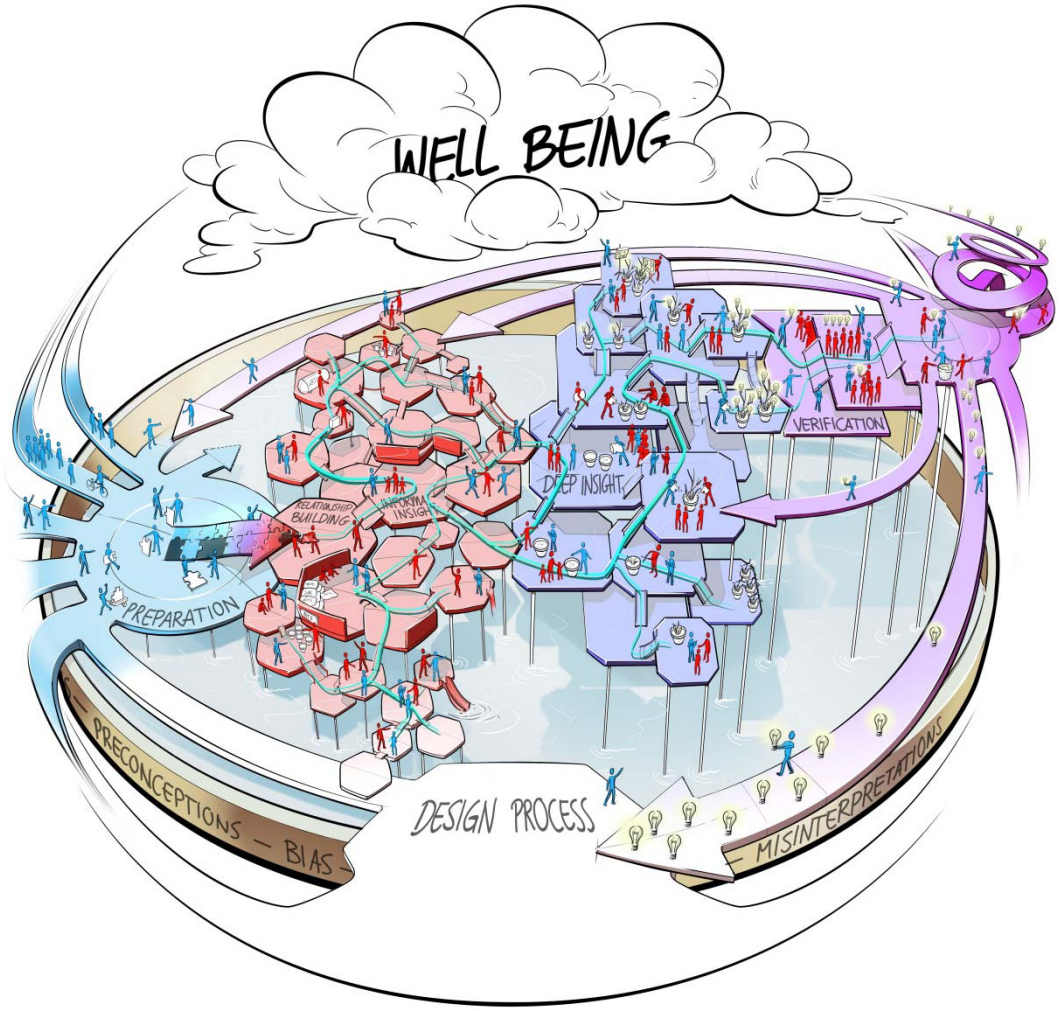
Capability Driven Design:

A step-by-step approach



Version November 2016
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This document is part of:

