Design for Well-Being

An Approach for Understanding Users' Lives in Design for Development
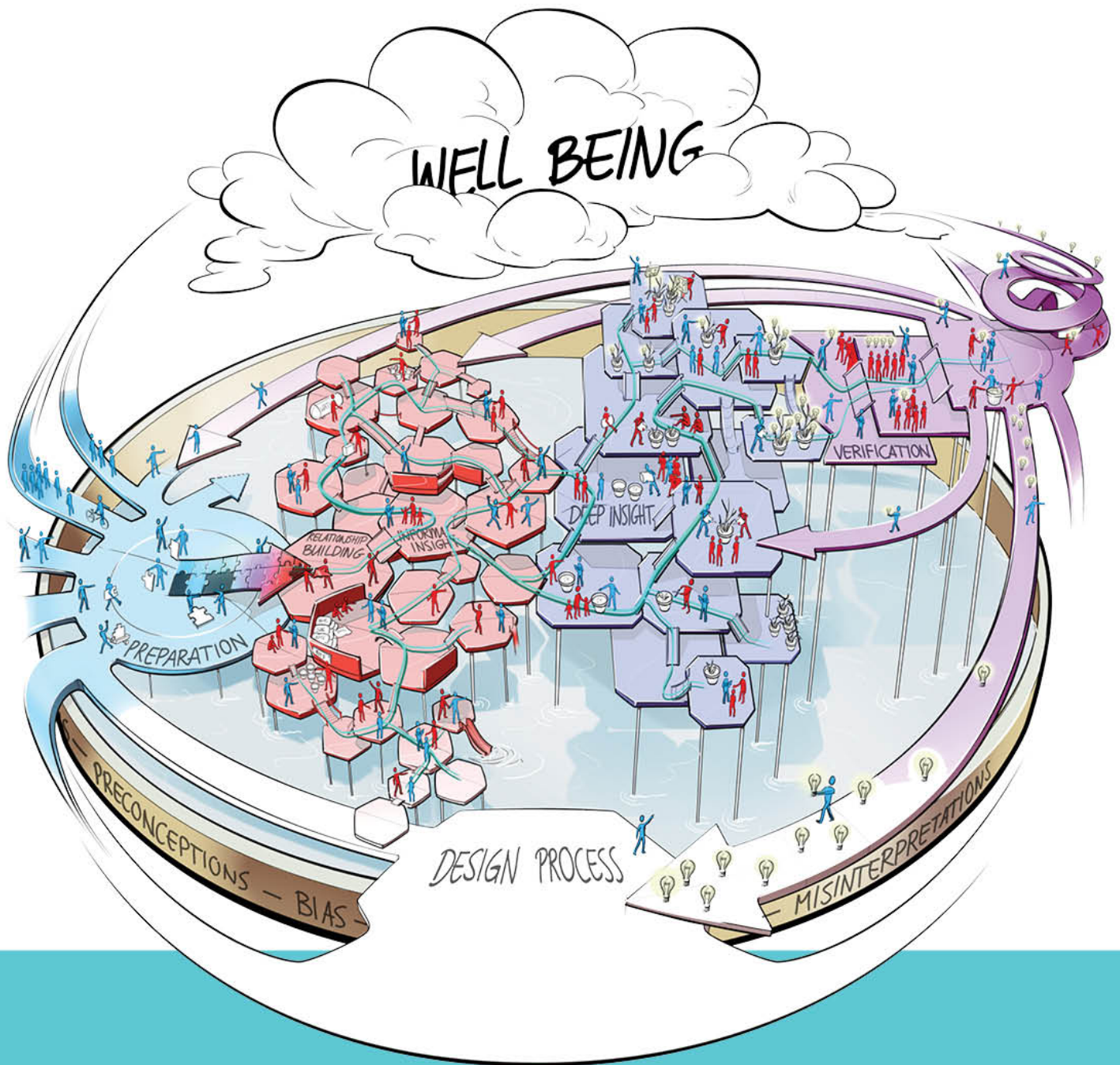
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APPENDICES

Design for Well-Being

*An Approach for Understanding Users' Lives
in Design for Development*

Annemarie Mink

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APPENDIX A

Appendix A

A. Lists and Dimensions Used

In chapter 2, the 37 lists mentioned by Alkire (2007) have been used to establish a list of beings and doings. In chapter 4, these lists, together with identified dimensions from the literature of the domains of Design for Development (DfD), User-Centred Design (UCD) and Rapid Ethnography (RE), have been used to establish a list of themes and topics. In this appendix an overview of the used lists and dimensions are provided which formed the basis for these lists. In appendix A1 the lists of Alkire (2007) are provided. In appendix A2 the additional dimensions from DfD, UCD and RE are described.

A.1 Dimensions of Alkire's Lists

In chapter 2 the dimensions of the 37 lists mentioned by Alkire (2007) have been classified, resulting in a list of beings and doings used to evaluate the design project of the silk reeling machine. The lists as presented in table 1 have been used.

Table 1: Lists of Alkire (2007) used to establish a list of beings and doings

Author	Name of list
Allardt (1993)	Comparative Scandinavian *welfare* study
Anand and Sen (1994)	Basic features of *well-being*
Andrews &Withey (1976)	*Concern* clusters
Argyle & Martin (1991)	Causes of 'joy'
Biswas-Diener & Diener (2001)	Twelve life domains
Braybrooke (1987)	*Basic needs* – practical applications
Chambers (1995)	Dimensions of *deprivation*
Cummins (1996)	Domains of *life satisfaction*
Davitt (1980)	*Value areas*
Doyal & Gough (1991)	Intermediate needs
Finnis (1980)	*Human values - Dimensions of poverty or human flourishing*
Fromm (1956)	*Basic needs* –psychological bases
Galtung (1980)	*True worlds*
Griffin (1986)	*Prudential values*
Hamilton (2003)	*Needs* categories
Lane (1969)	Needs inform political behavior
Lasswell&Holmberg (1969)	*Human values*
Maslow (1943)	*Instinctive and universal needs*
Max-Neef (1989)	Axiological categories (categories concerning the nature of values and value judgments)
Millenium Development Goals (2000)	UN *Goals to end poverty*
Murray (1938)	*Basic needs* –psychological bases
Myers & Diner (1995)	Correlates of high subjective well-being
Narayan (2000)	*Voices of the Poor*

Nielsen (1997)	Central elements of <u>human need</u>
Nussbaum (2000)	Central human *capabilities*
Packard (1960)	*Hidden needs* toward which marketing theory is oriented
Qizilbash (1996)	*Prudential values* for development
Ramsay (1992)	*Human needs*
Rawls (1971)	*Primary goods*
Rokeach (1973)	Terminal values
Ryff (1989)	Dimensions of wellness
Schwartz (1994)	Universal human values
Sen (1999)	*Instrumental freedoms*
Sphere Project	*Minimum Standards*
Universal Declaration of Human Rights (UDHR)	Index of Articles concerning *Human Rights*
Wilson (1967)	Correlates of *avowed happiness*

One list is not used, which is the 'Modules in World Bank LSMS questionnaires' list. The Living Standards Measurement Study (LSMS) and the Living Standards Measurement Study-Integrated Surveys on Agriculture (LSMS-ISA) were established by the Development Research Group (DECRG) to explore ways of improving the type and quality of household data collected by statistical offices in developing countries. The goal is to foster increased use of household data as a basis for policy decision making (www.worldbank.org/lsms). However, this list does not represent people's opportunities but ways to identify their opportunities and is therefore left out.

A.2   Dimensions from UCD, DfD and RE literature

In chapter 4, the above dimensions of the 37 lists mentioned by Alkire (2007) have been classified, together with dimensions derived from the consulted UCD, DfD and RE literature, resulting in a list of themes. Besides the above mentioned lists, the dimensions in table 2 have been used.

Table 2: Dimensions from UCD, DfD and RE literature

Source	Dimensions
Banu (2009)	Local history, culture, politics, definitions, local histories, present needs and future ambitions, natural environment
Barab, Thomas, Dodge, Squire and Newell (2004)	ecology, social organization, developmental cycle, and cosmology
Bowman and Crews (2009)	Needs, economic environment, infrastructure, culture, wants, cultural and social context, expectations
Boztepe (2007)	Behaviours (activities, surrounding, product, habits), socially and culturally shared meanings (social rituals, traditions and customs, beliefs, social roles, visual meanings), and systems (geographic, economic and interfacing systems), utility value (e.g., convenience, quality and performance, economy), social

significance value (socially oriented benefits, such as saving face, impression management, role fulfilment, group belongings), emotional value (affective benefits, e.g., local perceptions of aesthetics/trends/fashion, pleasure, sentimentality), spiritual value (supernatural; benefits such as good luck, sacredness).

Chavan and Gorney (2008)	Local histories, present needs and future ambitions
Donaldson (2006)	Loyalty to local brands, institutional aspects (policies, laws, regulations, corruption, property rights), sustainability, economic development
Gardner, Acharya and Yach (2007)	Local histories, present needs and future ambitions
Guimaraes, Penn, and Moody (1996)	Literacy, infrastructure, local histories, present needs and future ambitions
Handwerker (2001)	Cognition, emotion, behaviour, patterns, networks, social interaction, events / circumstances / processes that constitute people's choices, wonderful and traumatic days / events / interactions, intellectual and emotional associations, feelings, actions, identities, experiences and meanings of activities / interactions, other people's perceptions of informant, changes, people / places / things that make up a person's world, features of the environment, recurrent patterns of behaviour
IDEO (2008)	Needs (physical, cognitive, social and / or cultural), dreams, behaviours, desires, aspirations, needs / hopes / aspirations for the future, beliefs, ideas, social / political / economic / cultural opportunities and barriers, relational dynamics between people / places / objects / institutions
Iyer, LaPlaca, and Sharma (2006)	Institutional aspects (policies, laws, regulations, corruption, property rights)
James (2011)	Sharing
Krishnan and Prabhu (1999)	Purchasing power, institutional aspects (policies, laws, regulations, corruption, property rights)
Kujala (2003)	Needs and underlying problems and possibilities
Martin and Hanington (2012)	Activities, Environments, Interactions, Objects, social / environmental / financial realities, underlying beliefs, values, and desires, innermost feelings / thoughts / desires / emotions, behaviours, interactions, daily life routines, challenges, needs, preferences, environmental context, use patterns, language, motivations, perceptions
McNeill and Westby (1999)	Literacy, local languages
Narayanasamy (2001)	Age, gender, ethnic or social group, poverty, education, livelihood strategy, types of assets, occupation, well-being category
Oulasvirta, Kurvinen, and Kankainen (2003)	Specific physical, social, interactional, and/or psychological contextual factors
Pelto (2013)	Similarities and differences between people
Prahalad and Lieberthal (2003)	Standard, preference, willingness to pay, loyalty to local customs / habits / brands, infrastructure, local histories, present needs and future ambitions
Ray and Ray (2011)	Purchasing power, preferences, acceptability criteria, infrastructure, institutional aspects (policies, laws, regulations, corruption, property rights), environmental aspects (climate)

