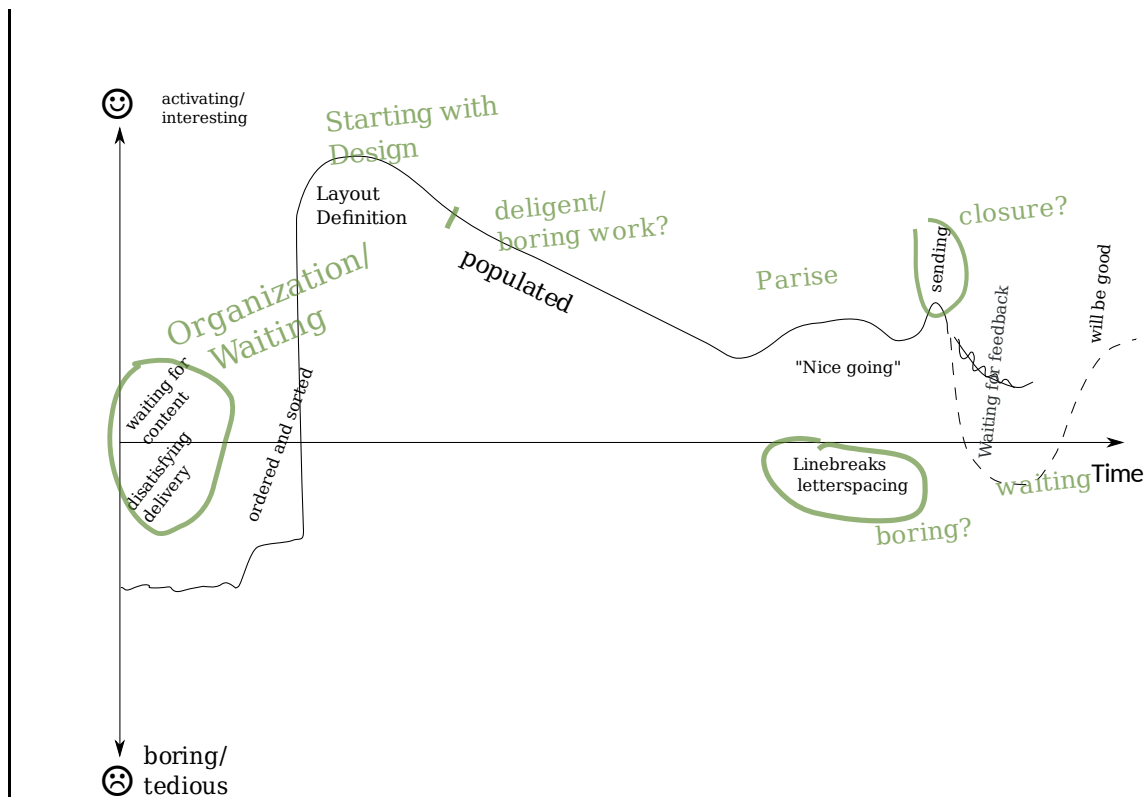
Annotated mood-graph

In this diagram I noted some ideas for an interpretation:

■ _I remembered, that most participants seemed to be quite happy at the beginning of their projects. This participant seemed to have a tough start. I assumed organization and waiting was not a positive experience, so I highlighted it_

- *Starting with the designing itself was a positive experience.*
- *After the start, the curve declines a bit. Maybe this is because populating the design with texts and images may be a bit boring.*
- *Praise seemed to raise the mood.*
- *…in parallel the participant did line breaks and letter spacing, I assume these are finishing touches and itself maybe a bit boring.*
- *Sending the finished design to the client seemed to be a positive thing. Maybe this is a kind of closure point—"I finished the design!"*
- *…however, waiting for the final acceptance is again negative, though usually only in the beginning (the participant projected this—the dotted line is assumed, since at the point of the research session, the design was just send a day ago or so.)*

I did such annotations for all the diagrams, to keep it brief, I don't include all of them here.

ADDING instanceof (P31) to entities related to polish architecture

Configuration

setup

1) Enable 'Drag'n'drop gadget on Wikidata

create a list

see: https://petscan.wmflabs.org/

2) Petscam query-Pages on plwiki, category 'Architecture in Poland"

depth: 4, excluding category 'Biographies'

*setup;
P31 is "instanceOf"*

On Wikidata Tab user items/props – P31 – none /P31 missing

*Above seems to be
needed to avoid having
useless matches*

Reason: Petscan will return also completely empty items

Opens one item on the list

1) open wikidata item page

uses Wikipedia as information source

2) click on [ref] near link to plwiki, article appear on right *opens it in parallel*

3) Drag and drop any link

4) In dialog - select matching property – choose from suggested or
Enter P1234

5) Issues – can not drag something that is not a long
- dragging country (Poland) takes very long
to load suggestsions   *seem to be technical problems*

*P1234 is like foo (assume they did not mean the
actual 1234, which is ISFDB publication ID*

by Yarl
documented by Papuass

Based on: https://commons.wikimedia.org/wiki/File:WikidataCon_2017_Workshop_Workflows_03.jpg

Annotated workflow diagram: CC-BY 4.0 ([https://creativecommons.org/licenses /by/4.0/deed.en *(https://creativecommons.org/licenses/by/4.0/deed.en)*](https://creativecommons.org/licenses/by/4.0/deed.en)) *Credit:* Yarl (Workflow) Papuass (documenting), Jan Dittrich (recording, adaption as SVG) *Based on:* Wikimedia Commons [WikidataCon_2017_Workshop_Workflows_03.jpg *(https://commons.wikimedia.org /wiki/File:WikidataCon_2017_Workshop_Workflows_03.jpg)*](https://commons.wikimedia.org/wiki/File:WikidataCon_2017_Workshop_Workflows_03.jpg)

This is a diagram of a user's workflow when editing on the free database project [Wikidata (https://www.wikidata.org)](https://www.wikidata.org). Wikidata collects statements about things. These things are called "Items". The [item for the Mona Lisa (https://www.wikidata.org/wiki/Q12418)](https://www.wikidata.org/wiki/Q12418) could have the statements "instanceOf: Painting", "Creator:Leonardo da Vinci". "Painting" and "Leonardo da Vinci" would be items themselves, so all is linked!

The workflows for the Wikidata example were created by participants in a workshop at a conference.

I wrote my interpretation and ideas in blue at the workflow steps:

- *Enabling the gadget (a little helper tool) seems to be a prerequisite, so I wrote "setup"*
- *In 2), a series of points concerned with list creation seems to start: "create a list"*
- *I added a link to the used tool, so I can see how it works ("see: https//pet…")*
- *The participant wrote they add P31. This is a computer readable identifier for the data property "instanceOf"*
- *For each entry on the list, they seem to open a Wikidata item ("Opens one…")*
- *Wikipedia is source for data and opened in parallel ("Uses Wikip…")*
- *Point 5) seems to be less a workflow step but more a list of problems.*
- *I was irritated by P1234. It is an actual data property on Wikidata, but it did not make much sense, so I assumed 1234 is a placeholder for any number.*

Commonalities and contrasts

Once you thought of possible meanings, you can check them. For this, you compare data from different users. Do they show the same pattern or do they differ? If yes, do you have a guess, why? Note common patterns as well as interesting findings, e.g. if most diagrams share a common pattern, but one does not.

*I compared the diagram above with this diagram:*
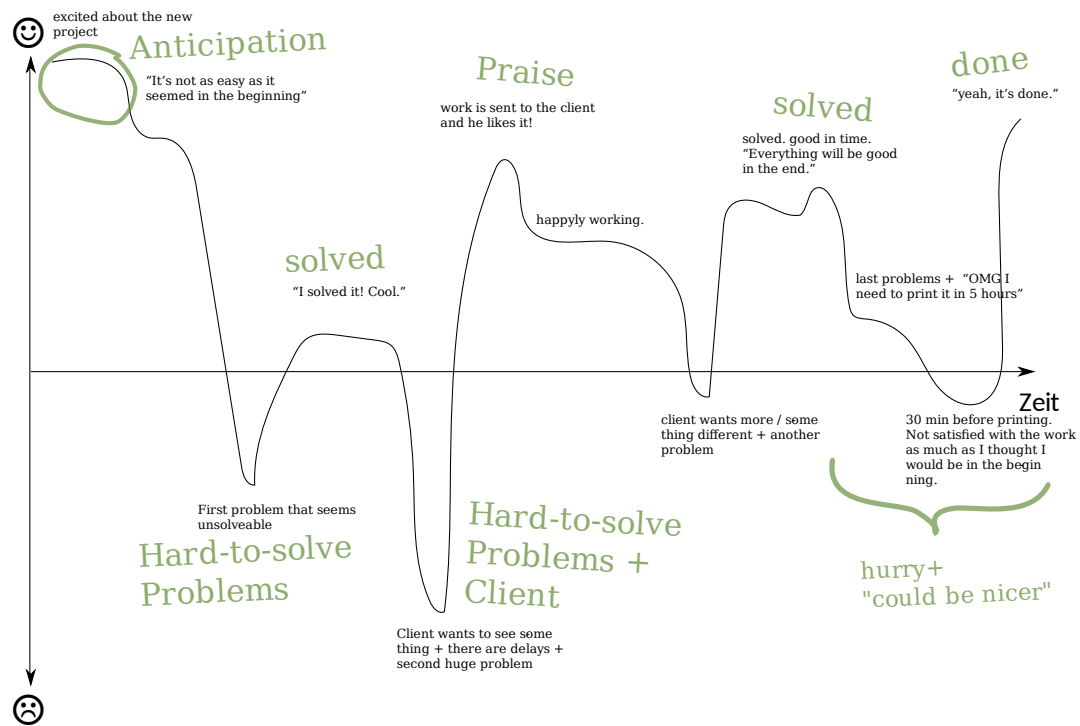
Annotated Diagram, P2

- *It looks much different from the first diagram above—there are far more ups and downs*
- *However, we have also a positive start of the design process*
- *New is, that the hard to solve problem cause bad mood, and that solving them makes the participant happy.*
- *The client also praises (which lifts the mood)*
- *The clients wished cause problems and thus a worse mood, in the*

diagram above it was mainly that the client caused "waiting"

- *Distressful phase at the end*
- *Like in the diagram above, there is a positive "it is done" phase*

My third participant's diagram was this:
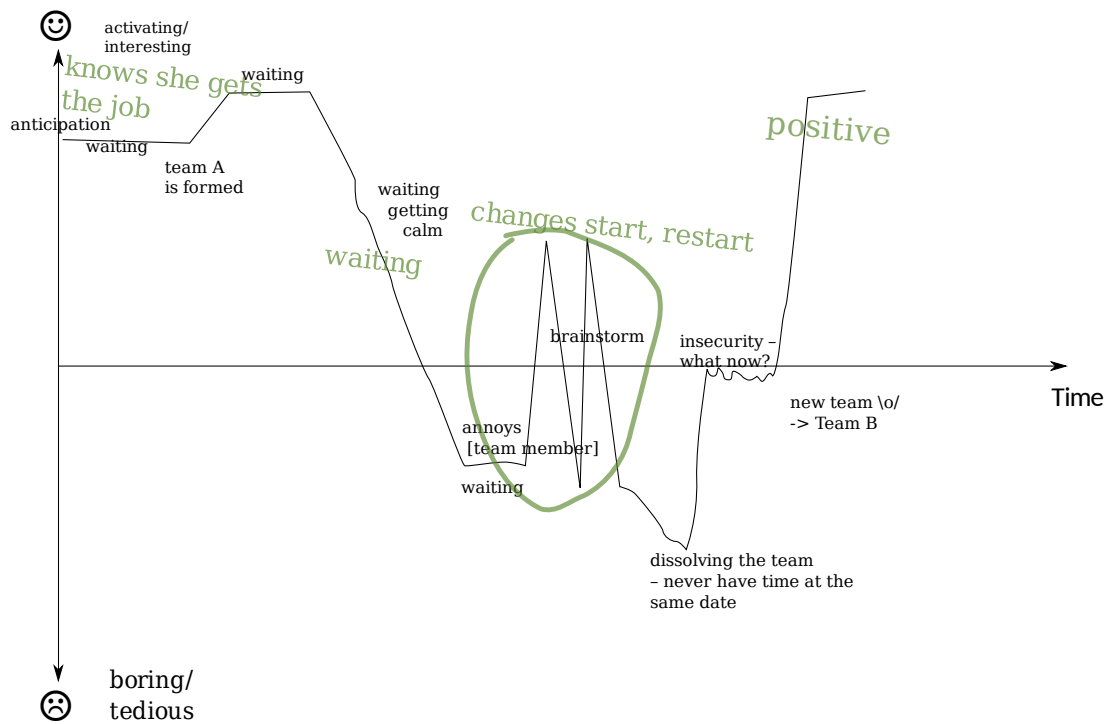
Annotated diagram, P3