Capability Driven Design

An Approach for Understanding Users' Lives in Design for Development

www.design4wellbeing.info

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This manual results from research which was made possible by
the Netherlands Organization for Scientific Research (NWO)
under grant number 2009/06098/GW
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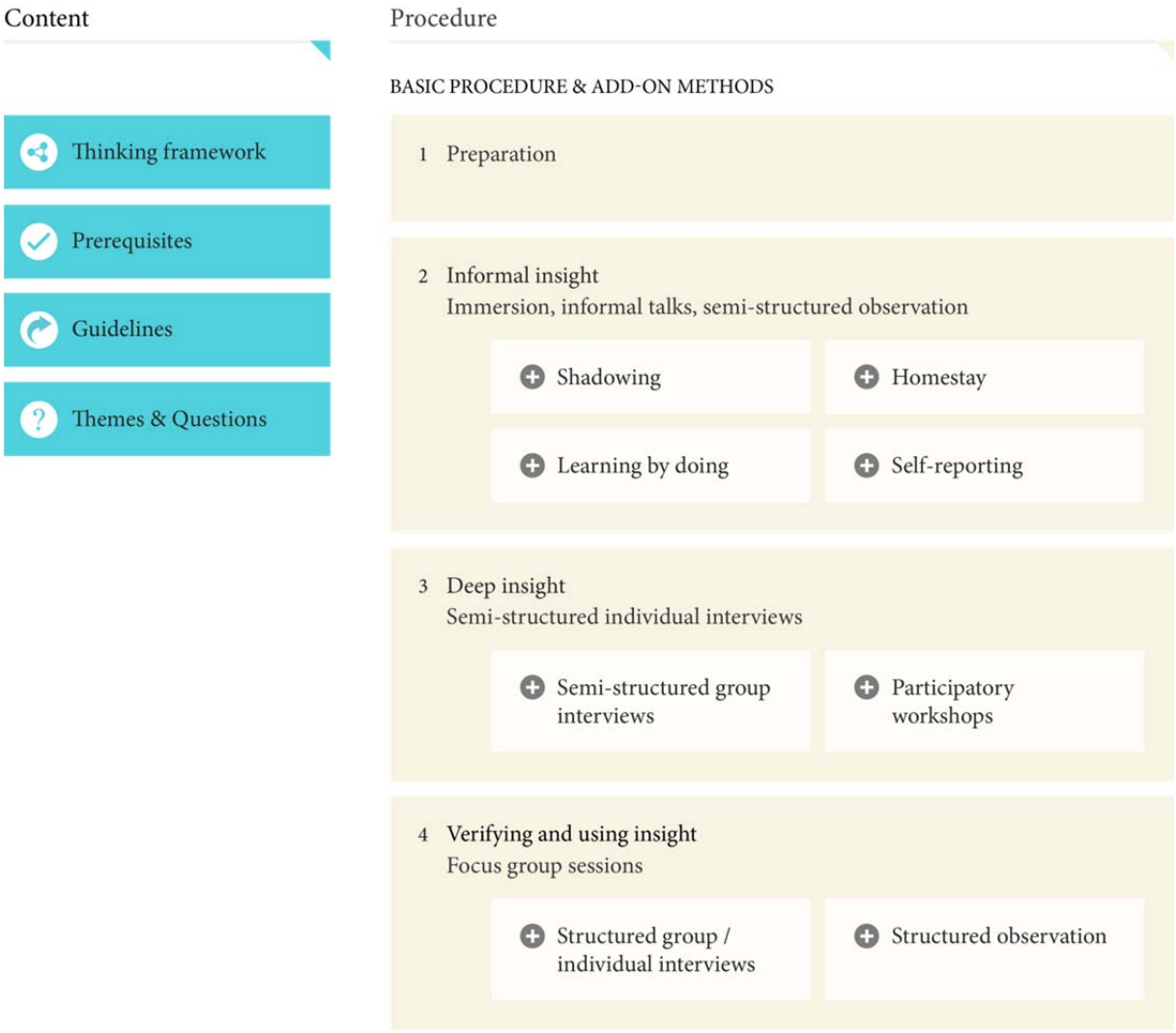
Contents

Steps and methods of Capability Driven Design

The CDD approach consists of two parts. The first part is its contents (theoretical) consisting of a thinking framework, prerequisites, guidelines a set of conversation topics (themes) and questions. The second part is a procedure (practical) consisting of a four-step procedure, tips and tricks. Both parts of the approach are presented in the manual. The full approach is presented the figure below.



The Capability Driven Design approach and its two components: content (theoretical) and procedure (practical)

In this document the step-by-step procedure of the CDD approach is explained. Together with the ODK content, as presented in the figure above, this step-by-step procedure forms the Capability Driven Design approach.

Four steps comprise the 'basic procedure' of the CDD approach to guide product designers to obtain comprehensive user insight. These steps are:

1. Preparation and planning before entering the field;
2. Informal insight;
3. Deep insight;
4. Reflection and sharing outcomes in a bigger group.

To this basis, the add-on methods can be added, resulting in more steps. The steps and methods are explained below.

Capability Driven Design step 1: Preparation

Before entering the field, several steps need to be taken to ensure comprehensive and efficient user context research: 1) establish local partnerships; 2) get everyone on board; 3) prepare and train the team; 4) get acquainted with the CDD approach; 5) obtain data before going into the field; 6) prepare methods and materials; and 7) plan the to be conducted activities (see figure below).

Visualisation of step 1: preparation

Step 1-a: Establish local partnerships beforehand

It is important to build relationships with governmental and non-profit organizations in order to obtain knowledge and information about the potential users, to get advice on the planned activities, to acclimate quickly, to build trust and relationships in communities, to gain access and to make arrangements to start learning.

Step 1-b: Get everyone on board

Make sure that everyone supports the aim to obtain comprehensive user insight and to use the CDD approach: the team, the client, local partners and translators as well – when required during the activities.