Appendix A

Roibás 2008	Physical and social environment, emotions, feelings, confidence, trust, security, control, reliability, privacy, everyday objects, attention, action, knowledge, support, experiences, emotions, feelings, beliefs, desires, aesthetic preferences, cultural concerns
Shahnavaz (1989)	Environmental aspects (climate), local histories, present needs and future ambitions, local conditions, self-reliance
Sklar and Madsen (2010)	Local histories, present needs and future ambitions
Souiden, Pons, and Mayrand (2011)	Risk aversion, preference
Van Boeijen, Daalhuizen, Zijlstra, Van der Schoor (2013)	Thoughts, feelings, ideas, concerns, memories, experiences
Viswanathan and Sridharan (2012)	Literacy, adaptability, product use inventiveness, willingness to pay, infrastructure, institutional aspects (policies, laws, regulations, corruption, property rights), culture, market, and marketplace, product use
Viswanathan, Yassine and Clarke (2011)	Literacy, local histories, present needs and future ambitions
Waeyenberg and Hens (2008)	Literacy, purchasing power, local histories, present needs and future ambitions
Wasserman (2012)	Evolving needs, forces that create change

APPENDIX B

B. Methods, Techniques and Tools to Explore the User Context

In chapter 3, the consulted DfD, UCD and RE literature resulted in an overview of methods, techniques and tools that can be used to explore the user context. In chapter 3, the selection of methods, techniques and tools that has been made is presented. Here, a full overview of all detected methods, techniques and tools is provided, and the filters that have been applied to form the selection of methods are indicated. The following filters have been used:

A. Comprehensiveness. Many methods mentioned are examples of purposes for which specific methods can be used, for example: activity analysis is an observational and interview method focusing on a specific task, resource flow analysis investigates in and outgoing resources. These methods do not fulfil the requirement of obtaining *comprehensive* user insight.

B. Insight in the user. All methods and tools that focus on obtaining insight into something else than the user (for example obtaining insight in a product, product use or in specific trends) do not fulfil the requirement of obtaining *user* insight.

C. Insight beyond product-user interaction. All methods and tools that focus on the analysis of the user in relation to a specific topic, issue or product do not fulfil the requirement of obtaining user insight *beyond product-user interaction*.

D. Direct contact. Following the project recommendations, direct contact with potential users in their natural environment is a requirement. Therefore al simulation methods and other methods without personal contact with potential users in their own surroundings do not fit the purpose of this research.

E. Focusing on relationships and/or dialogue. Following the project recommendations, methods and tools should stimulate rapport building and/or dialogue. Methods and tools that does not fulfil either one of them are discarded.

F. Adaptability. Following the project recommendations, the methods and tools must be able to adapt to an environment with regional languages, limited access to computers and/or internet and low literacy.

B.1 Methods derived from UCD, DfD and RE literature

In table 3 the methods that have been derived from the consulted UCD, DfD and RE literature are listed.

Table 3: Methods derived from UCD, DfD and RE literature

STUDYING SECONDARY DATA			
Name	Description	Mentioned by	Filter

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Literature review	Collecting and synthesizing research and knowledge on a given topic from literature. Caution needs to be exercised in establishing the credibility of sources. May include: books, research papers, journal articles, conference papers, records and statistics from government, NGOs or any number of other sources or archives. For designers it can include documented projects, products or case studies.	HCD: Barab et al. (2004), Kies et. al. (1998), Martin & Hanington (2012) DfD: Crul & Diehl (2006) RE: Pelto (2013)	**D**
Ethnographic document analysis	Studying anthropological and ethnographic documents of the users under study.	HCD: Oulasvirta et al. (2003)	**D**
Existing knowledge	Bringing about knowledge of people in the team or organization.	HCD: Liedtka (2011) DfD: IDEO (2008b)	**D**
Organizational document analysis	Collecting and synthesizing knowledge from documents of the organization under study. May include: possible strategic plans, strategies, market surveys.	HCD: Kensing et. al. (1998)	**C, D**
User document analysis	Collecting and synthesizing knowledge from artefacts from the site. May include: copies of pages from print documentation, online help screens, internal documentation, user-created tip sheets.	HCD: Kensing et. al. (1998), Smart & Whiting (2001, 2002), van der Veer (2008)	**C, D**
Physical traces	Measures made possible through physical evidence of use, can be erosion measures or accretion measures (such as, erosion of floors or grass, or litter, graffiti or fingerprints).	HCD: Martin & Hanington (2012)	**B, D**
System logs/ web analytics / automated remote research	Measurement, collection, analysis, and reporting of data from interaction with internet or with system tools.	HCD: Nesset & Large (2004), Roibás (2008), Martin & Hanington (2012)	**C, D**

SIMULATION

Name	Description	Mentioned by	Filter
Role Playing	Participants act out their issues, needs or solutions. Can be done by researchers who act the role of the user, or can be done by potential users themselves.	HCD: FrogDesign (2012), Lebbon et al. (2011), Martin & Hanington (2012), Steen (2010) DfD: Larsen & Flensborg (2011)	**D**
Simulation exercise	Researchers experience interactions with physical characteristics of users, for example by wearing a pregnancy suit or glasses that distort sight. Personas can be used as a starting point for the role play exercise.	HCD: Lebbon et al. (2011), Martin & Hanington (2012) , Steen (2010)	**C, D**
Simulated	Researchers observe simulated use.	HCD: Sperschneider et. al.	**D**

| observation | | (2003) | |

SELF-DOCUMENTATION OF PARTICIPANTS

Name	Description	Mentioned by	Filter
Personal Documentaries / Cultural probes	Participants document important events, interactions or experiences in their lives and narrate orally or in written form about their documentation. In order to provide self-reported insight into people's lives, culture and environment, their thoughts, preferences, desires, beliefs, interactions, feelings, behaviours and priorities throughout a day, week or month. Can be done with photo, video, notes or a combination of these A cultural probe package might consist of diaries/notebooks, postcards, maps, text, imagery, and/or recording devices (video, camera, voice recorder). Can be done individually or in pairs	HCD: Barab et al. (2004), d.School (2013), Gielen (2008), Hanington (2010), Johansson & Linde (2005), Lebbon et al. (2011), Martin & Hanington (2012), Roibás (2008), Smart & Whiting , Sperschneider et. al. (2003), Steen (2010), Van der Veer (2008) DfD: IDEO (2008b), Larsen & Flensborg (2011), Van Boeijen et al. (2013)	
Graffiti walls	An open canvas on which participants can freely offer their written or visual comments about an environment or system, directly in the context of use. Particularly useful in environments or for situations in which traditional methods may present ethical issues.	HCD: Martin & Hanington (2012)	**F**
Love Letter and Breakup Letter / Critique - Fantasy	Participants explain what they value and expect from the objects in their everyday lives. Can be done by writing a personal letter to a product.	HCD: Martin & Hanington (2012), Nesset & Large (2004)	**C**

METHODS TO EXPERIENCE THE LIVES OF PARTICIPANTS

Name	Description	Mentioned by	Filter
Immersion	Experiencing what potential users experience by meeting people where they live, work and socialize. In order to understand situations and behaviours and to build rapport. Can be marginal (researchers blend in as natural observers), or full (researchers become complete members of a group, subculture or culture)	HCD: d.School (2013), Lebbon et al. (2011), Martin & Hanington (2012), Liedtka (2011) DfD: IDEO (2008b) RE: Handwerker (2001), Narayanasamy (2013), Pelto (2013)	
Homestay	Staying over in the house of potential users to build trust and report. Possibility for this activity depends on local customs, level of safety, and language barriers.	DfD: IDEO (2008b), Larsen & Flensborg (2011), Simanis & Hart (2008).	

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Learning by doing	Participation in work routines, activities, village tasks, household tasks or community events. In order to better understand needs, barriers and constraints.	HCD: Kies et. al. (1998), Martin & Hanington (2012), Sperschneider & Bagger (2003)	
		DfD: IDEO (2008b) Larsen & Flensborg (2011), Simanis & Hart (2008)	
		RE: Chambers	

QUESTIONING METHODS

Name	Description	Mentioned by	Filter
Interviews / dialogue (situated)	Scheduled, face-to-face consultations with potential users in order to collect first-hand personal accounts of experience, opinions, attitudes, motivations, behaviour and perceptions. Can be short and informal or long and in-depth. Can be semi-structured, open or closed/structured. Can be qualitative or quantitative. Can include visual and verbal methods. Can be video-recorded to be afterwards analysed in the team. Can be with individuals, couples or with strategic groups, with stakeholders, experts, or key informants.	HCD: Barab et al. (2004), Boztepe (2007), Hanington (2010), d.School (2013), Van Boeijen et al. (2013), FrogDesign (2012), González et al. (2003), Hanington (2010), Iivari & Iivari (2011), Kensing et. al. (1998), Kies et. al. (1998), Kujala (2003), Lebbon et al. (2011), Martin & Hanington (2012) Nesset & Large (2004), Roibás (2008), Smart & Whiting (2001), Sperschneider & Bagger (2003), van der Veer (2008), Viitanen (2011)	
		DfD: IDEO (2008b), Larsen & Flensborg (2011), Simanis & Hart (2008)	
		RE: Chambers (2004), Beebe (2014), Handwerker (2001), Narayanasamy (2013), Pelto (2013)	
Informal talks	Unscheduled, short 'intercept' encounters with potential users, during which the researcher talks and listens to concerns and views. Can be casual or 'controlled gossip' (researchers gives some direction)	HCD: FrogDesign (2012), Liedtka (2011)	
		DfD: Polak (2008)	
		RE: Handwerker (2001), Narayanasamy (2013)	
Questionnaires	Used to gather information from respondents by posing a series of questions face-to-face, by telephone, or by filling in a paper or internet questionnaire. In order to obtain insight in participant characteristics, thoughts, feelings, perceptions, behaviours, or attitudes.	HCD: Hanington (2010), Steen (2010), Lebbon et al. (2011), Roibás (2008), Martin & Hanington (2012)	E
		DfD: Van Boeijen et al. (2013)	
		RE: Chambers (2004) ("*If at all, preferably late in the process, designed to fill dummy*	