- *Here, also, a positive start of the process (though the action is not designing, but forming a team)*
- *Waiting/idle time is associated with a declining mood, like with Participant 1*
- *There was a phase of rapid restructuring, positive new starts and declines of mood when the process did not work*
- *A (more dedicated?) new team formed. They had time to make it to the planning meetings. This experience was positive*

start is good

structuring
all works fine

finishing is good

start with many ideas

finishing

it works

Time

change plans: not good

1st thought
looks boring

things don't work
like planned   replanning

disappointed

boring/
tedious
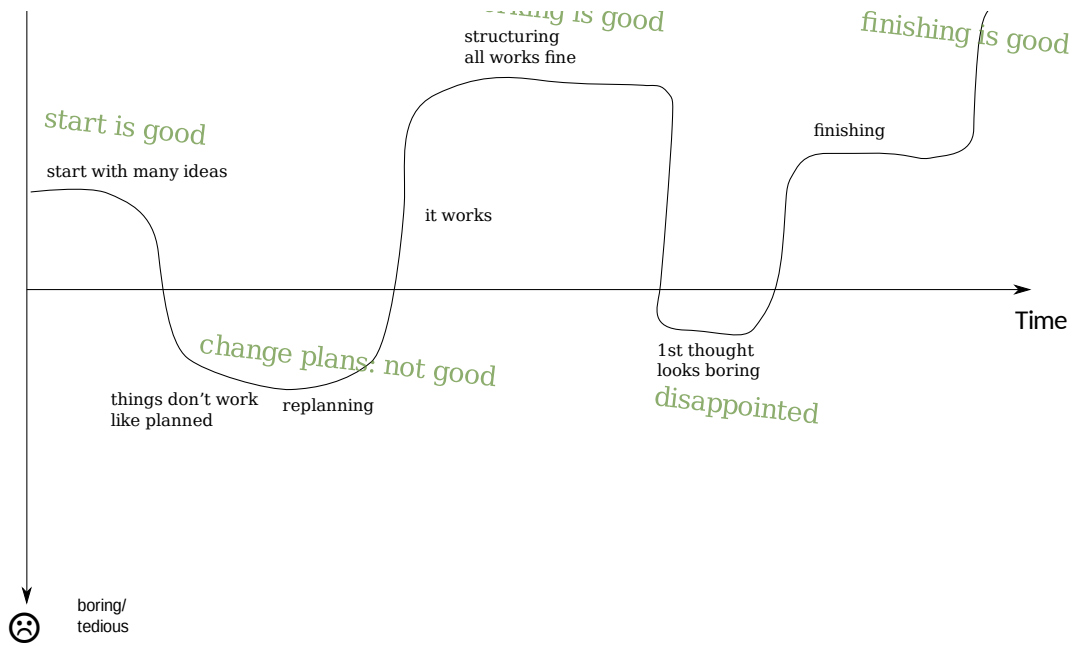
Annotated diagram, P4

The forth participant's diagram:

- *Start is good again (This seems to be a pattern), it can be due to anticipation (P3,P2) and because of actually starting (P1, P4, also P3)*
- *There are less great review/re-planning phases, which are also in U2 and U4;*
- *Finishing is good, which is also a pattern in P1,P2,P3*
- *What is new, is that the mood fell because a design seemed boring, the bad phases were usually framed as something from the outside (tough client wishes as in P2 or waiting: P1, P3) or as having a hard problem (P2).*

Last but not least: the 5th participant

activating/
interesting

actual start: even better

anticipation

first drafts

anticipation: good

maybe like a
new start?

pattern repeats
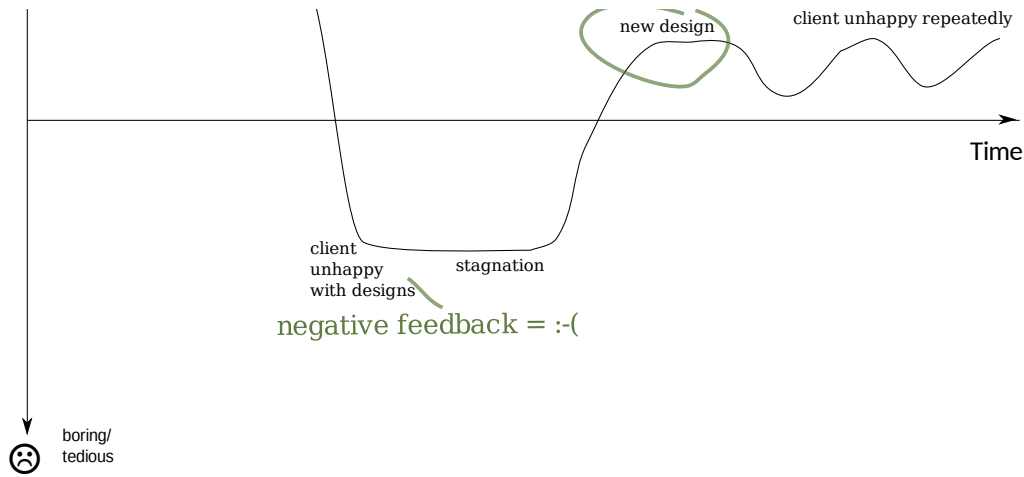
Annotated diagram, P5

- *Again, like in the diagram before, starting is good. I would hypothesize that the anticipation feels great and that the actual start even lifts the mood a bit on top (?)*
- *Like in P2, client wishes/negative feedback drag the mood down. Here we have negative feedback.*
- *Maybe starting/trying a new approach is a bit like the positive feeling at the projects start (also P4 shows a similar pattern, P2 framed it more as solving problems. I don't know if that is the same)*
- *The pattern of "new approach good/client feedback bad" repeats (at time of the research, the project was still ongoing, so there can't be an "end is positive" pattern here.)*

Here an example for doing an analysis on workflows:
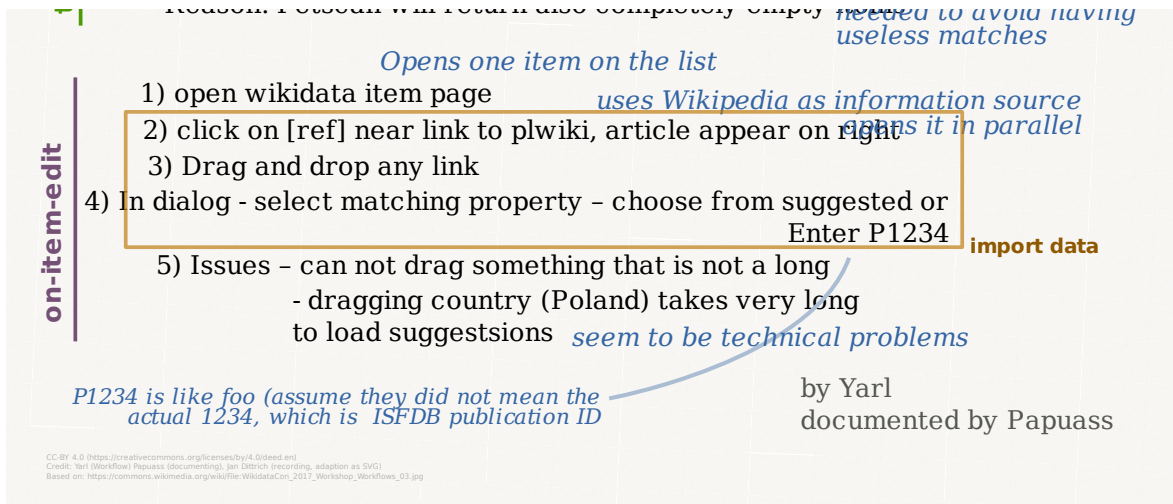
Annotated diagram 1: CC-BY 4.0 (https://creativecommons.org/licenses/by/4.0 /deed.en (https://creativecommons.org/licenses/by/4.0/deed.en)) *Credit:* Yarl (Workflow) Papuass (documenting), Jan Dittrich (recording, adaption as SVG) *Based on:* Wikimedia Commons WikidataCon_2017_Workshop_Workflows_03.jpg (https://commons.wikimedia.org /wiki/File:WikidataCon_2017_Workshop_Workflows_03.jpg)

First diagram:

- *…from the annotating, I already got the impression that there are two main steps: working on a to-do-list and working on an item, adding data.*

CONFLICT... *why conflict?!*

~~INS~~ ADD PROPERTIES I

FIRST ~~ADD~~ P31 = CITY — SAVE *P31 is "instanceof"*
instanceOf being (most) important?

- COUNTRY
- COORDINATE LOCATION

- AS LONG AS THERE IS SOMETHING TO ADD

- MOST IMPORTANT FACTS FROM THE ARTICLE *reuse WP data*

- 3-4 PPL IN THE USER GROUP - OTHER CAN CONTINUE *share tasks*

- MAKE LINKS TO OTHER WIKIMEDIA PROJECTS *links*

~~M~~ WIKIPEDIA + WIKIMEDIA

import/edit data

Created by
Susannaanas

Annotated diagram 2: CC-BY 4.0 (https://creativecommons.org/licenses/by/4.0 /deed.en *(https://creativecommons.org/licenses/by/4.0/deed.en)*) *Credit:* Susannaanas (documentation), Jan Dittrich (photo and adaption as svg) *Based on:* Wikimedia Commons WikidataCon_2017_Workshop_Workflows_04.jpg *(https://commons.wikimedia.org /wiki/File:WikidataCon_2017_Workshop_Workflows_04.jpg)*

Second Diagram:

- *Here we seem to have an additional step of creation before data is added to the new item.*
- *The participant checked if there is a corresponding Wikidata-entry the entry on the to-do list, since the list was created from wikipedia items (in order to check if corresponding wikidata items exists.)*
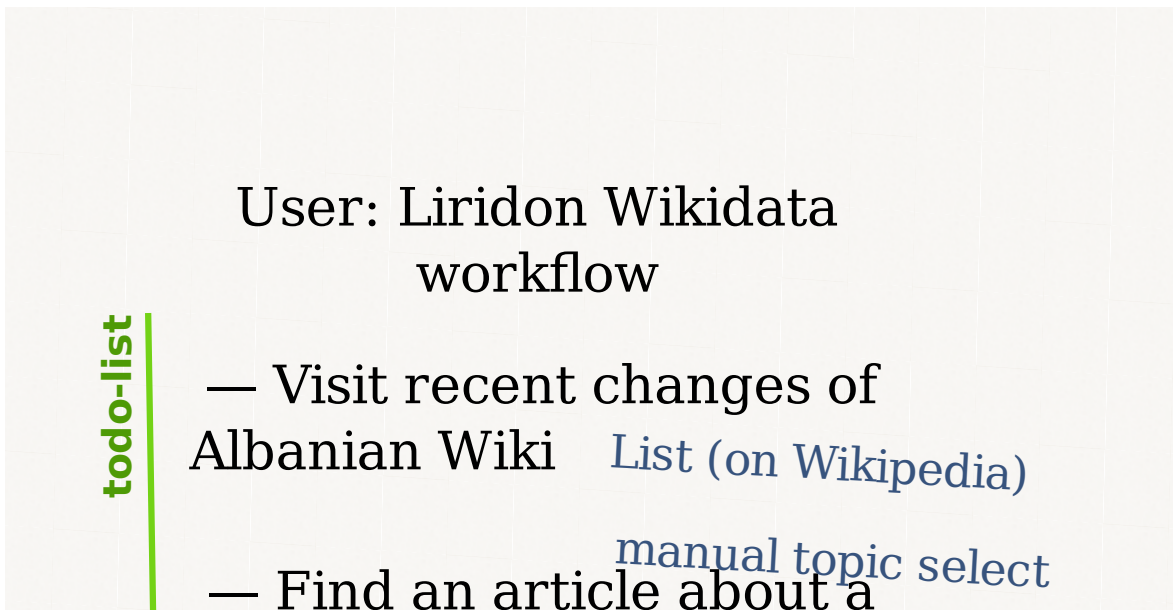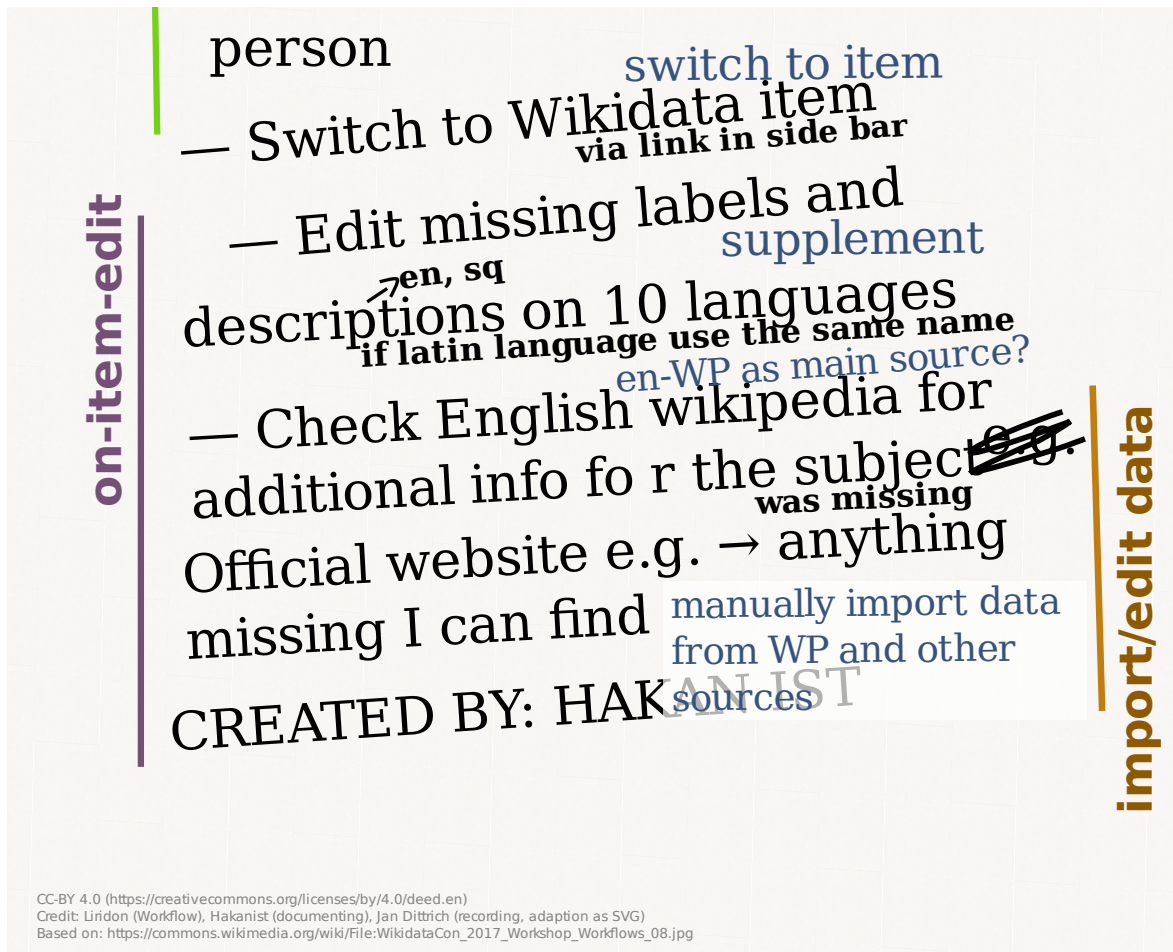
**adding Wikidata items for newly created
articles on latvian Wikipedia**

setup

setup   **todo-list**   SE 1. – INIT

1. enable widget/user script showing label and description from WD
   (WikidataInfo.js)

List (on Wikipedia, probably)

2. go to [[Special: NewPages]]   *sets up list in RSS reader,
since it has a good visited/
not visited management → keep track*

3. copy link   to atom feed of a page

PHA...

4.   import link to rss reader   →   in order   see that you visited link

PHASE 2.

on-item-edit

1. open link to wikipedia page in the RSS Wikipedia articles that have no
2. click on "Wikidata item not found"-link Wikidata item yet are good
3. adjust name, add description and aliases starts for corresponding items
4. click create

creation/labels

User: Papuass
documented by Yarl

Annotated diagram 3: CC-BY 4.0 (https://creativecommons.org/licenses/by/4.0
/deed.en (https://creativecommons.org/licenses/by/4.0/deed.en)) *Credit:*
Papuass (Workflow) Yarl (documenting), Jan Dittrich (recording, adaption as SVG)
Based on: Wikimedia Commons WikidataCon_2017_Workshop_Workflows_06.jpg
*(https://commons.wikimedia.org
/wiki/File:WikidataCon_2017_Workshop_Workflows_06.jpg)*

Third diagram:

- *Here is a create list-step. It did not happen in 2) but there is also there in 1)!*
- *There is a tool setup-step in the beginning.*
- *The step for the item concerns only its creation and addition of name and description, not adding of content.*

User: Liridon Wikidata
workflow

todo-list

— Visit recent changes of
Albanian Wiki   List (on Wikipedia)

manual topic select
— Find an article about a

person

— Switch to Wikidata item *switch to item*
via link in side bar

on-item-edit

— Edit missing labels and *supplement*
en, sq
descriptions on 10 languages
if latin language use the same name
en-WP as main source?

— Check English wikipedia for
additional info fo r the subject *e.g.*
was missing
Official website e.g. → anything
missing I can find *manually import data*
from WP and other
CREATED BY: HAK *sources*

import/edit data

Annotated diagram 4: CC-BY 4.0 (https://creativecommons.org/licenses/by/4.0
/deed.en (https://creativecommons.org/licenses/by/4.0/deed.en)) *Credit:* Liridon
(Workflow), Hakanist (documenting), Jan Dittrich (recording, adaption as SVG)
Based on: Wikimedia Commons WikidataCon_2017_Workshop_Workflows_08.jpg
(https://commons.wikimedia.org
/wiki/File:WikidataCon_2017_Workshop_Workflows_08.jpg)

Forth diagram:

- *A "Standard"-Function of Wikipedia is used as list (Recent changes page)*
- *In contrast to the other workflows, there is a manual select step (Finding a change concerning a person);*
- *Like in the third diagram, there is editing of name/labels and description— but on an existing item, not a new one.*
- *Like in the first and second diagram, the Wikipedia article serves as data source.*

Summarize

You can summarize the findings in a diagram itself. It will look similar to the ones the participants drew. In this diagram, you include findings you could support since they showed in several diagrams. I sometimes also include data which I could not necessarily corroborate, but find interesting.

> *Analyzing the mood-diagrams I got these conclusions:*
>
> - *In all but one (P1) diagram the onset of a project seems to be a good experience*
> - *In three (P2, P4, P5) of the five diagrams there is a significant decline after the projects first, motivated phase. The reasons are: Seemingly unsolvable problems, project not going according to the plan and unhappy clients. A commonality is that the named reasons for the bad mood are seemingly out of the control of the participants (Except for P4, where the reason was seen in the "boring" design)*
> - *for all participants the project ends good (excluding P5, where the project has not ended yet). Three (P2,P3,P4) seem to be very happy at the end: Finishing seems to be a good experience.*
>
> *This can also be shown in a summarizing diagram which I drew:*

activating/
interesting

Motivated at
Project start:
Anticipation and/or
first drafts

Summarizing diagram of the analysis
of 5 participant drawings on
their mood/motivation during their
last design project

finished!
Feels good

productive again
Problems solved
Client prises

Time

"Disillusion":

idle waiting time,
Hard-to-solve Problems
Difficult client wishes

Cycle repeats

boring/
☹ tedious

summary of the analysis in diagram form

I created this diagram to summarize the workflows for editing wikidata:

possibly: **setup** Activate/configure needed tools

todo-list

The list is used to get links to items that probalbly
need work or should be created.

existing list e.g "recent changes",
"new pages"...), often on
Wikipedia

self-created list e.g. using
Petscan-Tool

to item (Wikidata) or article (Wikipedia)

on-item

one of or both

if item does not exist:
item creation, often based on existing Wikipedia article
without a Wikidata item

if you can/want add data:
adding data, based on Wikipedia and/or external sources
often, tools to ease this are used

repeat for several items on list

- *In the first ("Adding instanceOf…") and in the third ("Adding wikidata items…") were a setup step. I included this—also because I knew from other research that tool use is widespread*
- *All four editors worked from a list. I tried to specify what that list could be. Different kinds of lists served different purposes: A list of existing items can serve for supplementing these; a list of Wikipedia articles without corresponding Wikidata-items enables the creation of needed items.*

> ■ *All editors did some work on items. However, there are different possible actions: creating items (3), some editing existing ones (1,4) and some created and then edited (2).*

Making sense of notes

Your notes are data in written form, maybe with some occasional sketches. I will demonstrate a method to analyze your notes in depth. In contrast to the methods for analyzing diagrams, this is more complex. However, it is a very powerful method, which allows going beyond the pure data and extract overarching themes and interrelations from it. It is a variation of typical *qualitative data analysis* methods like *thematic analysis*, *grounded theory* or the like.

Organize notes hierarchically

The basis for our analysis are the utterances or observations, usually represented by a line in your transcript, like:

> *"I find it boring to move around all the text boxes again!".*

You will organize these hierarchically and group them if they may share a similar theme. Each group get a title, stating the theme of the underlying pieces of data. This is useful when designing, since you can refer to the title instead of reading through all the underlying data each time.

Sometimes, you will have several themes, which relate to a common theme themselves. In this case, it makes sense to make a group of groups with a title stating the overarching theme of this group of groups.

> *Here is a part of an analysis.*

- *Overarching theme: using existing work for inspiration*
  - *sub-theme: review previous projects*
    - *Data: " have a look at an old project to see how I solved this problem…"*
    - *Data: Participant searches for…*
    - *…*
  - *sub-theme: use other's work for inspiration*
    - *Data: "I look on google images how other calendars look like"*
    - *Data: browses through the book to see…*
    - *…*

Such a hierarchical analysis could be done in two ways:

1. **Top-Down**: You first name the groups and write the titles and then sort pieces of data into the groups hereafter
2. **Bottom-Up**: You first group pieces of data which seem to share a similar theme and then give the group a comprehensive title which states the topic shared by the underlying pieces of data.

We are going to use mainly the 2nd way, doing a so called "bottom-up" analysis. In a bottom-up analysis, the themes depend on the data, but also on your interpretation of the data.

In the analysis we may start with grouping similar data together— like these two lines:

- *Data: "I look on google images how other calendars look like"*
- *Data: Browses through the book to see…*

Then we give that data a headline and name the topic:

- ***Theme:** Use other's work for inspiration*
  - *Data: "I look on google images how other calendars look like"*
  - *Data: Browses through the book to see…*

When we come across a piece of data which shares the topic, we can add it to the group, too:

- *Theme: use other's work for inspiration*
  - *Data: Searches on amazon to see how covers of books about the same topic look like***
  - *Data: "I look on google images how other calendars look like"*
  - *Data: Browses through the book to see…*

This is a rather simplified overview of the process: In contrast to this example, you will as well spend time searching through data, rewriting theme titles and may need to step back or just sleep over it to find a good new way to make sense of your data.

Create meaningful groups

I already talked about grouping notes by shared themes. But what is a *meaningful* theme?

One method to group notes and to derive a theme would be going through the notes and see which utterances and observations mention the *same thing* or make the *same assessment*. Thus, all notes mentioning "color" would belong to one theme and get the title "Color"; all notes mentioning "good" belong to one theme and get the title "good things".

> *Let's say, we gathered this data (among others) in research on Do-It-Yourself-Work (DIY)*
>
> - *The shelf looks not as neat as a bought one, but it is mine*
> - *When it is broken and I need to get to work I can fix my bike quickly*
> - *The cabinet's door was loose. It annoyed me, so I repaired it.*
> - *I look at the assembled bike and think: nobody else has the same*

> *If we put the notes which mention the same things in the same group, we get these two groups:*
>
> **Theme: Bikes**
>
> - *I look at the assembled bike and think: nobody else has the same*
> - *When my bike is broken and I need to get to work I can fix my bike quickly*
>
> **Theme: Furniture**
>
> - *The cabinet's door was loose. It annoyed me, so I repaired it.*
> - *The shelf looks not as clean as a bought one, but it is mine*

Organizing the notes by this "same things mentioned"-method would help us find notes concerned with a specific thing or assessment: If we want see everything that concerned furniture, we can go through the notes in the "furniture" group; If we would like to know what people liked, we could look it up in a group titled "good".