Step 1-c: Prepare and train the multidisciplinary team for qualitative research

By attuning work practices and building a creative project space a collaborative working spirit and an inspirational working environment are created. It is relevant to bring about existing knowledge from team members, literature and local partners. By deciding on a project focus and goals an appropriate approach can be chosen. The team should prepare themselves for a possibly overwhelming experience and preferably follow qualitative research training or at least learn about what qualitative research entails, what appropriate and ethical attitude and behaviour is and how questions should be posed. In chapter 3 a list of recommendations for researchers' behaviour and attitude is summed up and explained. In chapter 3 also a list of recommendations for questioning is summed up and explained. The team members must furthermore get acquainted with the flow and structure of the activities as well as with the topics and key questions. This can be done by roleplaying the activities in the team.

Step 1-d: Get acquainted with the CDD backbone

In order to be able to get the most out of the CDD approach, it is important to understand its thinking framework, to fulfil the prerequisites, and to know the themes and questions. Read about it, but also practice using them, by for example role-playing or piloting ODK interviews.

Step 1-e: Obtain meso- and macro-data about the context beforehand.

To get out the most of the ODK interviews it is important to become familiar with general information about the potential users and their context, such as processes, trends, political and social systems, such as healthcare and education systems. Getting to know more about social and environmental conversion factors saves time during the interview. The information can be obtained by internet and literature search, by consulting people from the area, people who have worked in the area, people who are familiar to the area, or by consulting local partners. However, designers must be aware that other people have their own bias and interpretation. It therefore remains important to actually go into the field to experience the situation yourself. By collecting information you have to be aware not to become biased and be aware not to take along assumptions and preconceptions.

Step 1-f: Prepare methods and materials

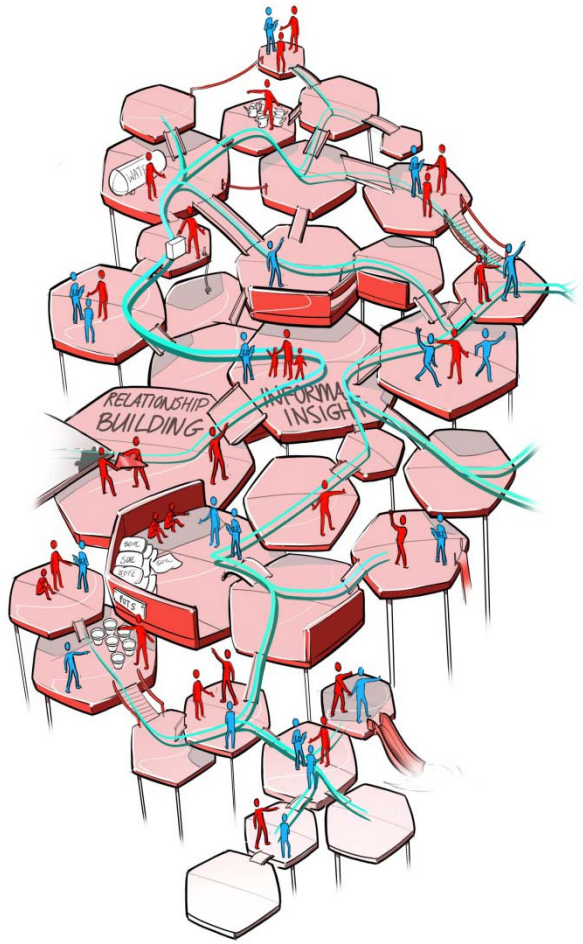
For the comprehensive context exploration as aimed for in this research, themes and guiding questions have been developed as part of the CDD approach. The themes aid the design team to obtain a comprehensive view of people's well-being. These themes should be taken into account during each activity. Especially during interviewing the themes are of significant value, as they can serve as discussion topics to guide a broad and deep dialogue with potential target users, specifying which topics to discuss. In the field not only user context research need to be conducted, also information from other stakeholders should be obtained, information about local materials and production processes must be collected and information concerning possible business models should be acquired. Therefore, the team must decide how much time they will spend on user context research. For CDD an essential set of different methods have been selected, but the research team can also add methods to this set. The materials for conducting the activities should be prepared and all supplies for the activities should be collected. The design team should check the planned activities with established ethical criteria.

Step 1-g: Plan activities

In order to use the time in the field efficiently, it is recommendable to plan activities, documenting and data analysis beforehand. No more than three intensive activities should be planned for one day and sufficient time should be kept free for documentation, analysis and for unexpected events, appointments or activities to happen.

Capability Driven Design step 2: Informal insight

When going to the field, the first action for the team is to obtain informal insight. To obtain this insight several steps need to be conducted: 1) meet local partners; 2) select a research area; 3) select and instruct a translator; 4) emerge and build rapport with potential users; 5) analyse, interpret and reflect on the obtained insights within the team; and 6) share interpretations with the participants and local partners (see figure below).



Visualisation of step 2: informal insight

Step 2-a: Meet local partners

When local partnerships have been established (one of the prerequisites!) it is important to meet them and explain the intentions of the research in order to build proper expectations. Local partners can aid in selecting a translator, in selecting the area of research and in selecting participants. They can also introduce the team in the selected area, provide knowledge and information about potential users, and give advice on the planned activities.