Name	Description	Mentioned by	Filter
	Can have open or closed questions or scales Can be short and simple	*tables which are by then known to be needed*")	
Focus group discussion	Specific type of group interview where group interaction is used to produce information and insight. Is used to collect contextual information by discussing topics with potential users in a group. In order to provide deep insight into themes, patterns and trends.	HCD: FrogDesign (2012), Martin & Hanington (2012), Roibás (2008) DfD: Larsen & Flensborg (2011), Van Boeijen et al. (2013) RE: Beebe (2014), Narayanasamy (2013), Handwerker (2001,	**C**
Participatory Exploration Workshop	Workshop with a group of participants aimed at gaining an understanding of the user's world. Can consist of projective techniques, such as collage, mapping or diagramming exercises.	HCD: Martin & Hanington (2012) DfD: Simanis & Hart (2008)	
Roundtables	Any team member can sit around a table and chat with a user who brings in examples of the topic under study.	HCD: Kujala (2003)	**C, D**
Name	**Description**	**Mentioned by**	**Filter**
Trend Analysis (future and/or past)	Searching for trends and changes in the past years or expected developments in the coming 3-10 years, related to society, individuals, families, institutions, systems, practices, communities, markets and technology. In order to identify and analyse customer needs and business opportunities.	HCD: Van Boeijen et al. (2013) RE: Chambers (2004), Narayanasamy (2013)	**A**
Analysis of difference	Analysing differences between people and groups related to for example gender, social group, wealth/poverty, occupation and age. Identifying problems and preferences.	Chambers (2004)	**A**
Personal history (past)	Interview focused on experience of use and changes in use witnessed during lifetime.	HCD: Park (2011)	**A**
Future workshop (future)	Workshop to investigate what kind of requests users would come up with for products to accomplish future tasks.	HCD: Kensing et. al. (1998), Sperschneider & Bagger (2003)	**A**
Social analysis	Focus group activity to map the relationships between relevant individuals and organizations.	Larsen & Flensborg (2011)	**A**
Trace Analysis	Deriving what happened to a product during past usages.	Boztepe (2007)	**A**
Force Field Analysis	3 to 5 participants visualize a problem's driving and restraining forces. They then have to focus on one of these forces as the new situation and repeat the exercise. This can be repeated another 2-3 times.	Narayanasamy (2013)	**A**
Ethno biographies	Detecting local histories of for example a crop, an animal, a tree, a pest or a weed	Chambers (2004)	**A**
Resource flow analysis	Investigating ingoing and outgoing resources of a local system such as a	Larsen & Flensborg (2011), IDEO (2008a)	**A**

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	household or business, or of a community.		
Factors and Forces	Identifying all factors and forces that affect the prosperity of an individual or group	IDEO (2008a)	**A**
Triading	Interviewing technique during which the participant has to select six to ten brands, products or services representative of a domain, pick three of them to explain how he/she feels two of the three examples differ from the third. Can be repeated as many times as required. In order to reveals deep-seated attitudes, perceptions, and feelings toward brands, products and services.	Martin & Hanington (2012)	**A**
Critical incident (past)	Asking questions about when critical incidents have been experienced for the last time. Critical incidents are situations about a product or service that, in their estimation, ended well or poorly.	HCD: Martin & Hanington (2012), Park (2011)	**A**
Census data	Going door-to-door to collect census data and genealogies	Handwerker (2001)	**A**

OBSERVATION METHODS

Name	Description	Mentioned by	Filter
Direct observation	Attentive looking and systematic recording of phenomena, variables or other interrelations by carefully observing and studying potential users in their natural context, in order to discover latent needs. • Can be interspersed with discussion and listening: seeing, hearing and perceiving. • Can be fly-on-the-wall, casual, intensive, or unobtrusive observation. • Can be documented with video, photographs, notes, sketches or audio.	HCD: Barab et al. (2004), Beyer & Holtzblatt (1995), Beyer et al. (2004) Boztepe (2007), d.School (2013), FrogDesign (2012), Hanington (2010), Iivari & Iivari (2011), Kensing et. al. (1998), Kies et. al. (1998), Lebbon et al. (2011), Martin & Hanington (2012), Nesset & Large (2004), Oulasvirta et al. (2003), Roibás (2008), Smart & Whiting (2001, 2002), Sperschneider & Bagger (2003), Steen (2010), van der Veer (2008), Viitanen (2011) DfD: Van Boeijen et al. (2013, Polak (2008), Viswanathan et al. (2012) RE: Beebe (2014), Handwerker (2001), Narayanasamy (2013), Pelto (2013)	
Shadowing	Closely following a potential user throughout his/her daily routines. • Can be interspersed with discussion and listening • Can be fly-on-the-wall, casual, intensive, unobtrusive, or covert observation. Can be documented with video,	HCD: Lebbon et al. (2011), Martin & Hanington. (2012), Sperschneider & Bagger (2003) DfD: Larsen & Flensborg (2011)	

	photographs, notes, sketches or audio.		
EXAMPLES			
Activity Analysis	Observing and interviewing people individually and collectively about their participation in activities.	Barab et al. (2004), Nesset & Large (2004)	**A**
Task analysis	Observe users performing specific tasks in a broader environment to understand work flow, actions and interactions, system response, and environmental context.	Lebbon et al. (2011), Sperschneider & Bagger (2003), Martin & Hanington (2012)	**A**
Artefact analysis	Systematic examination of material, aesthetic and interactive qualities of participants' owned objects in order to obtain an understanding of people's physical, social and cultural context.	Hanington (2010), van der Veer (2008), Viitanen (2011), Martin & Hanington (2012)	**A**
Technology tours	Participants show the researcher around their home and are questioned about how particular technologies are used.	Park (2011)	**A**
Personal inventories	Participants are encouraged to identify any and all items of personal significance to allow the researcher to see and understand the relevance of objects in a user's life from the participant's point of view to inspire design themes and insight.	Martin & Hanington (2012)	**A**
Technology immersion	Observing what participants do when exposed to unlimited access to extraordinary amounts of technology, in order to identify roles and patterns.	Nesset & Large (2004)	**A**
Customer Experience Audit	Observing participants who engage with the product or service under study. It captures what customers do, think, and use as they complete a task or set out to achieve a goal that involves your product or service.	Martin & Hanington (2012)	**A**
Transect walk	Systematically walking with informants through an area while observing, asking, listening and discussing with them, about activities, interactions, locations and actors. In order to identify the spatial dimensions of people's reality Results can be mapped and/or modelled. Examples are: village, resource or cultural transect	RE: Chambers (2004), Narayanasamy (2013), Pelto (2013)	A

B.2   Techniques derived from UCD, DfD and RE literature

In table 4, the techniques that have been derived from the consulted UCD, DfD and RE literature are listed.

Table 4: Techniques derived from UCD, DfD and RE literature

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EXPERIENCING TECHNIQUES			
Touchstone tours	A guided tour that uses artefacts and the environment as touchstones for questions and insights and immerses the design researcher in a participant's world. In order to understand how the participant organizes information and systems.	Martin & Hanington (2012)	

SELF-DOCUMENTATION TECHNIQUES			
Experience Sampling Method	Participants self-report in real time when signalled at random or timed intervals by collecting snapshots of behaviours, interactions, thoughts, or feelings. Often a device alarm is used to signal the participant.	HCD: Martin & Hanington (2012)	**F**
3 wishes	Participants have to fill in 3 wishes when encountering any problems		

OBSERVATIONAL TECHNIQUES			
Show me	Asking participants, in their natural environment, to show the things they interact with (objects, spaces, tools, etc).	IDEO (2008b)	
Eye tracking	Gathering detailed technical information on exactly where and for how long participants are looking and not looking when using an interface or interacting with products.	Martin & Hanington (2012)	**F**

QUESTIONING TECHNIQUES			
Journey of an offering	Understanding what a person considers when purchasing a new product or service for the first time by asking the person to think of the last time he/she bought something new and ask the person to tell about talking about the product, looking at it, comparing it, trying it , saving for it and buying it.	IDEO (2008a)	**C**
Aspirations exercise	Participants have to pick three pictures out of a set of cards that represent what they hope for for the future and let them describe what the picture means to them and why they choose this picture. Can also be about three pictures that represent what people fear for the future	IDEO (2008a)	
Sacrificial concepts	An abstract question is turned into a concrete scenario with two options posed to the participant. By changing the variables and again posing the question more insight is generated into an issue.	IDEO (2008b)	
Talking Diaries (past)	Participants have to describe important events in their lives as if they were reading diaries from a certain time period.	Barab et al. (2004)	

Thinking aloud	As participants perform a process or execute a specific task, they describe aloud what they are doing and/or thinking. In order to help uncover motivations, concerns, perceptions, and reasoning.	Kensing et. al. (1998), Martin & Hanington (2012)	
		DfD: IDEO (2008b)	
5 Why's	Asking "Why?" questions in response to five consecutive answers in order to detect the underlying reasons for participants' behaviour and attitudes.	IDEO (2008b)	
Directed storytelling	The researcher ask the participant to tell a story about something and guides the storytelling session, while the participant is comfortable in telling a flowing narrative. Who, what, when, where and how can be additional questions.	HCD: Martin & Hanington (2012)	
What-if scenario's/ storylines	Posing scenario's or storylines which need to be completed by the participant(s).	HCD: Gielen (2008), Nesset & Large (2004)	
Guided speculation (future)	Asking questions about possible future developments – hopes and fears.	HCD: Park (2011)	
Showing a video	Showing a video of something where participants can react upon	RE: Pelto (2013)	

BRAINSTORMING TECHNIQUES

While brainstorming techniques are mainly indicated to be useful for generating ideas/ solutions after data collection, they can also be used to generate issues in the analysis phase of a design process.

Name	Description	Mentioned by
Brainstorming	Topics are brought up in a group without critical evaluation.	HCD: d.School (2013), FrogDesign (2012), Nesset & Large (2004), Smart & Whiting (2002)
		DfD: IDEO (2008b), Crul & Diehl (2006)
Bodystorming	Issues are brought up in a group without critical evaluation and participants are asked to act out the activities.	HCD: Oulasvirta et al. (2003), d.School (2013), Martin & Hanington (2012), Steen (2010)
Brainwriting	Participants record individually what they think of and pass their records on to the next participant who can use it as a trigger of his/her own ideas/issues.	DfD: Crul & Diehl (2006)

Examples		
Issue/needs analysis	People brainstorm in groups about issues and needs in their community	FrogDesign (2012)

VISUALIZATION TECHNIQUES

Pictures / Drawings		
Creating visual materials during the activity that represent the context, user group or product category. In order to aid participants in expressing their innermost feelings, thoughts, emotions and desires.	**Mentioned by**	
	HCD: d.School (2013), Gielen (2008), Hanington (2010), Johansson & Linde (2005), Kensing et. al. (1998), Lebbon et al. (2011), Martin & Hanington (2012), Steen (2010)	
Can be drawings, symbols, collages, pictures, wall graphs.		