However, organizing by the "same things mentioned"-method has its shortcomings: A theme named "furniture" communicates only that the underlying notes have *something* to do with furniture. You still need to go through the underlying notes to find out what people *did* with their furniture and what *motivates* them or which *problems* they face.

The names of themes created by organizing by the "same things mentioned"-method are just *labels* for the content and have *no meaning* on its own.

Imagine, we would not create the themes by looking for same things being mentioned, but by the insights we drew from the notes in the group by focusing on the *meaning* of activities, problems and goals for the participants.

If we take the notes about DIY again this could look like this:

> **Theme (based on an insight about the participants): Participants need**

> ***to "make things work"***
>
> - *The cabinet's door was loose. It annoyed me, so I repaired it.*
> - *When my bike is broken and I need to get to work with it the next day I can fix my bike quickly*
>
> ***Theme (based on an insight about the participants): Good: DIY gives sense of individuality***
>
> - *The shelf looks not as clean as a bought one, but it is mine*
> - *I look at the assembled bike and think: nobody else has the same*

If we organize notes by themes based on the *insights* about the participants and summarize that insight in the group's title, the theme's title is a useful piece of information on its own: It is not just for accessing the notes, it is an empirically based principle we can follow, when we design.

If you design, let's say, for a DIY-Online community, a theme based on an insight, like "DIY gives as sense of ownership" may inspire the implementation of a function, which allows people to share their designs and customizations. The insight that sometimes DIY is just about fixing things may lead to the provision of a wiki for collecting best practices for doing common repairs and maintenance.

If you have a new idea you can ask: "Does this idea follow what is stated in the group titles? Does it violate them?". You may ask yourself "Which design could I create based on this theme?".

Since the themes are based on our data, they will express the actual needs of your users and not some (potentially stereotypical) assumptions.

Grouping your notes based on insights about your participants provides great benefits. But it can be hard and may be not possible for all your data. Thus, creating groups using the same-things-mentioned methods is still a useful method and these groups may still evolve.

Usually, I have some "same-things-mentioned"-groups in the beginning and far fewer at the end—but my analysis will be a mixture of both styles.

To understand how to organize notes by themes based on insights, can be hard to grasp for beginners. To ease the learning, I provide another example:

> *Let's say we gathered this data (among others) when researching beginners in web programming:*
>
> - *To try out stuff in HTML is fun*
> - *I analyze Javascript code to understand patterns*
> - *It is great to quickly test something using a JavaScript framework*
> - *To know these ›attributes‹ of HTML-›tags‹ makes writing code easier.*
>
> *If we put the pieces of data which mention the same things in the same group we get these two groups:*
>
> **Theme (based on same-things-being-mentioned):: Utterances with HTML**
>
> - *To try out stuff in HTML is fun*
> - *To know these 'attributes' of HTML-'tags' makes writing code easier.*
>
> **Theme (based on same-things-being-mentioned):: Utterances with JavaScript**
>
> - *I analyze JavaScript code to understand patterns*
> - *It is great to quickly test something using a JavaScript framework*
>
> *Organizing the notes by the insights we may draw from the notes, the structure look like this:*
>
> **Theme (based on an insight about the participants): Trying out is good**

- *To try out stuff in HTML is fun*
- *It is great to quickly test something using a JavaScript framework*

Theme (based on an insight about the participants): Learning makes own coding better

- *I analyze Javascript code to understand patterns*
- *To know these 'attributes' of HTML-'tags' makes writing code easier.*

Prepare your notes for Analysis

When you create groups of data, it is good to know if the theme of the group is relevant across several participants or only concerns one participant. To check for this, you should supply each note (=line in the transcript) with a participant code. A participant code works like a pseudonym: The user is not identifiable by his/her real name, but by a stand-in for the name. I use neutral number codes: The first person I did a research session with is P1, the second is P2 etc.

> *If you have this on your transcript:*
>
> - *It is hard to know what exactly the client wants, because I don't talk directly to the client*
> - *The document is divided in sections, separated by blank pages.*
> - *The current ideas/prototypes are in the first section. All discarded or "paused" ones are in later sections (the "archive") […]*
>
> *It will look like this after adding the participant codes (the data is from the second research session):*
>
> - *It is hard to know what exactly the client wants, because I don't talk directly to the client— **P2***
> - *The document is divided in sections, separated by blank pages. — **P2***

> ▪ *The current ideas/prototypes are in the first section. All discarded or*
> *›paused‹ ones are in later sections (the "archive")—**P2** […]*

You just add the participant code at the end or beginning of each line. It is not the most exiting work, but it can be done quickly—Copy the current code (like "P1") in the computer's clipboard (STRG+C), place the cursor with the <u>arrow keys *(http://en.wikipedia.org /wiki/Arrow_keys)*</u> and the <u>end *(http://en.wikipedia.org/wiki/End_key)*</u>/ <u>home *(http://en.wikipedia.org/wiki/Home_key)*</u> keys and paste the code (STRG+V).
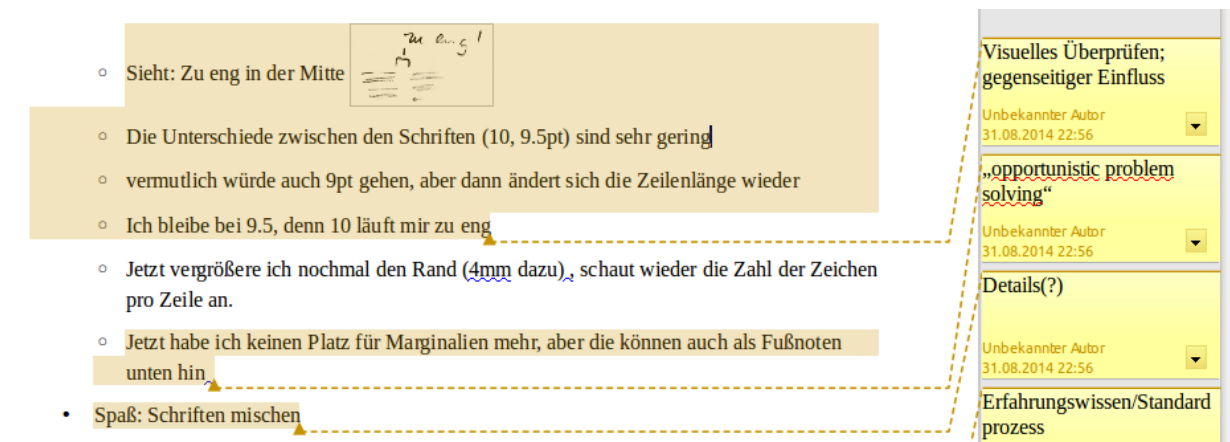
Annotating data in a wordprocessor

Annotate your notes

After you added your participant codes, you can start to review and to annotate your notes in order to find possible interpretations, themes and meaning behind the observations and utterances.

This will help you to get familiar with the data and to derive meaningful themes and insights later.

Annotations can be full sentences, as well as short list of words. Usually, they concern a line in the transcript but naturally you can comment on whole sections or just at words, too.

> ▪ *It is hard to know what exactly the client wants, because I don't talk*

> directly to the client— P2 **ANNOTATION: indirectness, division of tasks, friction, "I need to know the client".**
> - The document is divided in sections, separated by blank pages. — P2 **ANNOTATION: Keeping/imposing order**
> - The current ideas/prototypes are in the first section. All discarded or "paused" ones are in later sections ("the archive")— P2 **ANNOTATION: Keeps old ideas. Why? Possible: Later reuse, Inspiration, replication**

I suggest annotating each line, but this is not a must.

The annotations should be clearly distinguishable from data you got directly from observation or the participant's answers—just like other things you did add yourself (e.g. design ideas).

You can print out your transcript with a wide margin and write your comments in the margin. With pen and paper, you can write down your thoughts quickly, encircle interesting parts and connect them with lines. It will look messy, which is no problem, since your annotations are primarily to get familiar with the data and not for creating publication-ready thoughtful comments.

If you prefer working on a computer, you can annotate your data using a word processor with a comment function. Open your transcript, mark the part you want to annotate with your interpretation, then click the "comment" button. If you don't use the comment function, but plain text, use something like "COMMENT:" or "ANNOTATION:" to mark your comments;

Annotating your data is a creative process. If in doubt, whether an annotation is relevant or not: opt for writing it. Later on, it might become useful. If you are unsure about something or an idea seems to be far-fetched, just go for it. Since you keep data and comments distinguishable from each other, you can always throw stuff out again. The goal is not to come up with great annotations, but to wrap your head around the data and to find possible ways to interpreting it.

Decide, whether you want to do a digital or analog analysis

After annotating your data you should take the decision in which media you want to conduct your analysis: Digital in a word processor, where lines hold the basic units of data, or analog on paper, where sticky notes are your means of dealing with the data.

The analysis methods described here can be used in both media. Nevertheless, each way has different strengths.

Analyzing data analog by using sticky notes. Theme are written on yellow sticky notes, themes of themes are written on orange sticky notes

Use Existing Designs

- Question: Why do I like it? P1

> **Review previous projects**
> - Looked at old revisions of the calendar and considered what was good or bad P3
> - Took all old versions of the calendar with me to the meeting P3
> - To determine measurements I look up the ones form a previous project P5
>
> **Other (Web, bookshop)**
> - What is online at google P2
> - * Inspiration: Google, bookshop, own calendar P3

Analyzing data digitally by using a word processor. Themes have gray headlines, themes of themes have black headlines

The resources you need for analyzing on your computer are:

- a word processor

The resources you need for with pen and paper are:

- sticky notes
- paper
- printer (or a lot of patience to write all by hand)
- (removable) tape
- a big wall (2m*3m minimum—which is why the wall is usually the most difficult to get).

But why should you want to use an analog analysis, if it needs all these resources? Partly, the decision can be based on preferences: Some people like that they can move around the notes by hand and can get an overview of their data by just stepping back and glancing over it.

   If you work with peers on your analysis, you have some advantages when using the analogue pen and paper approach: you can easily discuss your ideas with others and will get new ideas how to structure the data. You can as well invite your boss to take a look and be part of the team, at least for some time. This type of on-site, collaborative, analysis is best done analog. Using digital tools it is not that easy and direct—despite all the great digital innovations we have nowadays.

Making sense of data together, using lots of sticky notes. (Image by _flickr user Kalsau (https://www.flickr.com/photos/kalsau/)_, licensed under CC-BY 2.0, _https://creativecommons.org/licenses/by/2.0/ (https://creativecommons.org/licenses /by/2.0/)_; Changes: Image was cropped)

How to: Analysis on the computer

For analysis on your computer, I suggest the following steps for preparing your analysis:

1. Create a new document
2. Paste your transcript into that document
3. Add a page break before the transcript to separate not-yet-grouped data from your (upcoming) structure of lines grouped by themes.

Creating Groups: Similar data is organized in lists. You can just use the word processors bullet point list feature. To rearrange data, you can use copy and paste, drag and drop and the tools the word

processor provides (toolbar to move points in lists etc.)

State themes in titles of groups: Each group gets a headline. Create a hierarchy by using different paragraph styles—bigger headlines for overarching themes-of-themes, smaller headlines for themes, that encompass the data directly. If you use paragraph styles to format your headlines, you can use the navigation tool of the wordprocessor to go through your structure. You can as well just use the list-hierarchy feature (pressing the tab-key creates a subordinate list point). I prefer headlines, though.

How to: Analysis with pen and paper

For working analog I recommend the following steps to get analysis-ready:

1. Create table in a word processor, many rows, 2 columns (given you print on DINA4). Each table cell will be a note.
   1. In the table settings, switch off page breaks in cells and switch "keep paragraphs together" on, so that one note/table cell will not break between pages.
   2. In the table settings, choose a decent padding around each cell, like 0.5cm
   3. Choose a font size of about 12pt, large enough to read it

Participant displays different font combinations in the layout application in order to see if the fonts go well together (see_U2-14-9-14_1.jpg)	Duplicating objects to save old ideas for later inspiration
creates empty pages to organize drafts	Makes space for additional comments by shrinking main text area.
A friend told her that concrete is visualized dashed	Creates page spreads (In books you have always 2 opposite pages, thus single pages are not useful for design)
feedback-rounds with other designers	Which design do we take? Talks with

2. Copy/paste all your data (line by line) from the transcript into the cells
3. Print it
4. Cut out each table cell (=piece of data)
5. Optional: Cover the wall with the paper from paper rolls (thus you can remove the analysis, roll up the paper and archive it and you can remove it from the wall temporarily)

Creating groups: during analysis you will stick your printed notes on the widths of paper using removable tape, crepe tape or spray glue—something sticky but non-permanent, so you can move the notes around in order to gradually improve the structure.