Step 2-b: Select the research area

The area of investigation should be selected depending on the purpose of the research, and availability, while carefully thinking about biases: design team should collect data that represents problems and realities and not fall back on quick and short visits to easy to reach locations or locations where activities already take place, during seasons with convenient climate conditions.

Step 2-c: Select and instruct a translator, when required

Working with a translator is difficult, as a barrier is formed to directly talk to participants. Properly select the translator and instruct the person in advance. Role-playing or piloting ODK interviews might help out. Tips & tricks for selecting, instructing and working with a translator are provided in chapter 7 of this manual

Step 2-d: Emerge and build rapport by immersion, observation and informal talks

After proper preparation, it is time for the design team to go into the field to explore the user and its context. The first step is to immerse in the context and meet people where they live, work and socialize. By observing them and informally talking to them rapport and empathy can be build. It is important to get familiar to potential users and their surroundings prior to conducting interviews. If required, a translator should be brought along. It is important to bring all required supplies: e.g., camera's, voice-recorders, notebooks. These observations and talks should be conducted carefully and systematically and be properly documented. First the team should determine what to observe. Here, the list of themes can be used as a checklist. In chapter 3 a list of aspects to pay attention to is provided, in general this comprises everything that is seen, heard, smelled, felt and tasted. For guidance, an observation form and / or a checklist can be prepared.

Step 2-e: Analyse, interpret and reflect within the team

After the observations the obtained data must be discussed between the observers and be reflected upon, analysed, communicated and discussed within the design team. In this way a better distinction can be made between factual behaviour and own speculations. The information obtained after each immersing activity can influence the next one. Thereby, the obtained information can also influence the next step: obtaining deep insight. The activity of obtaining informal insight should preferably be ended when not much new information comes up and sufficient rapport has been build.

Step 2-f: Share interpretations with the participants and local partners

After data analysis, it is important to check interpretations with participants and local partners to correct misconceptions and point out any errors. This improves data reliability and validity and results in a better understanding of the potential users. In this way, the data is also verified in a larger group.

Add-on methods

The following methods can be added to step 2-d when time and resources allow for it:

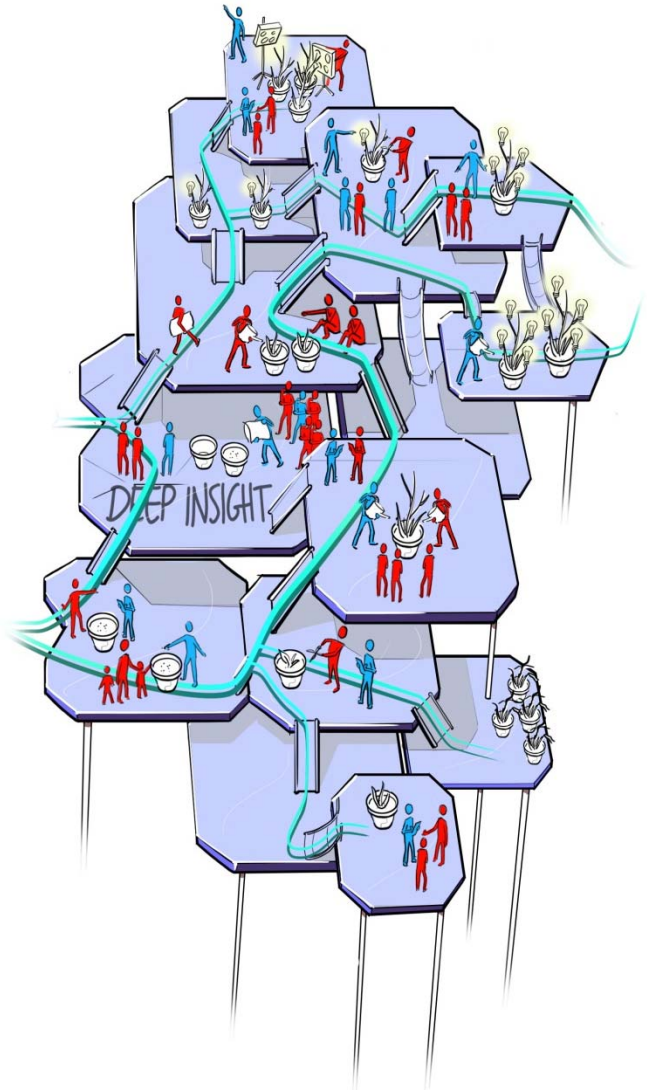
- *Shadowing.* Mostly, direct observation concerns groups or cultures of people. However, observation can also be conducted following a specific user. Shadowing is aimed at following a participant throughout his or her daily routine without interrupting this routine (Sperschneider and Bagger 2003; Martin and Hanington 2012). It is an exploratory type of observation that aids in understanding participant's actions, routines and decision patterns (Martin and Hanington

2012). During the activity questions may be asked (Martin and Hanington 2012; Larsen and Flensborg 2011). Participants normally know they are being shadowed, although they can be shadowed unobtrusively in public spaces (Martin and Hanington 2012).