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		DfD: IDEO (2008b),Larsen & Flensborg (2011), DfD: Van Boeijen et al. (2013)
		RE: Narayanasamy (2013), Pelto (2013)

Examples		
Name	**Description**	**Mentioned by**
Daily Schedule	Drawing a day's timeline covering 24 hours and ask people what they do on a day.	RE: Narayanasamy (2013)
Historical timeline	Visualizing chronologies of events, changes and landmarks in the past with approximate dates	RE: Chambers (2004), Narayanasamy (2013)
Exquisite Corps Game	Drawings on a piece of paper that is folded in a way that shows only part of the drawing. The next participant continues the drawing on basis of what he/she can see and then passes it on to the next participant, and so on.	HCD: Johansson & Linde (2005)
Brainstorm Graphic Organizers	Help in the creation of new knowledge by visually structuring a deep dive into a problem space. Visualization frameworks can be webs, tree diagrams or flow diagrams.	HCD: Martin & Hanington (2012)

Video/photography time-lapse techniques		
Creating video or photo material over time and location to follow activities		HCD: Barab et al. (2004), Martin & Hanington (2012)

Examples		
Name	**Description**	**Mentioned by**
Researcher biography	A documentary about a day in the life of a potential user	HCD: Barab et al. (2004)

Diagramming / Mapping techniques		
Creating a simple schematic device during the activity which presents information in a readily understandable form. *Can be systems diagrams, bar diagrams, flow diagrams, flowcharts, pie charts, maps, circular depictions, matrices etc.*		HCD: d.School (2013), Gielen (2008), Hanington (2010), Kensing et. al. (1998), Martin & Hanington (2012), Nesset & Large (2004), Roibás (2008), Steen (2010), Smart & Whiting (2002)
		DfD: Larsen & Flensborg (2011), Simanis & Hart (2008), Van Boeijen et al. (2013)
		RE: Beebe (2014), Chambers (2004), Handwerker (2001), Narayanasamy (2013), Pelto (2013)

Examples		
Name	**Description**	**Mentioned by**
Activity/journey map	Participants/Researcher create maps to indicate what people do during a day or week	HCD: d.School (2013)
		DfD: Larsen & Flensborg (2011)
Village map	Participants/Researcher create maps to indicate houses and infrastructure in their village	Pelto (2013)
Context map	Participants map the context in which they use the product or service. By using	HCD: Gielen (2008), Steen (2010)
		DfD: Van Boeijen et al. (2013)

	generative tools they are enabled to express their goals, motivations, meanings, latent needs and practical matters.	
Experience map	, a map of a user's experience	HCD: d.School (2013), Hanington (2010)
Territory map	Participants/Researcher create maps to visualize territories of individuals or organizations	RE: Handwerker (2001)
Behavioural map	Researcher create maps to visualize location-based observations of human activity	HCD: Martin & Hanington (2012)
Mobility map	Participants/Researcher create maps to indicate the movement pattern of an individual, group or community	HCD: Roibás (2008)
		RE: Narayanasamy (2013)
Social map / Institutional map	Participants/Researcher create maps to indicate the relationships between relevant individuals and organizations	DfD: Larsen & Flensborg (2011), Simanis & Hart (2008)
		RE: Narayanasamy (2013), Pelto (2013)
Price map	Participants/Researcher create maps to indicate economic information that is used to identify value propositions	DfD: Larsen & Flensborg (2011)
Perceptual Map / Value Curve	Visual representation of what consumers think about products or brands in relation to each other	Van Boeijen et al. (2013)
Transect map	Participants/Researcher create maps to indicate the spatial dimensions of people's realities.	RE: Narayanasamy (2013)
Resource map / diagram	Participants/Researcher create maps to indicate resources such as land, water, trees, agriculture, productivity, watersheds, treatment plans	RE: Narayanasamy (2013)
Location map	Participants/Researcher create maps to indicate locations of individuals and organizations	HCD: Gielen (2008)
User journey mapping	Visual representation of the customer's experience as he or she interacts with a product or service, or how a product moves through space and time (from manufacturing to store shelf to user's hands). It covers the emotions, goals, interactions and barriers customers experience at each stage. In order to gain empathy for a participant or understanding of a participant's process

Can depict the customer's actual or ideal journey. | HCD: d.School (2013), Liedtka (2011), Martin & Hanington (2012) |
| | | DfD: Van Boeijen et al. (2013) |
| 'Chapati' or Venn diagram | Participants/Researcher create a diagram to indicate the importance of elements in and for a community, and their relationship. By drawing circles of different sizes (the bigger means the more important) within a specific distance (close by indicates a stronger | RE: Chambers (2004), Narayanasamy (2013) |

Appendix B

	relationship).	
Seasonal calendar / diagram	Participants/Researcher create a diagram to visualize seasonal variations in activities, problems and opportunities throughout the year	RE: Chambers (2004), Narayanasamy (2013)
Sketch diagrams of work surroundings	Participants/Researcher create a diagram to visualize work surroundings	HCD: Smart & Whiting (2002)

MODELLING TECHNIQUES

People construct three-dimensional visual models during the activity to express their thoughts, feelings, desires and emotions, that might otherwise be hard to articulate.		HCD: Gielen (2008), Martin & Hanington (2012), Steen (2010)
		DfD: Van Boeijen et al. (2013)
Can be for example contextmapping/generative modelling, flexible/Velcro modelling, and business origami		RE: Chambers (2004)
Can be done with local materials		
Contextmapping modelling / generative tools	Users are asked to report about themselves in unconventional ways and actively produce diverse artefacts that express their thoughts, feelings and ideas, dreams, needs and desires.	HCD: Gielen (2008), Martin & Hanington (2012), Steen (2010)
		Van Boeijen et al. (2013)
Flexible/Velcro modelling	Toolkit with objects that facilitate participatory creative exercises in which participants create tangible artefacts on which they can project thoughts, feelings, desires, and emotions that might be otherwise hard to articulate.	Martin & Hanington (2012)
Business origami	Participants paper-prototype the interaction and value exchange among people, artefacts and environments in a multichannel system.	Martin & Hanington (2012)

Examples		
Name	**Description**	**Mentioned by**
Future modelling	Building a state-of-the- art product for the future from foam to visualize design ideas and discussions. Can be on-site, can be video recorded.	Sperschneider & Bagger. (2003)

SCORING / RANKING / SORTING TECHNIQUES

Ranking scoring and sorting exercises are used to analyse, prioritize and present information. Scoring and ranking can be used to compare, discuss, adjust and look at data in order to support the decision making process. Besides scoring or ranking it is important to ask for reasons for preference.	Hanington (2010), Martin & Hanington (2012)
	Larsen & Flensborg (2011)
	RE: Beebe (2014) , Chambers (2004), Handwerker (2001), Narayanasamy (2013)
Ranking means placing elements in an order, which can be done for example by using binary responses, Likert or rating scales.	
Sorting means placing elements in different categories	
Scoring means giving weight or prominence to different elements.	
Can be done in a group or individually.	

Sorting		
Card sorting	Participants are given cards with printed concepts, terms, or features on them, and are asked to sort them in various ways, to explore how participants group items into categories and relate concepts to one another.	Hanington (2010), Martin & Hanington (2012)
Criteria-based card sorting	Same as card sorting, but participants first come up with criteria, visuals are made, and the card sorting is done in a group.	RE: Narayanasamy (2013)
Pile sorting	Three to five different informants sort the households in a community individually in at least three piles	RE: Narayanasamy (2013), Handwerker (2001), Pelto (2013)
Ranking		
Pair-wise ranking	Participants have to compare pairs of elements in a group, such as problems, potentials and needs. The elements are put in a matrix as row and column headings and compared by pair.	RE: Narayanasamy (2013)
Matrix ranking	Participants have to rank three to eight items according to locally developed criteria. For each criteria the participant(s) have to rank the items related to each other.	RE: Narayanasamy (2013)
Direct ranking	Participants have to rank a set of problems related to each other	RE: Narayanasamy (2013)
Matrix of problem classification	Participants need to rank problems in the categories: most serious, serious and less serious, and in the categories: becoming worse, remaining the same and becoming better.	RE: Narayanasamy (2013)
Scoring		
Matrix scoring	Scoring three to eight items according to locally developed criteria. Scoring can be done closed (fixed scale) or open (decide on own scale to use)	RE: Narayanasamy (2013)
Hundred-seeds scoring	A group of participants receive 100 seeds, beans or pebbles and they have to discuss, decide and distribute them among the problems	RE: Narayanasamy (2013)
Examples		
Name	**Description**	**Mentioned by**
Ranking values	Value and rank products, services or detailed aspects of a solution in accordance to their perceived value.	DfD: Larsen & Flensborg (2011)
Ranking well-being or wealth	Participants classify households, based on locally evolved criteria. Wealth ranking implies a materialistic focus on assets, well-being ranking is a broader description of the quality of life.	RE: Chambers (2004), Narayanasamy (2013)

Appendix B

B.3   Tools derived from UCD, DfD and RE literature

In table 5, the tools that have been derived from the consulted UCD, DfD and RE literature are listed.

Table 5: Tools derived from UCD, DfD and RE literature

QUESTIONING TOOLS			
Picture cards	Picture cards contain images and words that help people think about and tell stories of their life experiences, grounded in context and detail. The images are connected to the personal accounts of participant lives.	HCD: Martin & Hanington (2012)	
Community character	Identifying persons in a community that represent the eyes and ears, the mouth, the brain, the heart, the hands and the feet of the community	DfD: IDEO (2008a)	**C**
Factors and Forces diagram	A diagram comprising three circles to discuss factors and forces (the three circles represent the community, the nation and the world, or the individual/family, the community and the nation/world)	DfD: IDEO (2008a)	**C**
Body map	Participants have to describe the location of body organs and bodily functions related to the topic of interest.		**C**
OBSERVATIONAL TOOLS			
Annotated map or plan	Architectural plan or own measured diagram that can be used as the underlay for documenting observations	HCD: Martin & Hanington (2012)	

APPENDIX C

Appendix C

C. Prerequisites, Steps and Guidelines

Below, the prerequisites, steps and guidelines as derived from literature are presented (appendix C1), and their adjustments as a consequence of the executed iterations (appendix C2- C6). The adjustments to the prerequisites, steps and guidelines are indicated with an orange colour, new prerequisites, steps and guidelines are marked green, and prerequisites, steps and guidelines that shifted from one to another are marked purple.

C.1 Prerequisites, steps and guidelines 0.0

Below, the prerequisites, steps and guidelines of the CDD approach / ODK as established from literature are listed.

Ten prerequisites

There are certain prerequisites regarding Capability Driven Design that are also relevant for using the ODK. These comprise the following:

A. *Multidisciplinary team.* In order to enhance data reliability and validity designers should triangulate data. Capability Driven Design already prescribes the use of multiple data sources, methods, tools and techniques, but to improve outcomes, team members from multiple disciplines should be included: designers with different backgrounds, skills and knowledge. This leads to a balanced perspective, access to a range of participants and speeding up of the process.

B. *Activities should be conducted in pairs.* In order to enhance data reliability and validity designers should triangulate data. Capability Driven Design already prescribes the use of multiple data sources, methods, tools and techniques, but to improve outcomes, activities should be conducted with multiple team members. By assigning one activity facilitator and one note taker, each of them can focus on their own specific task, while interpretations, experiences and perceptions can be compared, ensuring investigator triangulation. A third person can be added to take photographs or shoot video, but more people can overwhelm participants.