State themes in titles of groups: Write your group titles on notes of determined colors, which are different from the color of the actual data points. If you print your data points on white paper you can use yellow sticky notes for group titles and pink ones for titles of a group of groups.

Develop a first Structure

After you annotated your notes, you can start to structure them. Structuring the notes means grouping similar data together, suggesting themes behind the data, naming these themes and deciding which data falls under which theme.

You don't use all your data yet. You can start with what you find useful, when skimming through or you can use the data of two participants for now. The goal is to set up some preliminary structure, like a sketch of the analysis.
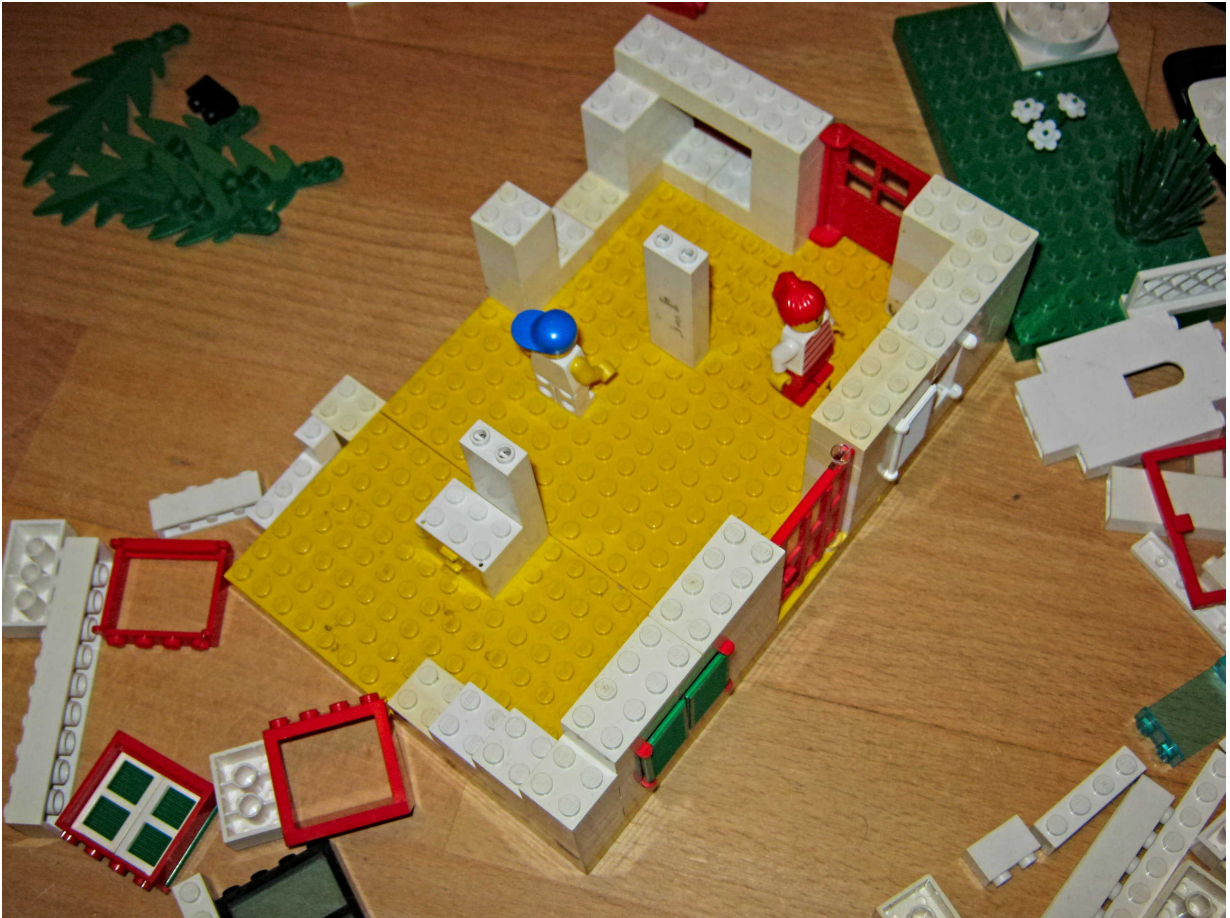
Setting up a basic structure

Move in Approximation

The easiest way to start a structure, is moving similar data in approximation. If you do you analysis on paper, cluster the notes you assume to follow a common theme in one place, and notes for other

themes in other places. If you analyze using a word processor, move similar notes in adjacent lines. Create different groups, each containing similar notes, by using several line-breaks above and below such a group or by creating a list for each assumed theme.

> - *Asking herself: what would impress the person (a safety advisor) "probably not that the blueprint is beautiful"*
> - *Good: Something that is not only useful, but aesthetically as well*
>
> *These themes have in common that they are about aesthetics and requirements. I did not have a good idea about a possible group title or even an insight I can draw from them, so I just moved them in approximation.*

Name Commonalities

You may have some data you assume to encompass a common theme, but you are unsure about the nature of the theme. In this case, just give that group of data a preliminary title. A group name, even if it does not state an insight, will make dealing with the data easier, since it gives your data some structure.

As you gather other data that falls under that (yet vague) category, you may be able to improve the theme and its title.

> - *Inspiration*
>   - *I try to get new ideas by looking at google images*
>   - *I get new ideas while showering*
>   - *[…]*
> - *Media*
>   - *I like to use photos*
>   - *The website is a great way to reach out*
>
> *These are mere titles, naming a commonality of the underlying data but telling nothing useful for design (yet)*

State insights

You may have read through your annotations and have noticed something that may make a good insight right away. Great. Just write it down and assign the data to it. Even if you have only one or two pieces of data that fit the insight, don't worry, just see if the insight will emerge to be bigger. If not, you can still revise the title or just get rid of the group and see where else the data might fit.

> *The first insights I wrote were these:*
>
> - *Review previous projects*
> - *Test designs in the media you deliver in*
>
>
> *The whole structure of my analysis later looked like that (the main list points are titles of groups-of-groups, the indented sub-lists are group titles):*
>
> - *Inspiration*
>   - *Review previous projects*
>   - *Other (Web, Bookstore)*
> - *Media*
>   - *Do tests in the media you target*
>   - *Suitablility of media*
>   - *"being closer": 2 page-spreads instead of single pages etc.*
> - *Idea Attachment*
> - *Motivation at the beginning; then the problems start.*
> - *Finishing is good*
> - *(Page) Format is hard to change later*
> - *TrialAndError*
> - *Mutual dependencies of design elements like type area, content, font size etc. (?)*

> *Note that some themes are actual, meaningful insights ("Finishing is good", "(Page) Format is hard to change later"), while some are mere group titles based on commonalities of the data they encompass ("Inspiration", "Trial and Error").*

Now, you will have some preliminary, data based themes, each created based on a few data points. Next, try if these themes are useful for organizing more than just a few data points.

Fill the Structure

Now need to try if the structure you created is feasible. Go through your data and sort it into the themes—be it actual insights or just stated commonalities—you came up with, or just move the data into proximity to similar data.

The difference to the previous step is that we now focus on involving all the data into the process of generating themes. In contrast, in the previous steps we focused more on generating an initial structure.

If the previous step was building a (data-based) scaffold, now we try to build the actual walls.
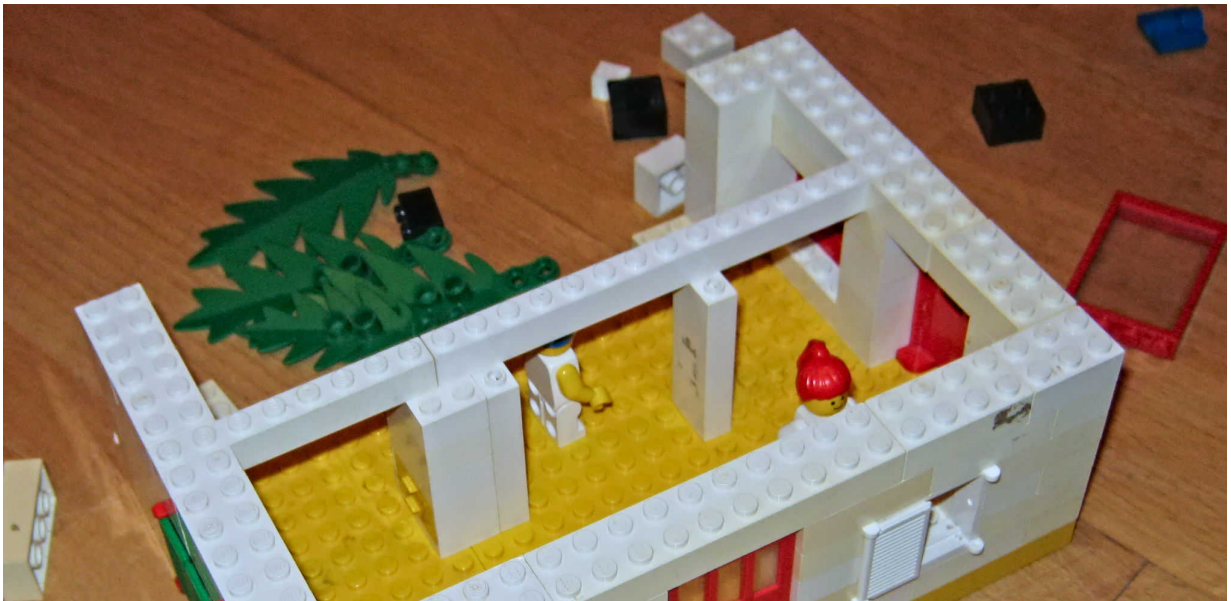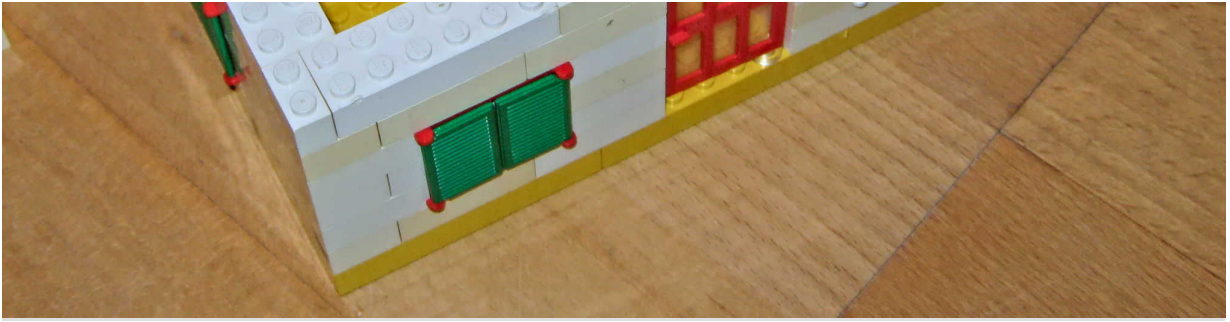
Build upon your preliminary structure to see if the idea actually works

Aim for 3 to 10 pieces of data per theme. While it is temporarily OK to have very small groups, at the end each theme should be derived from several data points and not on a single utterance. On the other hand, if a theme encompasses more than 10 utterances or observations, consider if it makes sense to split the group in "subthemes".

Usually, I would go chronologically through all my notes starting with the first participant and ending with the most recent one—though any other scheme will suffice as well. Just be sure, that you know with which data you dealt with already and with which you did not.

When filling the data in the structure, you may notice that you need to create additional themes. Some titles of the themes may need to be renamed as well. Just go ahead and make these changes, if you feel they are needed.

- *Title: Test in the media you target*
  - *I folded prototypes for paper sizes that seem to be suitable*
  - *This is close the print shops results without spending too much*
  - *Tedious: Not having an own printer*
  - *[…]*
- *Title: "being closer": Page Spreads instead of single pages*
  - *Creates page spreads (In books you have always 2 opposite pages, thus single pages are not useful for design)*

Actually, the example above is not great in terms of analysis: The "Test in the Media you target" data is almost all from one person (P3) and the "being

closer"-Group has only a single data point. In later iterations I'll change this group. But for now it suffices.