- *Homestay*. A homestay accelerates the process of building rapport and means staying a few nights with people in their homes, resulting in improved understanding and empathy (IDEO 2008b). The focus is not on obtaining data, but on building trust and rapport (Simanis and Hart 2008; Larsen and Flensborg 2011). The researchers should assist in daily activities (Simanis and Hart 2008). Compensation for costs should be provided (Simanis and Hart 2008). It is recommended that different team members stay over with different hosts, reflecting a diversity of the community (Simanis and Hart 2008). Limitations of a homestay are that participants might treat the researcher as a guest, limiting the insights obtained (IDEO 2008b). thereby, the attitude and behaviour of the researchers influence the insights obtained and the rapport being build (Chambers 2004), as well as the extent to which participants and researchers like each other (Handwerker 2001).
- *Learning by doing.* Working alongside people accelerates the process of building rapport and means learning by doing, experiencing activities, resulting in improved understanding of the people under study (IDEO 2008b), trust, and empathy and interest in of the people in the research (Larsen and Flensborg 2011). By following participants and participating in daily activities the researcher experiences daily life challenges and obtains deeper insight as the people under study more easily express their reflections, feelings and ideas while working (Larsen and Flensborg 2011). Limitations of learning by doing are that the researcher might endanger the work of the people and might experience the activities differently (Larsen and Flensborg 2011). They might also create an extra burden on the participants (Simanis and Hart 2008). The attitude and behaviour of the researchers influence the insights obtained and the rapport being build (Chambers 2004). Thereby the extent to which participants and researchers like each other influence the results (Handwerker 2001).
- *Self-reporting.* Self-reporting can be used to capture life as it is felt by the participants (Van Boeijen et al. 2013). Without being physically present, insights can be obtained that would otherwise not emerge (Larsen and Flensborg 2011). Often self-reporting is done by offering participants cultural probe packages. These consist of several artefacts, such as postcards, maps, diaries and/or recording devices which are left intentionally flexible and open-ended (Martin and Hanington 2012). Participants are more likely to participate in creative methods than in more traditional methods of behaviour survey (Martin and Hanington 2012). Self-reporting is an exploratory research method, without a defined outcome, serving as inspiration for the design process, thereby also providing information for starting conversations (Martin and Hanington 2012; Van Boeijen et al. 2013). The method might lead to "*unique discoveries about users, their behaviors, and priorities*" (Martin and Hanington 2012, p. 134). Limitations are that self-reporting cannot be used to validate results or to provide answers to specific questions, and does not explain the reasons behind the things documented (Van Boeijen et al. 2013). Participants might not complete the assignments (Van Boeijen et al. 2013; IDEO 2008b) or misuse the materials for different purposes (Larsen and Flensborg 2011). Thereby, the outcomes depend on the open-mindedness of the full research team (Van Boeijen et al. 2013) and are difficult to interpret as they are unstructured (Roibás 2008).

Capability Driven Design step 3: Deep insight

After building initial rapport and obtaining informal insight, specific participants can be selected to obtain comprehensive and deep insight into their life-worlds. To be able to obtain deep insight the following steps should be followed: 1) discuss, test and adjust the interview to the local context; 2) prepare the semi-structured interview; 3) select a variety of participants; 4) engage in deep dialogue; 5) analyse, interpret and reflect on the obtained insights within the team; and 6) share interpretations with the participants and local partners (see figure below). For CDD step 3, a toolkit has been developed, termed 'Opportunity Detection Kit' (ODK). This kit further specifies the steps presented here and offers specific guidelines, techniques and tools which can be used when conducting the interview. See [TOOLKIT] for an overview of the ODK.



Visualisation of step 3: deep insight

Step 3-a: Discuss, test and adjust the semi-structured interview locally

Before conducting semi-structured interviews, it is recommended to test the length and content of the interview and to adjust it to the context. The content and wordings can be discussed with a local partner to adapt them to the context. The local partner can also point out possible sensitivities. By conducting a local pilot the length of the interview can be tested.

Step 3-b: Prepare the interview: instruct the translator, assign roles
If a translator is required, this person should be carefully selected and instructed. The translator must know the goals of the research and the rules of the interview. By assigning roles for each interview executed, the roles of the design team members who conduct the interview is clear to the participants and the translator.

Step 3-c: Select variety of participants and decide on time and place
Based on the selection criteria, established in accordance with the project goals, a variety of participants should be selected. The established local network (e.g., local partners, participants of observation and informal talks, village heads) can aid in selecting participants. A broad range of participants with different characteristics should be included. These characteristics can be, for example, gender, social class, income, religion, age, ethnicity, occupation, adoption speed, access to resources, community. Especially a variety in gender, social class and age are important to include. It is important to be clear about compensation to set the right expectations for participants. To minimize bias, the design team should focus on the selection criteria and search for participants within the full targeted population, not only for easily accessible or familiar community members. When participants have been selected, a time and place for conducting the interview can be arranged. Preferably, the interview takes places in participants' homes with no audience.