C. *In the field.* Potential users should be directly observed and interacted with in their natural settings in order to improve learning and understanding by building a shared language, capturing detail, gather concrete data, develop empathy and reduce bias and rationalization, filtering and distortion of information.

D. *Training.* In order to conduct sound, rigorous research that does not invade people's private lives in an incompetent way, and which results in valuable data, designers should have a solid and broad understanding of doing good research in the field. The research should be executed in a systematic, sceptical, ethical and rigorous manner and therefore need to follow a training to learn the right attitude, behaviour and questioning skills. Designers should also continuously examine their attitude, behaviour and questioning in order to improve upon them.

E. *Participatory, simple and enjoyable activities.* Capability Driven Design techniques and tools can be tweaked by the designers to better fit their purpose. However, they should keep in mind that activities should be fun, interactive and simple in order to create an enabling atmosphere in which

participants feel free to express themselves. It also aids to let participants perform tasks or to let them create things.

F.   *Local partnerships.* Local partners are required in order to adjust quickly to the local circumstances, obtain information about the potential users, get advice on activities, gain access and build trust in communities. They can also aid in selecting participants and finding translators.

G.   *Iterative data analysis.* As newly obtained information leads to new understanding, research goals and methods should be changed accordingly to obtain additional information. The research outcomes should therefore be analysed by the team after each activity to adjust the activities based on new insights.

H.   *Sharing and checking outcomes.* The information, knowledge and interpretations should be shared with participants to point out misunderstanding and to improve data validity. If participants agree, they should also be shared with the community and local partners to keep stakeholders involved, enhance transparency and openness and improve data reliability.

I.   *Critical reflection on limitations.* The data obtained, the methods used, the researchers involved and the project executed all have limitations and the researchers should reflect on them and be open and honest about them. For example about the generalizability of outcomes, errors in data collection, the role different people played in the process, and mistakes being made.

J.   *Keep the themes in mind.* In order to obtain broad insight into all aspects that comprise a person's life and context, the themes and topics are leading.

Thirteen steps

From the literature in chapter 3 and the selection of techniques, the steps that need to be executed in order to conduct semi-structured interviews are distilled. In total they comprise seven steps which are the following:

1.   *Get familiar with the ODK.* The team members must get acquainted with the flow and structure of the interview. This can be done by roleplaying the interview in the team, but also by conducting a local pilot in the field.

2.   *If required, select and instruct a translator.* Share the goals of the research and explain the rules. It is wise to walk through all the themes and questions to get the translator acquainted with the interview flow and structure, the themes and key questions.

3.   *Select participants.* A local partner can aid in selecting participants. See the guidelines.

Prepare the interview:

4.   *Assign roles.* Conduct the interview with at least two (a facilitator and a note taker / photographer) and a maximum of three researchers, and assign roles beforehand to clarify the purpose for each researcher.

5.   *Decide on time and place.* Time and place of the interview should be at convenient to the participants and preferably conducted in their local context.

Conduct the interview:

6.   *Introduce.* Introduce the design project, the interview, the translator and yourselves. Participants should be informed about the research and its goals. It is important to be clear about

compensation to set the right expectations for participants. Communicate openness and being non-threatening, stress that there are no wrong answers and that not all questions have to be answered. Make the participants feel relevant in their roles by sharing yourself, verbally or with help from pictures. Try to limit the influence of audience.

7. *Ask for informed consent.* Ask for consent to record the interview, to take pictures and to use the data. Stress that participants are not obliged to participate, and can withdraw from the activity at any time.

8. *Ask for the participant's introduction.* Asking participants to say something about themselves provides an easy start and shows interest.

9. *Conduct a touchstone tour.* Let the participant show you around in their home or the environment where the interview is conducted. Use the show me technique: let the participants show you objects, spaces and tools.

10. *Sit down and…*
    a. *For the facilitator: …build dialogue.* Start with the participant's personal details, continue with the timeline of a participant's day and week, and then start collecting answers for the themes and questions using the drawing/mapping sheets and the answer sheets.
    b. *For the note-taker: …document.* Record the interview, take notes and photographs.

11. *Thank the participant.* Thank participants for their invested time and effort and for sharing personal information. Bring a small gift to show appreciation.

Process the outcomes:

12. *Document.* Note down anything surprising directly after each interview.

13. *Analyse, interpret and reflect with the team.* Share all information with the full design team after each interview. Analyse, interpret and reflect on the insights with the full team, and use the outcomes during the following interviews.

When using the ODK, all thirteen steps should be followed and step 4 to 13 should be repeated for each interview.

CDD guidelines

The following five guidelines designers are advised to follow when using the CDD approach:

A. *Select a variety of participants with different characteristics.* Variety in gender, social class and age are especially important to include. Be aware to not only select participants that are easy to access.

B. *Appropriate behaviour and attitude.* All team members should follow the tips and tricks for 'appropriate behaviour and attitude'. See: tips & tricks.

C. *Appropriate questioning.* The facilitator(s) should be trained on qualitative research skills (prerequisite). In order to guide them, the tips & tricks regarding 'appropriate questioning' should be followed. See: 'tips & tricks'.

D. *Document everything.* Note down characteristics of the participant (e.g., name, gender, social class, religion, age, occupation), of the activity (e.g., type of activity, the people present, date and location, materials used), and of everything that is seen, heard, felt, smelled, tasted, and / or surprising. Follow the tips and tricks for 'what to pay attention to'. See: tips & tricks.

Appendix C

E. *Bring along the required supplies.* The materials for the activities, recording devices, a notebook and pen should be brought along to the interview. Consider bringing pictures of yourself and your surroundings, as well as food for the participants.

ODK guidelines

The following four guidelines designers are advised to follow when conducting ODK interviews:

A. *Flexible but focused conversations.* The ODK provides steps, themes and guiding questions, but there is room for flexibility and unexpected turns in order to stimulate dialogue. There is no indicated order indicated for addressing the themes. Do not ask questions from a script, and feel free to add or change questions. The interview should feel like an open-ended, dynamic conversation to make participants feel comfortable. It is important to continue dialogue regarding topics that seem to be of interest to the participant, and regarding surprising, idiosyncratic or contradictory responses or behaviour from the participant. It might be useful to hide the list of questions and to learn the key questions by heart or keep them out of sight. Do, however, exert some control over activity topics.

B. *Duration of interviews.* The interview should be sufficiently long to make participants feel to make participants feel they are being heard, but should not continue too long resulting in participants becoming tired and disinterested. End activities when no questions are left, or when you feel like delaying a participant. The ODK interview is scheduled to last approximately 1.5 hours. The participants should be informed about the duration of the interview before agreeing to it.

C. *Number of interviews.* The objective of the ODK interviews is to get to know people's available and valued beings and doings, and to become inspired. For the ODK interviews the number will mainly depend on the amount of time and resources available, but at least five interviews should be conducted to ensure some variety.

D. *Consider to use specific questioning techniques.* These techniques are: 'Five Why's', 'Directed Storytelling', 'Guided Speculation', 'What-if-scenarios', 'Sacrificial Concepts', 'Talking Diaries', and 'Thinking Aloud' and are described under 'questioning techniques'.

Tips and tricks for behaviour and attitude

These tips and tricks have been derived from: Larsen and Flensborg (2011); Viitanen (2011); IDEO (2008a); Beyer and Holtzblatt (1995); Narayanasamy (2013); Handwerker (2001); Barab et al. (2004); Simanis and Hart (2008); Verdu-Isachsen (2012); Naidoo (2012); Beebe (2014); Chambers (2004); Pelto (2013); Van Boeijen et al. (2013); Kapoor (2012); d.School (2010); Von der Lippe (2012); IDEO (2008b); Johansson and Messeter (2005); Polak (2008); Ramberg (2012); Sperschneider and Bagger (2003); Martin and Hanington (2012); FrogDesign (2012); Freudenberger (1999); Nesset and Large (2004); Smart and Whiting (2001). These tips and tricks can elaborately be found in chapter 3.

The recommendations for designers' behaviour and attitude are:

- *Minimise hierarchy.* In order to minimise hierarchical perceptions:
    - Sit at the same height level as the participants;

- o Do not sit together if you are with more than one person;
- o Wear casual clothing with the same status as participants, which does not mean identical clothing
- o Avoid organization-branded clothing.
- *Build rapport.* Build relationships and trust with potential users early in the process and make them appreciate the work being done. This stimulates becoming accepted and motivates collaboration, resulting in a better understanding. It takes time to win trust and build rapport and this time should be taken in order to stimulate opening up of potential participants. To fasten the process of building rapport, follow the following tips:
  - o Be aware of potential codes of behaviour;
  - o Explain who you are;
  - o Seek and listen carefully;
  - o Demonstrate commitment;
  - o Show respect towards the people, their culture, their customs, attitudes, beliefs and their way of life;
  - o Do not criticize, correct or judge participants, but try to understand their perceptions and underlying reasons, appreciate how people live their lives;
  - o Show humility;
  - o Show interest;
  - o Be honest;
  - o Be open and clear about intentions and do not make false promises;
  - o Develop a collaborative dialogue;
  - o Be ready to learn and ask to be taught. Invite and answer questions;
  - o Share yourself. By sharing personal experiences an open atmosphere is created that allows for vulnerability and gossip;
  - o Share information, ideas and food;
  - o Accept and give gifts if appropriate.
- *Demonstrate willingness to learn.* Go into the field with the recognition that indigenous knowledge is essential. Do not act as the expert knowing what is best and do not impose theories and insights on participants, but instead be willing to admit ignorance and threat the participants as the experts who should feel that the designers are open to learn from them, that their knowledge is relevant. Gain appreciation for the people, culture, customs and the way people live their lives and do not correct them.
- *Start with an open mind.* You are an 'outsider' who probably speaks a different language and has different perceptions of meanings due to different life experiences and cultures. Try to understand the insiders' perspective, learn about the categories that local people use to describe situations and inquire about local perceptions of the meaning of important denominators. Learn to think different about the world. To avoid carrying assumptions, it is important to enter the field with an open mind, willing to learn. Put aside what you know and look with fresh eyes, think like a child. Pay attention to detail, question everything, be truly curious, do not judge, look for interesting

threads and themes that come up and truly listen. Even if you think you know the answer, pretend you do not know.

- *Listen with genuine interest.* Listen actively and attentively with genuine interest, enthusiasm and curiosity, without thinking about the next question or comment.

- *Encourage answering.* Encourage answering verbally and nonverbally. Say things like 'mmmm', 'uh-huh', 'I see' or 'really?', and use body language, such as head nodding, attentive forward leaning, and smiling.

- *Mind your body language.* While body language can be used to encourage participants to share stories, it can also communicate disinterest or lack of commitment. Be aware and careful about body language and keep an appropriate amount of eye contact.

- *Pay attention to body language.* Decide how to continue an activity based upon non-verbal behaviour of the participant.

- *Stimulate storytelling.* Stories indicate how participants think about the world. Do therefore not try to make participants answer brief and concise, but encourage them to tell stories in their own way - in all its complexity.