While I was sorting the data, I created a new group to accommodate data related to changes in designs:

- *[Titel:]Changing and determining*
    - *Determining: What do we have? What do we need? What do we want to avoid?*
    - *Sketching, e.g. for "How can I divide the page for 7 days of the week?"*
    - *"This is trial and error"*

Some data could not be accommodated yet. So I created a misc group, where I could offload the data for now and try to find a better place later:

- *[Titel:]misc*
    - *God: Shortcuts*
    - *I need to ask the print shop what this design would cost*
    - *Bad: Doing the same steps over and over again.*
    - *[…many other points…]*

Inside the misc group some possibilities for future insights emerged—for example the first (god: Shortcuts) and the third point ("bad: doing the…") could be part of a newly formed insights named "I want to avoid repetitive tasks"

Now, your groups will be informed by several data points each. But there will be many themes, which are created by the "same things mentioned"-Method; they don't state insights. In addition, there might

be overlapping themes and groups encompassing many data points, while other groups may be only informed by few data points from just one participant. It is time to revise the structure.

Revise the Structure

After you went through your data and sorted it into themes, review your work. You now may have a clearer view of what constitutes the themes after you sorted the data.

If you recently dealt with just a particular part of the analysis (like dealing with two particular groups), your view might be too narrow: Glance over the whole range of clustered data, and rediscover themes, which might be a better fit for some data.

Have a look at structures that need improvement: Groups, which have a title which does not express an actual insight yet, and data, for which you did not find a good place. This data might now be helpful to create new themes or can add to some themes.

Take a critical look at the themes in relation to the data they encompass: Is there a fit or did you fall prey to wishful thinking? Possibly, there is actually only a weak match between the stated theme and the data. In this case, revise your structure.

Some parts need to be revised and newly created

Find better names

Groups based on commonalities or vague similarity will hopefully evolve into insights about the participants. To achieve this, try to revise group titles: make them more concise, clear and meaningful. If a group of data is just named with a title based on mere commonalities of the data in that group, try to state an actual insight for that group. This will almost certainly require moving some data between groups in order to accommodate the data to the improved structure.

> *For one group I used the title "Arranging", since arranging and aligning objects, lines and text to a predefined grid or to each other was a task that occurred frequently. But the title "Arranging" just names a commonality. To make clear that the group is about a user activity and to state the theme as an insight, I renamed "Arranging" to "Arranging objects is an important activity"*

> *One group was named "repetitive and manually". This could be easily stated as an insight: "repetitive and ›do-it-manually‹ tasks are tedious". By just adding the users view ("are tedious") the title became an insight which is a useful principle for design.*

> *I had the following structure:*

> - *Inspiration*
>   - *Review previous projects*

- *Others (Web, Bookshop)*

> *"Inspiration" is a title based on the "same-things-mentioned"-principle, so I had a look at the underlying data. They all were about inspiration—but they had another commonality: All inspiration techniques used other, existing designs, often ones that were created by the same person or even for the same project (It would have been possible that people take a walk or have frequent brainstormings or take drugs to get new ideas etc.). The insight I came up with was: "I use existing designs for inspiration"*

(Re) Move data to other groups

When improving your structure, it might be necessary to remove pieces of data from groups, either moving the data to a temporary "misc" group or to another, more suitable group.

While we want to make use of the data we have, it is most important to create sound and helpful themes based on the data— instead of just putting everything under a label.

It is possible, that you can state an insight more clearly by rewriting the group's title, but as a result, the clearer title may no longer encompass all data in the group. In this case, go for clarity of the groups title, even if it means, that the theme does not encompass all the data currently subsumed in the group.

Take out the data which does not fit the improved title and see if it might fit better to another group. If not, place it in a "not yet grouped" or "misc"-Group. Revise that "misc" group, when you made changes to your structure and see, if you can use the data from that group to enhance other groups.

> *I reviewed the following group:*
>
> - *Feedback*
>   - *Good: getting feedback*

> ■ *Bad: uncertainty before feedback from client*

> *The title was not a meaningful insight and I felt that the analysis might benefit if I use the data in other themes.*

> *I already had a cluster related to motivations and emotions– where I moved "bad: uncertainty before feedback from client". The "good: getting feedback" was moved to a cluster named "Exchange with others".*

> *While I think I gained something out of it, these changes did not result in a new much better structure. It was part of trials and errors in the process.*

> *Going through the data of a group named "general requirements". I noted, that a big part of the data was concerned with balancing functional or practical requirements (price, readability etc.) with requirements concerning style (using colors, being innovative)*

> *Thus, I renamed the group to "trying to combine aesthetics and functionality". As the new title was more specific some data needed to be taken out, put into other groups or to the temporary "misc" group.*

The previous examples were concerned with whole themes and thus focused on the macro level. Sometimes you just move data itself, without any trigger like renaming, just because you found a better fit.

> *For example "using the maximum possible height on a sheet of paper" was grouped into "media". Later, I moved it to "budget", because budget is something the user is directly concerned with, whereas media is even more abstract. The group "budget" was then later renamed "having little money and resources", expressing that a part of the participants work was finding out how they could make the most out of a small budget ("using the maximum possible height on a sheet of paper" is a practice that results from that*

concern.)

Create Subgroups

Some groups may grow rather big, especially if their themes are not insights, but are based on mere commonalities of underlying data (like "dealing with color"). This is an excellent opportunity to develop themes by creating subgroups. The process of developing subgroups is like in "Develop a first structure" (just inside the group): Move similar data in proximity and try to create clear-cut insights if possible. In this process, you might find a more suitable way to state the theme of the main group, too.

> *I had a group with more than ten points regarding "Colleagues and Friends". This title was rather general and thus not very useful for design. I created two subgroups which were more meaningful.*
>
> *Before:*
>
> - *Colleagues, Friends etc.*
>   - *A friend told her that concrete is visualized dashed*
>   - *Puts sketches on the wall: Others will see it and talk with me.*
>   - *Which design do we take? Talks with fellow designer*
>   - *[…]*
>
> *After splitting and rearrangement:*
>
> - *Exchange Knowledge*
>   - *A friend told her that concrete is visualized dashed*
>   - *Puts sketches on the wall: Others will see it and talk with me.*
>   - *[…]*
> - *making decisions with others*
>   - *Which design do we take? Talks with fellow designer*

- *feedback-rounds with other designers*

One main point in my first structure was "Highly motivated at the beginning; then the problems start.". After restructuring, this became a sub point of motivation related groups.

- *[group-of-groups] Motivations*
  - *[Subgroup]: Highly motivated at the beginning; then the problems start.*
  - *[Subgroup]: Finishing is good*
  - *[Subgroup]: Waiting for feedback is bad*
  - *[Subgroup]: being afraid of the client's rejection of the design*

Sometimes you first sort the data under the overarching title or principle and then move it to an already existing subgroup later:

The utterance: "Its bad that you can do imprecise things here, compared to programming (talking about Illustrator)" was first sorted into "Media" and subsequently put into "using the right media"

Wrap it up

it's done! (though you could still change some things or two…)

The steps described above build on each other. But like in other creative tasks, there will be a lot of going back and forth between steps of creating groups, assigning data to them and revising these groups.

These iterations may also happen just in parts of the structure you create. or example, after you revised your overall structure, you find, that a grouping should undergo a major change and you put all its data out. Then, you are back to developing a structure for a part of your analysis. Or, you notice, that some notes which you moved in proximity, can be summarized by a clear principle, and you jump straight to the revision of that part of the analysis, leaving the "fill in the data" step out.

This process can take up some time. The analysis may never come to an actual halt, but it will slow down at some point. Continuing to move data may still do minor improvements, but there are no big changes anymore. Review the data a last time. The analysis is finished and it is time to communicate your results.

> ***Final structure:***
>
> - *Arranging Objects as important part of the work*
> - *using existing work for inspiration*
>   - *review previous projects*
>   - *use other's work*

- *use previous ideas from same project*
- *Media*
    - *Test design in the target media*
    - *Find suitable media*
- *Being attached to ones own ideas*
- *Working visually*
- *Social*
    - *Exchange Knowledge*
    - *Collaborative decision making*
- *Motivation*
    - *Highly motivated at the beginning; then the problems start*
    - *Finishing is good*
    - *Waiting for feedback is bad*
    - *being afraid of the client's rejection of the design*
- *repetitive and manual work (negative)*
- *changes and requirements*
    - *Some changes like page format are hard to change later*
    - *combine function and aesthetics*
    - *changes cause other changes*
    - *considering the budget*
    - *trial and error as method*
    - *use the actual content for testing (not fake content)*
    - *fixate things to have a starting point*
- *Misc*
    - *designer vs. technology*
    - *making calculations*
    - *choosing fonts*

These are all the groups I created in my analysis. The results could be more concise, having fewer groups concentrating on fewer themes. However, this would probably lead to more abstract insights which would presumably harder to use in design.

> *The groups of groups are partly not insights themselves. I tried to find some, but was not able in a part of the cases: "changes and requirements" is not an insight (but it's subordinated groups are: "combining functions and aesthetics" etc.). In contrast, "using existing works for inspiration" is a group of groups which states a meaningful insight.*
>
> *You see that I could not use all data, so I made some less significant groups in the "misc" section.*

Communicate Results

If you work with others, the results of your research need to be communicated so they can act upon your research results.

Aside from getting the results of your research across, communicating your results has some positive side effects: collecting, organizing and summarizing your findings will make it easier for yourself to remember your findings and you may be even able to improve your analysis further.

Consider the audiences needs

Who will receive the research results and what interests do they have? There may be different stakeholders with different needs, e.g.

- Management
- Programmers
- Designers
- …

Some of their needs align, some may differ. Before you start, you should ask yourself who will receive the results and what specific interests they have. Also inquire if there is any preferred format. Some may prefer text-based reports, others may be used to slidedecks.

First things first

Structure documentation in a way that puts the essential information first. A simple rule of thumb is this: If a reader stops early at some point, they should already know the most crucial information. If the documentation is structured in a different way, it can happen that after reading half of it, the most crucial information has not delivered. Also, it is motivating to deal with documents that put important matters first. One can read e.g. the summary in the beginning and then decide that this is the needed information and continue—or discard the document and don't waste time.

Don't make it hard to understand

You create the documentation for people who are not user researchers and who often have not taken part in the research. They won't understand any jargon of your profession and maybe also not the vocabulary the users use. Thus, avoid language that is hard to grasp or uses words unknown to your readers. Instead, "translate" for them: Describe the research in terms they know and help them to make sense of the participants' language and actions.

As a rule of thumb, rather assume too few knowledge than too much. A person knowing something will just overhear or overlook an explaination while a person who lacks knowledge is lost without it.

Sections of a research documentation

There are some typical sections of a research documentation:

Executive Summary
> Summarize the research and its results in a few paragraphs.

Aim
> Summarize the research question you aim to answer with your research

Research Methods
> Describe how you gathered and analyzed the data. The research in this guide uses "interviewing and obeservation" for gathering the data and "thematic analysis" or "qualitative clustering" as analysis methods (The terms for the analysis are not 100% scientifically correct though since analysis followed no "official" method)

Participants/Sample
> Describe how you got your participants and why you did so. Show that you did not just got somebody, but people who were relevant to the research needs.

Results
> The themes and consolidated diagrams belong here. They are the core of your documentation. While most other content follows a pattern, the results will be different each time. So be extra careful that the results can be understood by the audience and use illustrations, photos and quotes to get your message across.

Recommendations
> Sometimes you may give some advice for possible further research or or designs.

Appendix

If your audience is interested in digging deep your documentation you can provide additional information here, e.g. an in-depth breakdown of your themes or additional photos and sketches. If you provide material that is less abstract, take extra care to check if the privacy of the participants is maintained.

In a longer, written report you may have all of these sections. However, often you will only provide a subset according to the needs of the audience e.g. only the executive summary and the recommendations in an email.

Components of deliverables and reports

Let me give a brief overview of typical building blocks for communicating your research. They are all useful on their own and you can combine them to use their strengths together.

Text

Text is as very versatile way to convey informations. On the downside, text may seem not as quickly accessible as a diagram or a sketch. To lower the barriers, make sure that people know why they are reading your text. Give essential information at the beginning (What is this text about? Why was the work done?) and make sure that it is easy to get a quick overview: Structure your text using headings, lists and italics to guide the reader.