Step 3-d: Engage in deep dialogue
Semi-structured interviewing is the main activity within CDD. The interviews can verify the things observed and interviewing can deepen and broaden the insights obtained by informal talks and observations. The list of recommendations for researchers' behaviour, attitude and questioning should be followed by the facilitator, the list of aspects to pay attention to should be followed by the note-taker. It is important to bring all required supplies: e.g., camera's, voice-recorders, notebooks. These interviews should be conducted carefully and systematically and be properly documented. It is important to address all themes and advised to follow the established guiding questions, but also to remove or add questions in order to be able to follow-up on the unexpected.

Step 3-e: Analyse, interpret and reflect within the team after each interview
As soon as possible after each interview, the obtained data must be discussed between the team members present, in order to reflect on the challenges during the interview. In chapter 3 already challenges of user context exploration methods are described. However, the specific method of interviewing brings about some additional challenges, especially when using a translator. These challenges cannot all be undone, but should be considered during the interviews. The design team should pay attention to them, note them down if they occur, and take into account their influence when judging the outcomes. These challenges depend on:

- The facilitator's quality, skills, behaviour, bias, subjectivity and terminology used;
- The design team's presence, characteristics, agenda and perspective;
- The participant's character, motivation, interest, well-being, feelings, emotions, etiquette, availability of time, scepticism, distrust, suspicion, prior experiences, cultural background and values;
- The setting of the interview, the audience present, gatekeepers present, disturbances and distractions from outside;

- The translator' s presence, biases, skills, interest in and understanding of the project;
- The amount of distortion due to translation;
- The presence of recording devices.

Besides reflection on the above mentioned influences, the outcomes must immediately be analysed, communicated and discussed within the design team. Depending on the information obtained, the next interview can be adjusted to further explore surprising things that come up.

Step 3-f: Share interpretations with the participants and local partners after each interview.
After data analysis, it is important to check interpretations with participants and local partners to correct misconceptions and point out any errors. This improves data reliability and validity and results in a better understanding of the potential users. In this way, the data is also verified in a larger group.

Add-on methods
The following methods can be added to step 3-d when time and resources allow for it:

- *Semi-structured group interviews.* Semi-structured group interviews are open-ended group conversations, during which researchers keep a checklist of topics and questions in mind, or bring one along as a guidance (Narayanasamy 2013; Chambers 2004). This type of interview provides deep and varied insight in existing knowledge, attitudes, perceptions, needs and experiences of people, their contexts and existing networks (Larsen and Flensborg 2011). They can be used to obtain quantitative as well as qualitative data (Narayanasamy 2013). "*This type of interview is free from inflexibility of formal methods, yet gives the interview a set form and ensures adequate coverage of all topics*" (Narayanasamy 2013, p. 292). Limitations are that researchers are likely to make mistakes (Narayanasamy 2013) and that only a few people are reached, resulting in non-generalizable data (Handwerker 2001).
- *Participatory workshops.* Participatory workshops involve several participants and researchers working together conducting several activities and are aimed at understanding the participant's world (Martin and Hanington 2012). These techniques might include collage making, mapping, diagramming and / or modelling (Martin and Hanington 2012). They might involve projective techniques aiming to get to the participants' sub consciousness (Martin and Hanington 2012). Often for creative expression sessions the group is split into smaller groups and in the end, each group presents their outcomes to everyone present (Martin and Hanington 2012). The activities are carefully planned, but can be adapted to circumstances and dynamics (Martin and Hanington 2012). Participatory workshops lead to understanding and building a shared language (Simanis and Hart 2008). Limitations are that it might take a lot of time and effort to prepare and conduct these workshops and that the timing and logistics for the different groups of participants might differ (Martin and Hanington 2012). Thereby, it might be difficult for participants to share personal information in a group (Narayanasamy 2013), and participants might influence each other (Martin and Hanington 2012).

Capability Driven Design step 4: Verifying and using insight

After obtaining informal and deep insight several steps should be conducted to improve data validity and generalizability: 1) the data needs to be verified with participants and a larger group of potential users; and 2) the insight needs to be transformed into data usable in the design process (see figure 27).