- *Encourage sharing of details and context.* Stimulate participants to share details and context to help you to understand which experiences have been significant to them and why they have been significant.

- *Sympathize.* Even if you do not agree, it might be useful to sympathize with the participant in order to make the participant open up more.

- *Limit interruption.* Play an active role in engaging users, but do not interrupt or rush them. Listen first and then talk. Do not be afraid of silence. Give participants the time to reflect, think and respond. However, do not let pauses become awkward.

- *Mind habitual behaviour.* Behave as an apprentice, do not lapse into the role of interviewer, expert or personal friend.

- *Avoid abstract talking.* When participants start to talk in abstract terms, make them talk about actual experiences again. It might be useful to ask participants about concrete examples.

- *Make it relaxed.* The activities need to be conducted within limited time, but this does not mean that they should be rushed. Instead, interactions should be relaxed and conducted with commitment.

- *Be sensitive.* Certain topics might be controversial or sensitive to talk about. Be understanding and sensitive towards the feelings of participants.

- *Learn from failures.* Things will not always go as anticipated. When things go wrong, learn from those failures and start building new plans based on the failed ones.

- *Adhere to ethical principles.*
  - The participant community should be central in the research process, the research should be participatory and conducted with respect for everyone, regardless of race, ethnicity, culture, religion, gender, class, sexual orientation, disability etc. The first responsibility is towards the participant community: their interests should be central to the study. Do not use your power to the disadvantage of participants, act responsibly.

o   Different participants should be included in the research, not only the ones who are easily accessible.

o   Obtain permission to conduct research, follow formal requirements and procedures. Check for review obligations of research plans in your home country and in the country under study.

o   Share objectives, expected outcomes, source of funding, methods to be employed, output usage, risks and benefits to the community prior to conducting research. Also share their rights and responsibilities. Be open and honest, frank and realistic about research constraints and outcomes, do not make false promises, do not raise unreasonable or unrealistic expectations.

o   Obtain informed consent. Preferably a written statement in the local language, but if most participants are illiterate, verbal consent is more ethically appropriate. Obtain consent for conducting the research activity, recording the activity, and using and sharing the – anonymised – outcomes.

o   Be aware of the risks and dangers that the research may pose to local communities and individuals and take appropriate action to eliminate them, protect the weakest in a community. Protect participants' privacy. Anonymise and secure data in order to protect identities and locations of participants. Ensure that the data is protected from misuse and falling into the wrong hands. Be careful to engage with organisations who might use research results against – certain members of – the participant community

o   Conduct research that is sound, well-conducted and results in relevant and useful data, as it is unethical to incompetently invade participant's personal lives resulting in questionable data.

o   Recognise and respect people's sensitivities and rights, do not trick them into revealing dark, shameful, personal or sensitive information or feelings, do not be intrusive or too demanding. The designers interests should not be placed ahead of those of the collaborators or the participants. Do not mine developing societies for data and minimise social harm (e.g., intrusion, distress, indignity, physical discomfort, personal embarrassment, psychological harm), maximize social benefit

o   Be aware of your position, your background and training, power differentials, cultural distance, and the privileged position of power to influence situations through design. These influence the way you think, and the relationships with participants and their reactivity.

o   Contexts vary, appreciate cultures, traditions, norms, mores, values, practices, systems and structures and be open to learn without judgement.

o   Try to limit inequalities: build local partnerships and collaborate on different levels, and try to contribute in a positive way, without making false promises.

o   Properly thank participants and local assistants, and provide appropriate compensation for time and effort taken. Avoid making excessively high rates of payments, but provide appropriate compensation to participants and local assistants. Provide gifts where this is culturally appropriate or expected, but do not end up in bribery or corruption. Avoid

exploitation of local assistants by providing them a fair return. The appropriate compensation can be discussed with local stakeholders. The research should not result in any material gain or loss for the participants.

o Judge responses, but do so carefully. Limit misinterpretation of outcomes due to preconceptions or misunderstandings, by triangulation, sharing of data, and consulting stakeholders, participants and / or participant communities. Be open about how interpretations are established.

o Reflect critically on:
  ▪ data limitations. E.g., regarding generalizability, errors;
  ▪ method limitations. E.g., regarding the approach and methods used and the selection of participants;
  ▪ designer limitations. E.g., regarding their position, established relationships, way of working, documentation, handling of delegated power, personal errors and mistakes;
  ▪ project limitations. E.g., regarding the roles of participants, distributed power and agency.

o Resist pressure from funding agencies or local authorities to make the outcomes match their needs or expectations: outcomes should be transparent, genuine and honest.

o Make the research outputs available locally, ideally in a language and / or form that the communities can understand and use. This enhances transparency and openness, and facilitates mutual learning. Acknowledge the contribution of everyone involved.

o Provide follow-up / keep the people involved in an accessible and understandable manner, without making false promises.

Tips and tricks for ethical behaviour

- The participant community should be central in the research process, the research should be participatory and conducted with respect for everyone, regardless of ethnicity, culture, religion, gender, class, sexual orientation, disability etc. The first responsibility is towards the participant community: their interests should be central to the study. Do not use your power to the disadvantage of participants, act responsibly.

- Different participants should be included in the research, not only the ones who are easily accessible.

- Permission to conduct research should be obtained, follow formal requirements and procedures. Review obligations of research plans in the designers' home country and in the country under study should be checked.

- Designers should explain who they are, what the nature and goals of the research are and what the programme and purpose of the activity is.

- Objectives, expected outcomes, source of funding, methods to be employed, output usage, risks and benefits should be shared to the community prior to conducting research. Their rights and responsibilities should also be shared. Designers should be open and honest, frank and realistic about research constraints and outcomes, do not make false promises, do not raise unreasonable or unrealistic expectations.

- Informed consent should be obtained. Preferably a written statement in the local language, but if most participants are illiterate, verbal consent is more ethically appropriate. Consent should be obtained for conducting the research activity, recording the activity, and using and sharing the – anonymised – outcomes.

- Designers should be aware of the risks and dangers that the research may pose to local communities and individuals and take appropriate action to eliminate them, in order to protect the weakest in a community. Participants' privacy should be protected. Data should be secured and anonymised in order to protect identities and locations of participants. It should be ensured that the data is protected from misuse and falling into the wrong hands. Designers should be careful to engage with organisations who might use research results against – certain members of – the participant community.

- Designers should conduct research that is sound, well-conducted and results in relevant and useful data, as it is unethical to incompetently invade participant's personal lives resulting in questionable data.

- Designers should recognise and respect people's sensitivities and rights, should not trick them into revealing dark, shameful, personal or sensitive information or feelings, should not be intrusive or too demanding. The designers interests should not be placed ahead of those of the collaborators or the participants. Designers should not mine developing societies for data and should minimise social harm (e.g., intrusion, distress, indignity, physical discomfort, personal embarrassment, psychological harm) and maximize social benefit.

- Designers should be aware of their position, their background and training, power differentials, cultural distance, and the privileged position of power to influence situations through design, as these influence the way they think, the relationships with participants and the reactivity of participants.

- Designers should appreciate varying contexts, cultures, traditions, norms, mores, values, practices, systems and structures and be open to learn without judgement.

- Designers should try to limit inequalities: they should build local partnerships and collaborate on different levels, and try to contribute in a positive way, without making false promises.

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- Designers should provide follow-up / keep the people involved in an accessible and understandable manner, without making false promises.

Tips and tricks for questioning

These tips and tricks have been derived from: Martin and Hanington (2012); Narayanasamy (2013); FrogDesign (2012); IDEO (2008a); d.School (2013); Larsen and Flensborg (2011); Van Boeijen et al. (2013); Handwerker (2001); Chambers (2004); Johansson and Linde (2005); Beyer and Holtzblatt (1995); Freudenberger (1999); IDEO (2008b); Viitanen (2011); Barab et al. (2004). These tips and tricks can elaborately be found in chapter 3.

The recommendations for questioning are:
- *Pose questions that are*:
  - o Neutral. Avoid steering participants' answers by implying a right or wrong answer, do not lead them towards an expected answer and avoid blaming questions which suggest the participant is wrong or at fault. Such oriented questions introduce bias;
  - o Specific. Avoid using the word 'usually', but make questions more specific by asking about a specific instance or occurrence;
  - o Naïve. Pretend you do not know to hear how people narrate things themselves;
  - o Open-ended. To stimulate conversation and stories, questions should elicit answers that require more than one word. Open-ended questions often start with 'what?', 'when?', 'where?', 'who?', 'how?', and 'why?'. Why-questions make brings about reasons, intentions, and motivations, but often result in more abstract answering. 'How'-questions stimulate straightforward storytelling.
  - o Simple, short and to the point;
- *Avoid questions that are*:
  - o Insensitive;
  - o Offensive;
  - o Ambiguous;
  - o Biased. Questions with built-in assumptions are not always corrected by participants, who might answer the question to please you;

     o   Leading, blaming, or oriented;

     o   Abstract, consider to explain them through a story;

     o   Multiple questions in one;

     o   Hypothetical;

- *Mind terminology.* Properly word and ask questions:
    - Avoid jargon and tricky language;
    - Avoid vague language that makes no sense to the participants;
    - Avoid terminology with multiple meanings attached to them that might different things to different participants;
    - Use local indicators and terminology;

- *Pose follow-up questions.* Probe into issues before continuing with the next topic. To improve understanding of how the participants view the world, it is useful to ask them why they say or do things;

- *Pose questions that stimulate description, discussion and depth.* Ask participants to tell more about a certain topic, echo answers in a question format, or retell answers or stories in order to stimulate further explanation and to elicit additional information;

- *Mix questions with discussions.*

- *Pose verifying questions.* Pose different types of questions about the same topic to verify participants' answers. Summarize answers to check understanding. Pay attention to and check inconsistencies and discrepancies, as they may hide interesting information. Admit confusion and ask for clarification;

- *Verify interpretations.* To avoid misinterpretation, check your interpretations of answers or observations by sharing them during the interview. Checking interpretations is not only useful for verification, but might also provide participants a starting point for providing additional insight;

- *Start with easy questions.* Start with more general and easy to answer questions, and then probe broader and deeper. Pose sensitive questions later in the interview, when rapport has been build.

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Questioning techniques

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These questioning techniques are:

- *The 'five why's'.* This technique means asking why five times in a row to probe deeper and detect underlying reasons for behaviour and attitudes.