(Smartphone, Netzwerkrouter, PCs) mit alternativer Betriebssoftware („Flashen", „Hackintoshen") oder das Aufbereiten oder Neubauen von Möbeln, deren Teile z.B. vom Sperrmüll stammen.
Reparieren muss erst erlernt werden. Besonders bei Elektrogeräten muss erst die

menzuarbeiten o.Ä. sind Teilnehmer geneigt, sich die nötigen Gegenstände oder Programme trotz ihrer Bedenken zu kaufen, weil die Arbeiten erledigt werden müssen.

a page spread from a report

There are lots of books which explain how to write concise and easy-to-get text. The most efficient guide I know was given by George Orwells in "Politics and the English Language"—I quote:

> 1. *Never use a metaphor, simile or other figure of speech which you are used to seeing in print.*
> 2. *Never use a long word where a short one will do.*
> 3. *If it is possible to cut a word out, always cut it out.*
> 4. *Never use the passive where you can use the active.*
> 5. *Never use a foreign phrase, a scientific word or a jargon word if you can think of an everyday English equivalent.*
> 6. *Break any of these rules sooner than say anything barbarous.*

4

In addition, read the text aloud—in particular, if you already noticed that you have had difficulties finding the right word or to express a complicated concept. If you need to re-read sentences to make sense of them or to stress the right words, you should go for a rewrite.

Quotes

Quotes convey the participant's motivations and feelings. This is important to help others to have empathy with the users.

> ***Rather abstract:*** *Users like the alignment function*
>
> ***Combined with Quote****: Users like the alignment function. Sandy: "It is like doing work by magic—click! And its there!"*

Remember to protect the participant's identity if they did not give you the permission to share their quotes or names. If they did not give you the permission, only share a plausible, but faked "quote" and don't use real names but faked ones as well. Don't deceive your audience either: mention that the names and quotes are not real but are only corresponding to their actual counterparts.

Scenarios

Activities don't happen in isolation from each other: They depend on previous activities and (possible changing) motivations. One way to communicate a sequence of interrelated activities is a scenario. Simply put, a scenario is a short story written as text or given as a sequence of images (like a comic)

A good framework for writing scenarios is asking yourself these questions:

- **Person**: Who is the main person in the scenario?
- **Motivations**: Why does this person what he/she does? What is the motivation?
- **Activities**: What are the actions of the person and how are they done?
- **Context**: Where and When does the scenario take place?

Answer them in your scenario:

> *Annika studies media culture and needs to finish here homework on "Cultural subconceptualist theory in the works of Koons" in order to hand the homework in on time. She goes to the library to see if the book on "Capitalism in the works of Rushdie" by Andreas Geoffrey contains arguments supporting her view on the structuralist paradigm.*
>
> *She enters the library and walks up to one of the computers standing in the corners of the library's halls. She wants to look up the name of the author, but she notes that she forgot the copy of the book that referenced the work. She still knows that "Rusdie" or "Rushdie" was in the title of the book she needs. After several trials she finds the right spelling of the name and, after scanning through a list, she finds the book she wants to read. The detail page of the search application gives the address of the library building she is in already and a code: "X0-3R52"… [scenario may continue]*

You could as well create a scenario as a series of sketches, like a comic strip:
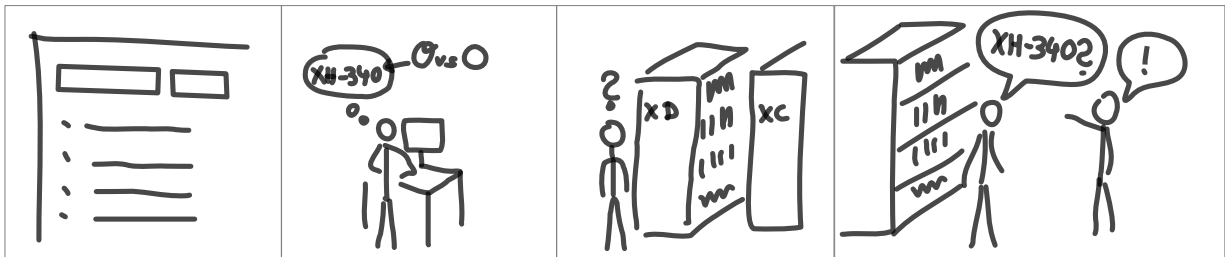
1 the search interface of the library's computer **2** remembering the code. Is this character a zero or the letter ›O‹? **3** I can't find the right shelf! **4** I'd better ask somebody… …now I know where I need to go!

Diagrams
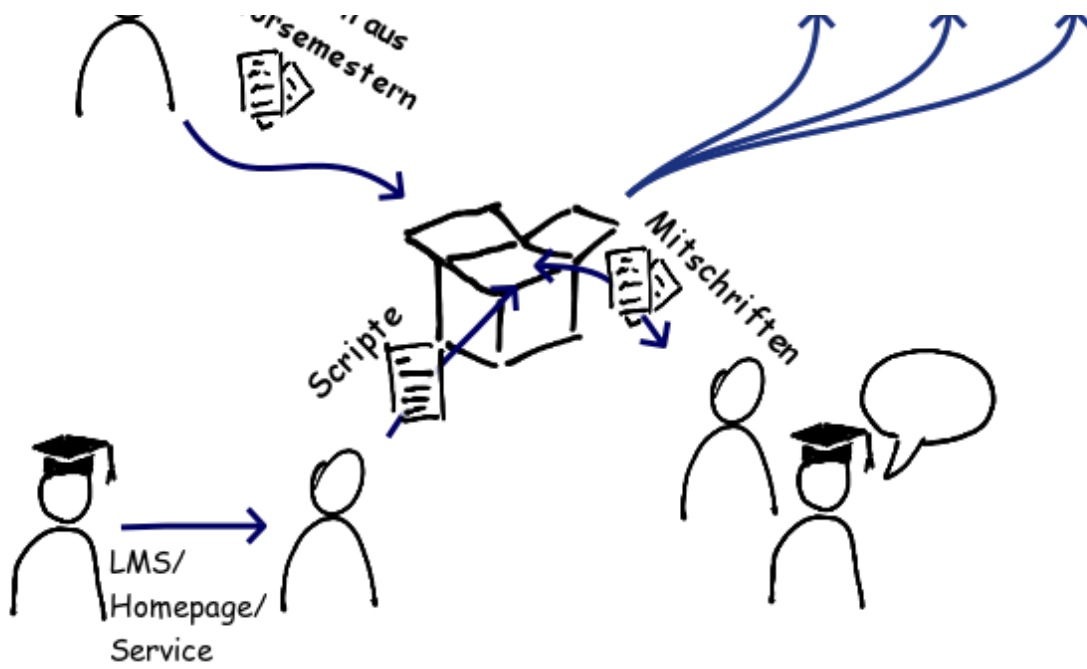
A diagram showing the sources and flow of files used by university students
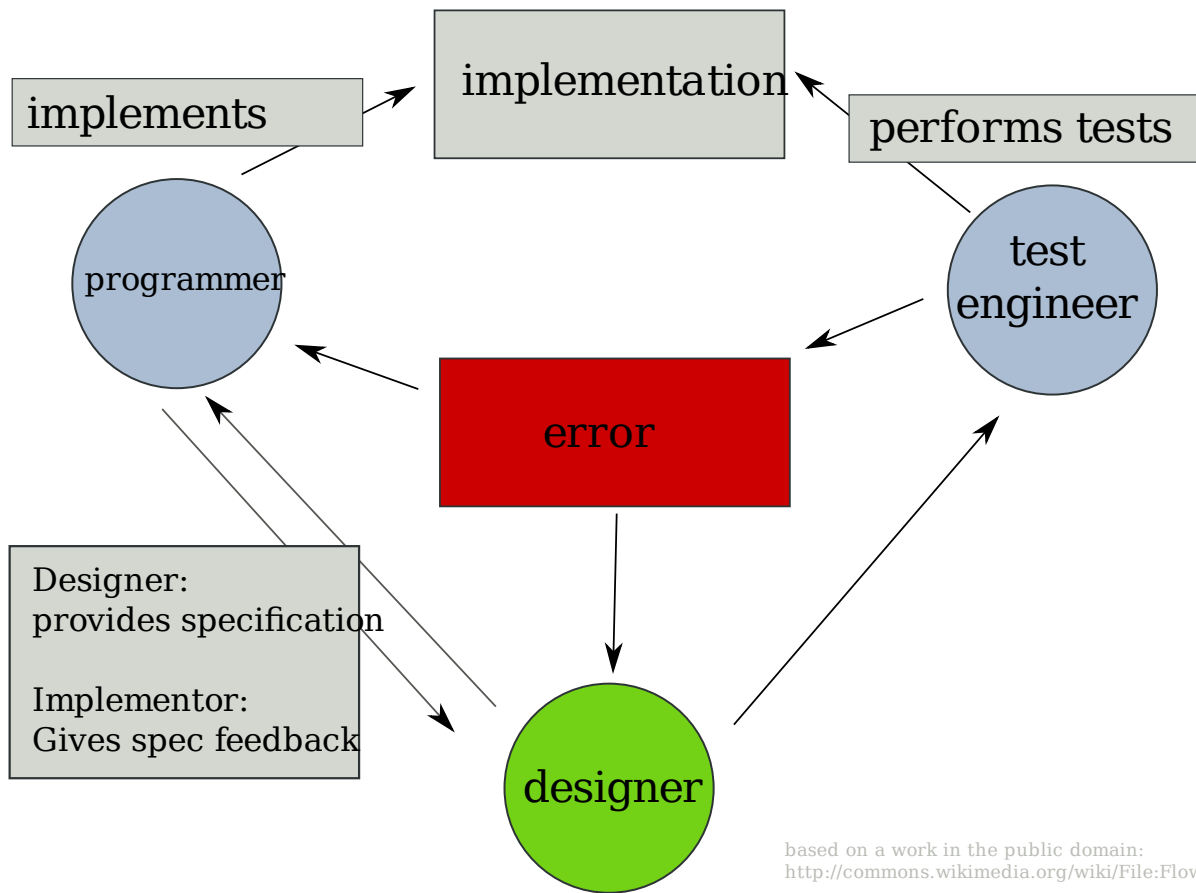
A diagram showing the workflow in creating a software

Diagrams are useful to show high-level concepts, relations and

dependencies – for example showing which activities need to be done to create a page of a magazine or the ways a group of students share files when working together on a joint project.

You may use the summary diagrams you created in the analysis or create new diagrams for this step.

Photos and Illustrations

Which one is easier to understand and less ambiguous:

This:

> *The participant's desk is rather tidy. In front of the keyboard is a book and on the book a calculator. Left hand are additional utilities, like…*

Or that:
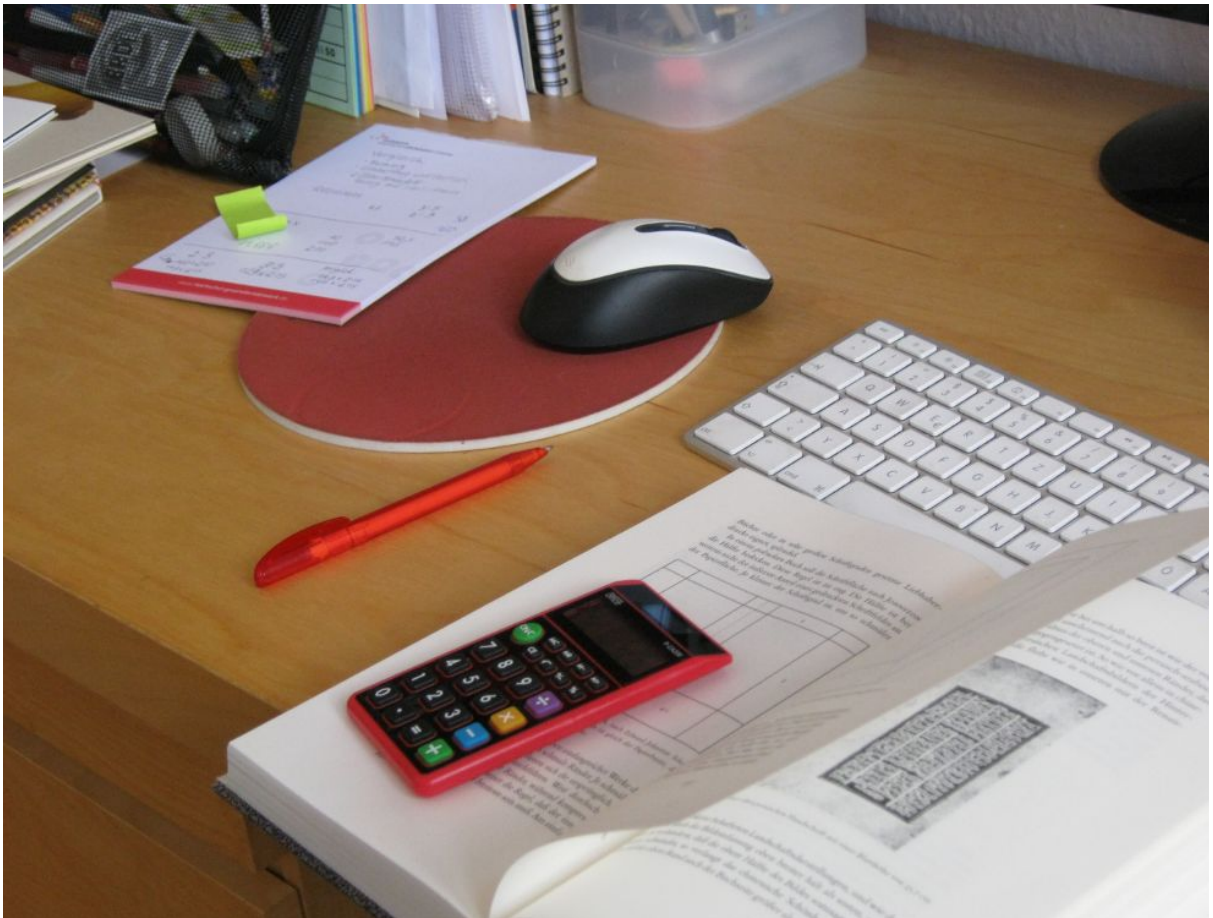
I suppose the image wins.