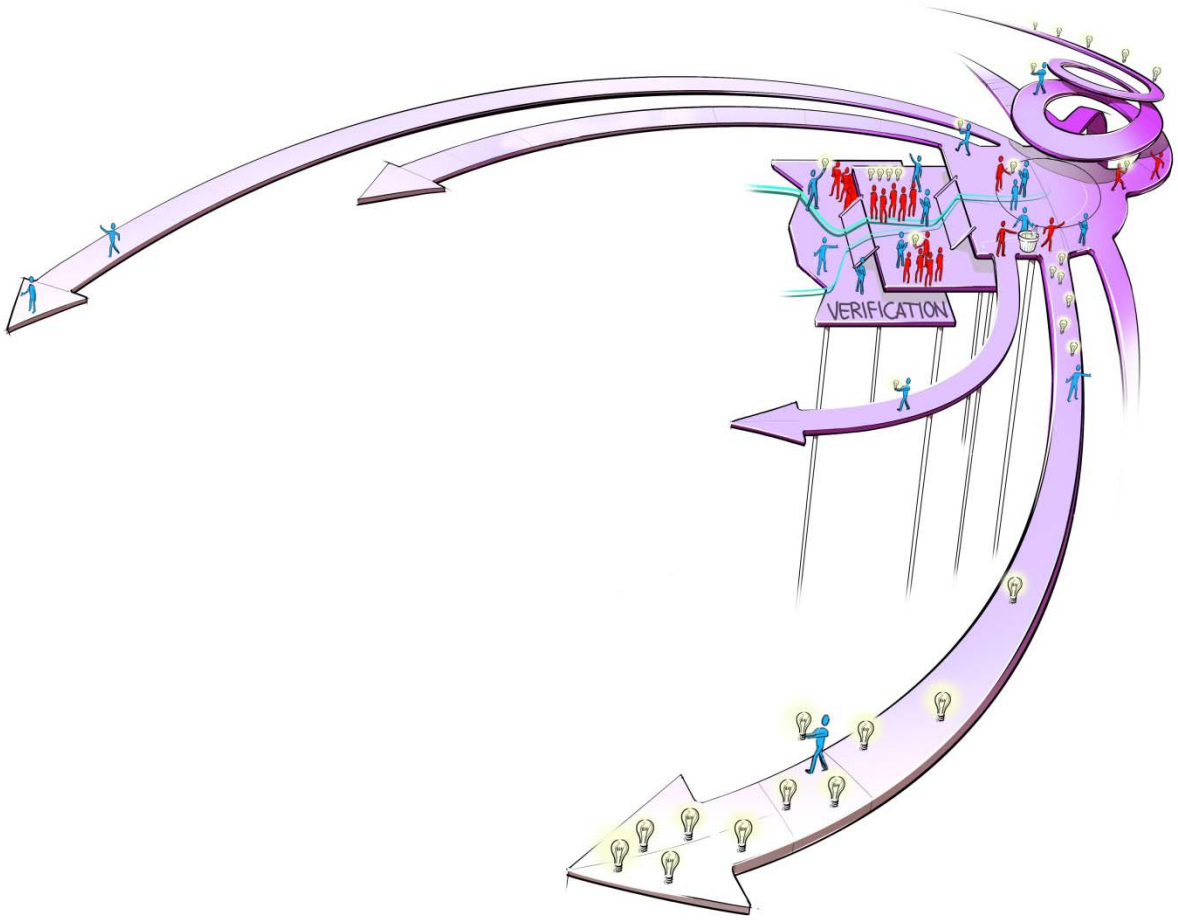


Figure 1: Visualisation of step 4: verifying and using insight

Step 4-a: Share and verify insights with a bigger group of potential users

After analysing and interpreting the obtained data from the immersion, observations, informal talks and semi-structured interviews, the data should be verified with the participants. If the participants agree, the outcomes can also be shared with relevant stakeholders and other potential users. This improves data reliability and validity, as misunderstandings can be pointed out, statements can be clarified, data is triangulated and verified. It also improves feeling of joint ownership, transparency and involvement. This activity can be more focused on a deeper understanding and more extensive exploration of key insights from a larger group of participants selected for their diversity. For this session many things are the same as for the interview: the session should be prepared, piloted, translator and participants should be selected, time and place must be decided upon, roles must be assigned, the activity should be executed and the outcomes should be discussed within the team and with the participants.

Step 4-b: Understand data in larger and future context

The obtained information should be integrated in the design process and inspire designers. Therefore, the insights should be framed in a larger and future context. The insights can lead to design requirements and inform design decisions. However, the design decisions made should be checked with the potential users who should continuously be involved in the design process – following the capability approach and the human-centred design spirit.

Step 4-c: Provide follow-up

It is reputable to provide participants follow-up, as they have spent time and effort and shared their life stories with the researchers. Therefore, the participants should preferably be informed about the next steps and if possible be updated about the progress of the project at hand.