Appendix C

- *'Directed storytelling'*. This technique means guiding the participant to tell a story about a certain topic with help from additional questions such as 'who?', 'what?', 'when?' 'where?' and 'how?'.
- *'Guided speculation'*. This technique means asking questions about hopes and fears for the future
- *'What-if-scenarios'*. This technique means putting forward scenarios or storylines for the participant to complete.
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Tips and tricks for 'What to pay attention to'

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Basically, learn everything there is to know. Relevant knowledge is not only with the participants, it is also present in the context. Try to understand the details of people's lives and practices and detect patterns and structure. Specific things to pay attention to are:

- Everything that is seen
  - Things that are physically present
  - Objects participants care about
  - Body language
  - Factual behaviour and things that change behaviour
  - Interactions with the environment
  - Adaptations and work-arounds
- Everything that is heard
  - Language, vocabulary, words and categories
  - Expressions
  - Motivations
  - Perceptions
  - Issues, difficulties or obstacles
  - Interactions
  - Social actors
  - Unarticulated needs
  - Events and circumstances that shape experiences
  - Prior experiences, current experiences and how those are perceived and conceptualized
- Everything that is felt

- o Emotions, moments or things that participant react upon emotionally
- o Feelings
- Everything that is smelled
- Everything that is tasted
- Anything surprising: that changes assumptions or seems irrational
- Observable and explicit needs, but also tacit needs – which cannot be expressed verbally, and latent needs- which are subconscious. These can be detected by exercises where participants create or perform tasks.

C.2 Prerequisites, steps and guidelines 0.1

Below, the prerequisites, steps and guidelines of the CDD approach / ODK as established after the first iteration are listed.

Ten prerequisites

There are certain prerequisites regarding Capability Driven Design that are also relevant for using the ODK. These comprise the following:

A. *Multidisciplinary team.* In order to enhance data reliability and validity designers should triangulate data. Capability Driven Design already prescribes the use of multiple data sources, methods, tools and techniques, but to improve outcomes, team members from multiple disciplines should be included: designers with different backgrounds, skills and knowledge. This leads to a balanced perspective, access to a range of participants and speeding up of the process.

B. *Activities should be conducted in pairs.* In order to enhance data reliability and validity designers should triangulate data. Capability Driven Design already prescribes the use of multiple data sources, methods, tools and techniques, but to improve outcomes, activities should be conducted with multiple team members. By assigning one activity facilitator and one note taker, each of them can focus on their own specific task, while interpretations, experiences and perceptions can be compared, ensuring investigator triangulation. A third person can be added to take photographs or shoot video, but more people can overwhelm participants.

C. *In the field.* Potential users should be directly observed and interacted with in their natural settings in order to improve learning and understanding by building a shared language, capturing detail, gather concrete data, develop empathy and reduce bias and rationalization, filtering and distortion of information.

D. *Training.* In order to conduct sound, rigorous research that does not invade people's private lives in an incompetent way, and which results in valuable data, designers should have a solid and broad understanding of doing good research in the field. The research should be executed in a systematic, sceptical, ethical and rigorous manner and therefore need to follow a training to learn the right attitude, behaviour and questioning skills. Designers should also continuously examine their attitude, behaviour and questioning in order to improve upon them.

E. *Participatory, simple and enjoyable activities.* Capability Driven Design techniques and tools can be tweaked by the designers to better fit their purpose. However, they should keep in mind that activities should be fun, interactive and simple in order to create an enabling atmosphere in which participants feel free to express themselves. It also aids to let participants perform tasks or to let them create things.

F. *Local partnerships.* Local partners are required in order to adjust quickly to the local circumstances, obtain information about the potential users, get advice on activities, gain access and build trust in communities. They can also aid in selecting participants and finding translators.

G. *Iterative data analysis.* As newly obtained information leads to new understanding, research goals and methods should be changed accordingly to obtain additional information. The research outcomes should therefore be analysed by the team after each activity to adjust the activities based on new insights.

H. *Sharing and checking outcomes.* The information, knowledge and interpretations should be shared with participants to point out misunderstanding and to improve data validity. If participants agree, they should also be shared with the community and local partners to keep stakeholders involved, enhance transparency and openness and improve data reliability.

I. *Critical reflection on limitations.* The data obtained, the methods used, the researchers involved and the project executed all have limitations and the researchers should reflect on them and be open and honest about them. For example about the generalizability of outcomes, errors in data collection, the role different people played in the process, and mistakes being made.

J. *Keep the themes in mind.* In order to obtain broad insight into all aspects that comprise a person's life and context, the themes and topics are leading.

Thirteen steps

From the literature in chapter 3 and the selection of techniques, the steps that need to be executed in order to conduct semi-structured interviews are distilled. In total they comprise seven steps which are the following:

1. *Get familiar with the ODK.* The team members must get acquainted with the flow and structure of the interview. This can be done by roleplaying the interview in the team, but also by conducting a local pilot in the field.

2. *If required, select and instruct a translator.* Share the goals of the research and explain the rules. It is wise to walk through all the themes and questions to get the translator acquainted with the interview flow and structure, the themes and key questions.

3. *Select participants.* A local partner can aid in selecting participants. See the guidelines.

Prepare the interview:

4. *Assign roles.* Conduct the interview with at least two (a facilitator and a note taker / photographer) and a maximum of three researchers, and assign roles beforehand to clarify the purpose for each researcher.

5. *Decide on time and place.* Time and place of the interview should be at convenient to the participants and preferably conducted in their local context.

Conduct the interview:

6. *Introduce*. Introduce the design project, the interview, the translator and yourselves. Participants should be informed about the research and its goals. It is important to be clear about compensation to set the right expectations for participants. Communicate openness and being non-threatening, stress that there are no wrong answers and that not all questions have to be answered. Make the participants feel relevant in their roles by sharing yourself, verbally or with help from pictures. Try to limit the influence of audience.

7. *Ask for informed consent*. Ask for consent to record the interview, to take pictures and to use the data. Stress that participants are not obliged to participate, and can withdraw from the activity at any time.

8. *Ask for the participant's introduction*. Asking participants to say something about themselves provides an easy start and shows interest.

9. *Conduct a touchstone tour*. Let the participant show you around in their home or the environment where the interview is conducted. Use the show me technique: let the participants show you objects, spaces and tools.

10. *Sit down and…*
    a. *For the facilitator: …build dialogue*. Start with the participant's personal details, continue with the timeline of a participant's day and week, and then start collecting answers for the themes and questions using the drawing/mapping sheets and the answer sheets.
    b. *For the note-taker: …document*. Record the interview, take notes and photographs.

11. *Thank the participant*. Thank participants for their invested time and effort and for sharing personal information. Bring a small gift to show appreciation.

Process the outcomes:

12. *Document*. Note down anything surprising directly after each interview.

13. *Analyse, interpret and reflect with the team*. Share all information with the full design team after each interview. Analyse, interpret and reflect on the insights with the full team, and use the outcomes during the following interviews.

When using the ODK, all thirteen steps should be followed and step 4 to 13 should be repeated for each interview.

CDD guidelines

The following five guidelines designers are advised to follow when using the CDD approach:

A. *Select a variety of participants with different characteristics*. Variety in gender, social class and age are especially important to include. Be aware to not only select participants that are easy to access.

B. *Appropriate behaviour and attitude*. All team members should follow the tips and tricks for 'appropriate behaviour and attitude'. See: tips & tricks.

C. *Appropriate questioning*. The facilitator(s) should be trained on qualitative research skills (prerequisite). In order to guide them, the tips & tricks regarding 'appropriate questioning' should be followed. See: 'tips & tricks'.

D. *Document everything.* Note down characteristics of the participant (e.g., name, gender, social class, religion, age, occupation), of the activity (e.g., type of activity, the people present, date and location, materials used), and of everything that is seen, heard, felt, smelled, tasted, and / or surprising. Follow the tips and tricks for 'what to pay attention to'. See: tips & tricks.

E. *Bring along the required supplies.* The materials for the activities, recording devices, a notebook and pen should be brought along to the interview. Consider bringing pictures of yourself and your surroundings, as well as food, gifts and / or compensation for the participants.

ODK guidelines

The following four guidelines designers are advised to follow when conducting ODK interviews:

A. *Flexible but focused conversations.* The ODK provides steps, themes and guiding questions, but there is room for flexibility and unexpected turns in order to stimulate dialogue. There is no indicated order indicated for addressing the themes. Do not ask questions from a script, and feel free to add or change questions. The interview should feel like an open-ended, dynamic conversation to make participants feel comfortable. It is important to continue dialogue regarding topics that seem to be of interest to the participant, and regarding surprising, idiosyncratic or contradictory responses or behaviour from the participant. It might be useful to hide the list of questions and to learn the key questions by heart or keep them out of sight. Do, however, exert some control over activity topics.

B. *Duration of interviews.* The interview should be sufficiently long to make participants feel to make participants feel they are being heard, but should not continue too long resulting in participants becoming tired and disinterested. End activities when no questions are left, or when you feel like delaying a participant. The ODK interview is scheduled to last approximately 2 hours. The participants should be properly informed before the interview about how much time the activity will take, before they give their consent. Participants can be compensated for their time, for example by providing food or compensate for expenses, and a gift can be provided. If an interview takes longer, participants should be informed and asked for additional consent. The participants can be offered a compensation for continuing the interview. If the participant is not willing to continue longer, the interview should be concluded.

C. *Number of interviews.* The objective of the ODK interviews is to get to know people's available and valued beings and doings, and to become inspired. For the ODK interviews the number will mainly depend on the amount of time and resources available, but at least five interviews should be conducted to ensure some variety.

D. *Consider to use specific questioning techniques.* These techniques are: 'Five Why's', 'Directed Storytelling', 'Guided Speculation', 'What-if-scenarios', 'Sacrificial Concepts', 'Talking Diaries', and 'Thinking Aloud' and are described under 'questioning techniques'.

Tips and tricks for behaviour and attitude

These tips and tricks have been derived from: Larsen and Flensborg (2011); Viitanen (2011); IDEO (2008a); Beyer and Holtzblatt (1995); Narayanasamy (2013); Handwerker (2001); Barab et al. (2004);

Simanis and Hart (2008); Verdu-Isachsen (2012); Naidoo (2012); Beebe (2014); Chambers (2004); Pelto (2013); Van Boeijen et al. (2013); Kapoor (2012); d.School (2010); Von der Lippe (2012); IDEO (2008b); Johansson and Messeter (2005); Polak (2008); Ramberg (2012); Sperschneider and Bagger (2003); Martin and Hanington (2012); FrogDesign (2012); Freudenberger (1999); Nesset and Large (2004); Smart and Whiting (2001). These tips and tricks can elaborately be found in chapter 3.