While the above example just shows a setting, we could as well combine the strengths of text and images in an annotated photo.

Or you could show your general findings about how people organize their desktops by sketching a prototypical arrangement of items.

Illustrations and photos in particular have another function aside of getting information across: They make the research and its findings more graspable, intuitive and "real" for your audience. Just like scenarios and quotes they enable to imagine how your research participants acted which in turn helps to develop empathy for them. Consider again our example from above in which an image and a text were compared. The photo does not only give some abstract information. It shows that you have been with actual participant or—in this case—did research on actual tools they use.

When using photos, remember to protect the privacy of your participants. Only show photos of their workplaces or of themselves if they agreed to it.

Typical documents for reporting results ("Deliverables")

You can combine text, images diagrams and scenarios in several ways to communicate your message. Let's look at some possibilities.

Quick findings

Quick findings are short, annotated lists of your most important findings. They include only a brief description of methods, participants and environment. The focus is on the most important results. Quick findings can also be delivered before the analysis is fully finished. In this case, highlight that you are still refining the research.

Quick findings are very useful if your audience:

- already know about your research and want to have a look at your progress
- have very little time, and need efficient access to your results

Written Reports

Written reports are roughly four to a several dozen pages long. Nevertheless, only deliver what the audience needs and wants to know—be concise. It is easy to get sidetracked and to write length and complex sentences.

Written reports consist mainly of text, but you should use images, quotes and diagrams too when they make sense.

page spread from a report on wiki use for teaching at university

Slides

Slides can deliver the same content as written reports or quick findings. They convey the information in a more visual way—so they have fewer text and more images, diagrams, and storyboards.

If you give the presentation yourself try to deliver as few as possible of the information by text on the slides. You can do the talking and the slides supplement the information you give. On the other side, it may makes sense to use more text on the slides if you just share the slides with others and don't present them yourself.

a row of slides from a presentation on wiki use for teaching at university

Posters

A poster is a great way to show the results in a way that is easy to grasp and will be consumed too by people who do not take specific interest in user research. They can be put up in a hallway for everyone who walks by.

Focus on a few important findings and show them using graphical elements and text. You also can create a big version of diagrams you created or summarized.

»improving etymologies«, »vocabulary I learned«

Credit/License: [1]

Structuring data with templates

Data on Wiktionary is structured explicitly using Wikitext templates. Links to words, grammatical Forms, phonetic transcription etc. have own templates. Knowing the most basic templates (~20) is needed to edit Wiktionary successfully.

```
===Etymology===
[[File:Apfelernte 01 (RaBoe).jpg|thumb|[[apple|
to harvest and sell the fruit from it, he or sh

From {{der|en|LL.|usufructus}}, from {{der|en|1
{{m|it|usofrutto}}, {{cog|oc|usufrug}}, {{cog|p

===Pronunciation===
* {{a|RP}} {{IPA|/ˈjuːz(j)uːfɹʌkt/|lang=en}}
```

Social Nets are smaller

The communities are much smaller than the one on de.WP or en.WP. This leads to:
- "Recent Changes" is actually useful
- Article talk pages are less used, instead meeting places like "tea room" are used for article discussions
Small community does not mean that people know each other in person.

A poster showing three core findings from research with editors of the free online dictionary Wiktionary (By Wikimedia Deutschland, Licensed under CC-BY-SA 4.0, https://creativecommons.org/licenses/by-sa/4.0/ (https://creativecommons.org /licenses/by-sa/4.0/))

Appendix

Learn (even) more

Books

- **Observing the User Experience : A Practitioner's Guide to User Research** by Goodman, Elizabeth; Kuniavsky, Mike; Moed, Andrea. 2nd Edition. Amsterdam: Elsevier, 2012. ISBN 978-0-123-84870-3
  Covers multiple user research methods as well as research planning, recruiting and communicating results. Particularly interesting are the chapters on recruiting and analysis of qualitative data.
- **Interviewing Users : How to Uncover Compelling Insights** by Portigal, Steve. 1. Edition. New York: Rosenfeld Media, LLC, 2013. ISBN 978—1-9-33-82-0
  As the title suggests, it's focused on asking questions and listening to answers, but it covers additional methods as well. Includes lots of useful tips.
- **Shane, the Lone Ethnographer: A Beginner's Guide to Ethnography** by Galman, Sally Campbell. Lanham: Rowman Altamira. ISBN 978-0-759-10344-3
  Lots of the methods I described originated in ethnography. This book gives an hands-on and thoughtful introduction to enthography. Comes as a comic and is fun to read. Minor flaw: The lettering is a bit obscure
- **Successful Qualitative Research : A Practical Guide for Beginners** by Clarke, Victoria; Braun, Virginia. London: SAGE, 2013. ISBN 978-1-847-87581-5
  This book is aimed at aspiring academic researchers. Hands-on but covers the underlying (social science) theory as well. It inspired much of the analysis section in this book. Interesting for those who want to know more about doing thorough analysis of data (using the method of "Thematic Analysis")

- **Rapid Contextual Design : A How-to Guide to Key Techniques for User-centered Design**by Holtzblatt, Karen; Wendell, Jessamyn Burns; Wood, Shelley. Amsterdam: Elsevier, 2005. ISBN 978-0-123-54051-5
  Describes a collection of methods for user research. It is aimed at bigger teams (with time and money, I assume). However, its mentioned here since the idea of grouping data as core activity of data analysis is from it.
- **The Ethnographic Interview** by James P. Spradley. Waveland Press. ISBN-13: 978-1478632078
  Focuses on understanding the participants' language and jargon and consequently less on participants' activities. Nevertheless a great intro, particularly the annotated examples.

Examples

- Watch a demonstration of interviewing methods *(https://www.youtube.com/watch?v=9t-_hYjAKww)* (by Graham R Gibbs, CC-BY-NC-SA)
- Example Interview Guides *(https://github.com/idno/User-Research /tree/master/Interviews)* (by Erin Richey, CC0)
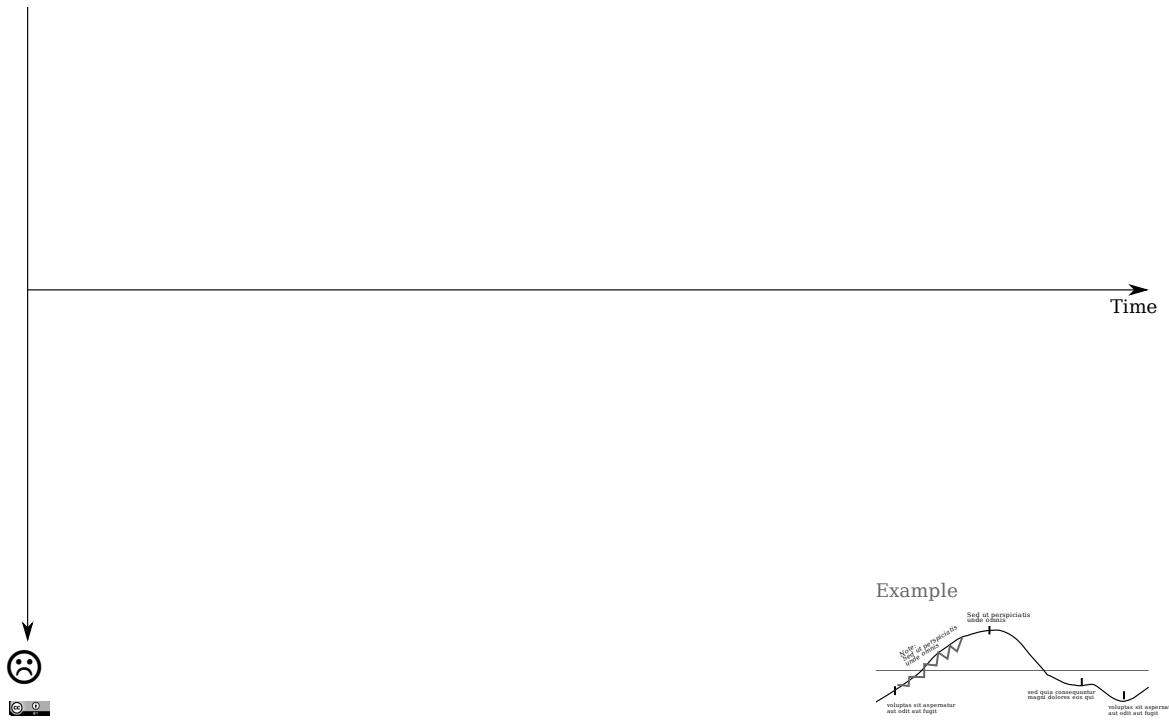
Forms and Templates

Co-Documentation Templates

If you read this on a computer, you can download the templates via right-click → "save image as"

☺ **Draw a graph of your mood**
add descriptions and explanations so that others can still understand it later
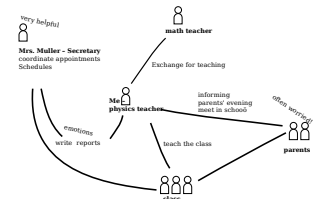Participant:

Time

Example

Co-Documentation Template for graphing and annotating a participant's mood over time

Draw a diagramm of the people you work with, what you work on and how!

Add descriptions and explanations so that others can still understand it later. If you are unsure if you should add something: add it.

Participant:

Example

Co-Documentation Template for diagramming the context of a participant's work
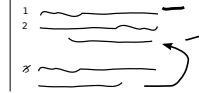
Create a how-to guide for an activity/a task

add descriptions and explanations so that others can still understand it later
Ideally, the task is demonstrated by the participant

Name of the task: Participant: Example:

Co-Documentation Template for documenting a workflow

Consent and Release Form

(based on a form from http://www.usability.gov
(http://www.usability.gov/), downloadable here
*(http://www.usability.gov/how-to-and-tools/resources/templates
/consent-recording-release-form-adult.html)*, released as public
domain)

Consent & Recording Release Form - Adult

I agree to participate in the study conducted and recorded by the
[Agency/Organization].

I understand and consent to the use and release of the recording by
[Agency/Organization]. I understand that the information and recording
is for research purposes only and that my name and image will not be
used for any other purpose. I relinquish any rights to the recording and
understand the recording may be copied and used by
[Agency/Organization] without further permission.

I understand that participation in this study is voluntary and I agree
to immediately raise any concerns or areas of discomfort during the
session with the study administrator.

Please sign below to indicate that you have read and you
understand the information on this form.

Date: _____

Please print your name: _____

Please sign your name: _____

Thank you!

We appreciate your participation.

---

1. This idea, that a book on methods should be treated like a travel guide, is inspired by *Reassembling the Social* by Bruno Latour, a book on so-called *Actor-Network-Theory*, which is frequently applied in sociology of science↵

2. Research concerned with finding out about "how" and "why" using methods like interviews and observations is also called "qualitative" research. In contrast, "quantitative research" usually tests hypothesis (like "an orange ›buy‹ button generates more sales that a blue one") and employs controlled experiments and statistics. In this book, we learn about qualitative methods↵

3. Also called a "leading question"↵

4. *Orwell's Rules for writers (http://wikilivres.ca /wiki/Politics_and_the_English_Language)*↵