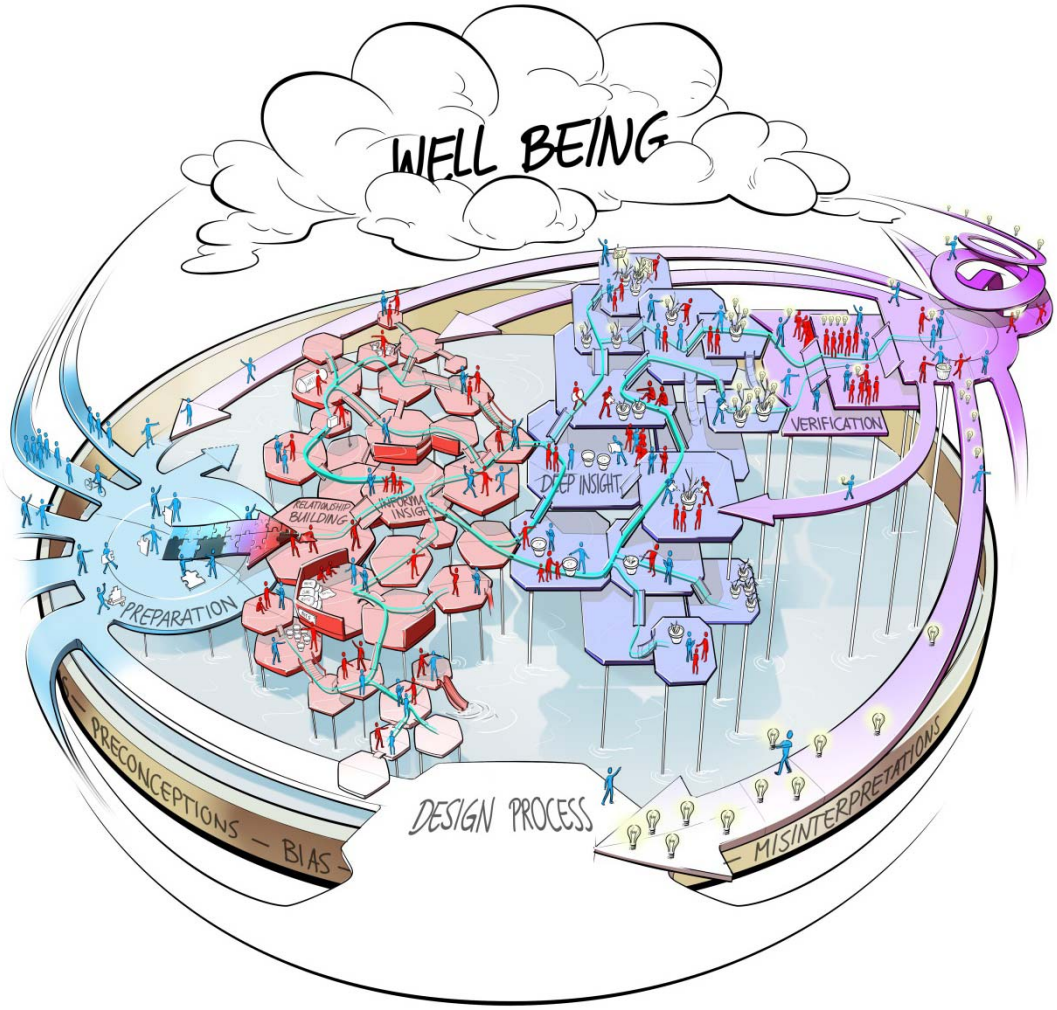
Add-on methods

The following methods can be added to step 4-a when time and resources allow for it:

- *Structured observation.* During structured observation, forms are used to codify observations. This type of observation is often used to deepen insights into specific behaviour or environments (Martin and Hanington 2012). There is an opportunity for quantification if the observational sample is large enough (Martin and Hanington 2012). The risk is that researchers 'find what they are looking for' or force certain information into the pre-set categories.
- *Structured individual / group interviews.* Structured interviews are focused, and are conducted using a detailed and standardised interview schedule (Narayanasamy 2013). During each interview, all the questions listed are posed, and they are asked in exactly the same way (Narayanasamy 2013). This type of interview is suited to collect generalizable data from a diverse and large set of people, providing insight in the significance of the information (Handwerker 2001). Time and questions are easier to control, researchers have less influence on the outcomes, and the data is easier to analyse (Martin and Hanington 2012). However, participants can perceive the interview as being formal and impersonal (Martin and Hanington 2012), and there is a risk that researchers miss out on information they are not specifically looking for or does not fit their pre-set categories.
    - *Individual interviews.* According to Narayanasamy (2013), individual interviews are apt for revealing specific, sensitive, confidential and/or personal information, resulting in representative information. IDEO (2008b, 28) argue that "*individual interviews are critical to most design research, since they enable a deep and rich view into the behaviors, reasoning, and lives of people*."
    - *Group interviews.* Group interviews are more efficient and lead to more natural dialogue (Martin and Hanington 2012), and they can be focused on more specific topics (Narayanasamy 2013). IDEO (2008b) explain that group interviews result in quick learning about the life, dynamics and issues of a community, and they offer all community members a voice. However, a group interview does not result in deep understanding of thoughts, beliefs or behaviours of people (IDEO 2008b), as in groups, personal information is often more difficult to discuss (Narayanasamy 2013). Thereby, participants might influence each other and there is a risk of domination (Martin and Hanington 2012).

Overview of Capability Driven Design procedure

In the figure below the steps are visualized together, and in this way form an overview of the procedure of the Capability Driven Design approach.



Overview of Capability Driven Design procedure

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