The recommendations for designers' behaviour and attitude are:
- *Minimise hierarchy.* In order to minimise hierarchical perceptions:
  o   Sit at the same height level as the participants;
  o   Do not sit together if you are with more than one person;
  o   Wear casual clothing with the same status as participants, which does not mean identical clothing
  o   Avoid organization-branded clothing.
- *Build rapport.* Build relationships and trust with potential users early in the process and make them appreciate the work being done. This stimulates becoming accepted and motivates collaboration, resulting in a better understanding. It takes time to win trust and build rapport and this time should be taken in order to stimulate opening up of potential participants. To fasten the process of building rapport, follow the following tips:
  o   Be aware of potential codes of behaviour;
  o   Explain who you are;
  o   Seek and listen carefully;
  o   Demonstrate commitment;
  o   Show respect towards the people, their culture, their customs, attitudes, beliefs and their way of life;
  o   Do not criticize, correct or judge participants, but try to understand their perceptions and underlying reasons, appreciate how people live their lives;
  o   Show humility;
  o   Show interest;
  o   Be honest;
  o   Be open and clear about intentions and do not make false promises;
  o   Develop a collaborative dialogue;
  o   Be ready to learn and ask to be taught. Invite and answer questions;
  o   Share yourself. By sharing personal experiences an open atmosphere is created that allows for vulnerability and gossip;
  o   Share information, ideas and food;
  o   Accept and give gifts if appropriate.
- *Demonstrate willingness to learn.* Go into the field with the recognition that indigenous knowledge is essential. Do not act as the expert knowing what is best and do not impose theories and insights on participants, but instead be willing to admit ignorance and threat the participants as the experts who should feel that the designers are open to learn from them, that their

knowledge is relevant. Gain appreciation for the people, culture, customs and the way people live their lives and do not correct them.

- *Start with an open mind.* You are an 'outsider' who probably speaks a different language and has different perceptions of meanings due to different life experiences and cultures. Try to understand the insiders' perspective, learn about the categories that local people use to describe situations and inquire about local perceptions of the meaning of important denominators. Learn to think different about the world. To avoid carrying assumptions, it is important to enter the field with an open mind, willing to learn. Put aside what you know and look with fresh eyes, think like a child. Pay attention to detail, question everything, be truly curious, do not judge, look for interesting threads and themes that come up and truly listen. Even if you think you know the answer, pretend you do not know.

- *Listen with genuine interest.* Listen actively and attentively with genuine interest, enthusiasm and curiosity, without thinking about the next question or comment.

- *Encourage answering.* Encourage answering verbally and nonverbally. Say things like 'mmmm', 'uh-huh', 'I see' or 'really?', and use body language, such as head nodding, attentive forward leaning, and smiling.

- *Mind your body language.* While body language can be used to encourage participants to share stories, it can also communicate disinterest or lack of commitment. Be aware and careful about body language and keep an appropriate amount of eye contact.

- *Pay attention to body language.* Decide how to continue an activity based upon non-verbal behaviour of the participant.

- *Stimulate storytelling.* Stories indicate how participants think about the world. Do therefore not try to make participants answer brief and concise, but encourage them to tell stories in their own way - in all its complexity.

- *Encourage sharing of details and context.* Stimulate participants to share details and context to help you to understand which experiences have been significant to them and why they have been significant.

- *Sympathize.* Even if you do not agree, it might be useful to sympathize with the participant in order to make the participant open up more.

- *Limit interruption.* Play an active role in engaging users, but do not interrupt or rush them. Listen first and then talk. Do not be afraid of silence. Give participants the time to reflect, think and respond. However, do not let pauses become awkward.

- *Mind habitual behaviour.* Behave as an apprentice, do not lapse into the role of interviewer, expert or personal friend.

- *Avoid abstract talking.* When participants start to talk in abstract terms, make them talk about actual experiences again. It might be useful to ask participants about concrete examples.

- *Make it relaxed.* The activities need to be conducted within limited time, but this does not mean that they should be rushed. Instead, interactions should be relaxed and conducted with commitment.

- *Be sensitive*. Certain topics might be controversial or sensitive to talk about. Be understanding and sensitive towards the feelings of participants.
- *Learn from failures*. Things will not always go as anticipated. When things go wrong, learn from those failures and start building new plans based on the failed ones.

Tips and tricks for ethical behaviour

- The participant community should be central in the research process, the research should be participatory and conducted with respect for everyone, regardless of ethnicity, culture, religion, gender, class, sexual orientation, disability etc. The first responsibility is towards the participant community: their interests should be central to the study. Do not use your power to the disadvantage of participants, act responsibly.
- Different participants should be included in the research, not only the ones who are easily accessible.
- Permission to conduct research should be obtained, follow formal requirements and procedures. Review obligations of research plans in the designers' home country and in the country under study should be checked.
- Designers should explain who they are, what the nature and goals of the research are and what the programme and purpose of the activity is.
- Objectives, expected outcomes, source of funding, methods to be employed, output usage, risks and benefits should be shared to the community prior to conducting research. Their rights and responsibilities should also be shared. Designers should be open and honest, frank and realistic about research constraints and outcomes, do not make false promises, do not raise unreasonable or unrealistic expectations.
- Informed consent should be obtained. Preferably a written statement in the local language, but if most participants are illiterate, verbal consent is more ethically appropriate. Consent should be obtained for conducting the research activity, recording the activity, and using and sharing the – anonymised – outcomes.
- Designers should be aware of the risks and dangers that the research may pose to local communities and individuals and take appropriate action to eliminate them, in order to protect the weakest in a community. Participants' privacy should be protected. Data should be secured and anonymised in order to protect identities and locations of participants. It should be ensured that the data is protected from misuse and falling into the wrong hands. Designers should be careful to engage with organisations who might use research results against – certain members of – the participant community.
- Designers should conduct research that is sound, well-conducted and results in relevant and useful data, as it is unethical to incompetently invade participant's personal lives resulting in questionable data.
- Designers should recognise and respect people's sensitivities and rights, should not trick them into revealing dark, shameful, personal or sensitive information or feelings, should not be intrusive or too demanding. The designers interests should not be placed ahead of those of the

collaborators or the participants. Designers should not mine developing societies for data and should minimise social harm (e.g., intrusion, distress, indignity, physical discomfort, personal embarrassment, psychological harm) and maximize social benefit.

- Designers should be aware of their position, their background and training, power differentials, cultural distance, and the privileged position of power to influence situations through design, as these influence the way they think, the relationships with participants and the reactivity of participants.

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- *'Thinking aloud'.* Asking participants to tell what they are doing and/or thinking when they are performing a specific task. This technique can, for example, be used during the scoring exercise.

Tips and tricks for 'What to pay attention to'

These tips and tricks have been derived from: Polak (2008); Van der Veer (2008); Diggins and Tolmie (2003); Beyer and Holtzblatt (1995); Handwerker (2001); FrogDesign (2012); IDEO (2008a); Narayanasamy (2013); Martin and Hanington (2012); d.School (2013); Beebe (2014); Pelto (2013); Liedtka (2011); Gielen (2008). These tips and tricks can elaborately be found in chapter 3.

Basically, learn everything there is to know. Relevant knowledge is not only with the participants, it is also present in the context. Try to understand the details of people's lives and practices and detect patterns and structure. Specific things to pay attention to are:

- Everything that is seen
    - Things that are physically present
    - Objects participants care about
    - Body language
    - Factual behaviour and things that change behaviour
    - Interactions with the environment
    - Adaptations and work-arounds
- Everything that is heard
    - Language, vocabulary, words and categories
    - Expressions
    - Motivations
    - Perceptions
    - Issues, difficulties or obstacles
    - Interactions
    - Social actors
    - Unarticulated needs
    - Events and circumstances that shape experiences
    - Prior experiences, current experiences and how those are perceived and conceptualized
- Everything that is felt
    - Emotions, moments or things that participant react upon emotionally
    - Feelings
- Everything that is smelled
- Everything that is tasted
- Anything surprising: that changes assumptions or seems irrational
- Observable and explicit needs, but also tacit needs – which cannot be expressed verbally, and latent needs- which are subconscious. These can be detected by exercises where participants create or perform tasks.

C.3   Prerequisites, steps and guidelines 0.2

Below, the prerequisites, steps and guidelines of the CDD approach / ODK as established after the second iteration are listed.

Ten prerequisites

There are certain prerequisites regarding Capability Driven Design that are also relevant for using the ODK. These comprise the following:

Appendix C

A. *Multidisciplinary team.* In order to enhance data reliability and validity designers should triangulate data. Capability Driven Design already prescribes the use of multiple data sources, methods, tools and techniques, but to improve outcomes, team members from multiple disciplines should be included: designers with different backgrounds, skills and knowledge. This leads to a balanced perspective, access to a range of participants and speeding up of the process.

B. *Activities should be conducted in pairs.* In order to enhance data reliability and validity designers should triangulate data. Capability Driven Design already prescribes the use of multiple data sources, methods, tools and techniques, but to improve outcomes, activities should be conducted with multiple team members. By assigning one activity facilitator and one note taker, each of them can focus on their own specific task, while interpretations, experiences and perceptions can be compared, ensuring investigator triangulation. A third person can be added to take photographs or shoot video, but more people can overwhelm participants.

C. *In the field.* Potential users should be directly observed and interacted with in their natural settings in order to improve learning and understanding by building a shared language, capturing detail, gather concrete data, develop empathy and reduce bias and rationalization, filtering and distortion of information.

D. *Training.* In order to conduct sound, rigorous research that does not invade people's private lives in an incompetent way, and which results in valuable data, designers should have a solid and broad understanding of doing good research in the field. The research should be executed in a systematic, sceptical, ethical and rigorous manner and therefore need to follow a training to learn the right attitude, behaviour and questioning skills. Designers should also continuously examine their attitude, behaviour and questioning in order to improve upon them.

E. *Participatory, simple and enjoyable activities.* Capability Driven Design techniques and tools can be tweaked by the designers to better fit their purpose. However, they should keep in mind that activities should be fun, interactive and simple in order to create an enabling atmosphere in which participants feel free to express themselves. It also aids to let participants perform tasks or to let them create things.

F. *Local partnerships.* Local partners are required in order to adjust quickly to the local circumstances, obtain information about the potential users, get advice on activities, gain access and build trust in communities. They can also aid in selecting participants and finding translators.

G. *Iterative data analysis.* As newly obtained information leads to new understanding, research goals and methods should be changed accordingly to obtain additional information. The research outcomes should therefore be analysed by the team after each activity to adjust the activities based on new insights.

H. *Sharing and checking outcomes.* The information, knowledge and interpretations should be shared with participants to point out misunderstanding and to improve data validity. If participants agree, they should also be shared with the community and local partners to keep stakeholders involved, enhance transparency and openness and improve data reliability.

I. *Critical reflection on limitations.* The data obtained, the methods used, the researchers involved and the project executed all have limitations and the researchers should reflect on them and be

open and honest about them. For example about the generalizability of outcomes, errors in data collection, the role different people played in the process, and mistakes being made.

J. *Learn the themes and questions by heart.* In order to obtain broad insight into all aspects that comprise a person's life and context, the themes and topics are leading.

Thirteen steps

From the literature in chapter 3 and the selection of techniques, the steps that need to be executed in order to conduct semi-structured interviews are distilled. In total they comprise seven steps which are the following:

1. *Get familiar with the ODK.* The team members must get acquainted with the flow and structure of the interview. This can be done by roleplaying the interview in the team, but also by conducting a local pilot in the field.

2. *Carefully select and properly instruct a translator (if required).* The translator should be thoroughly informed about the task at hand and his or her role. Go through all the themes and questions before the first interview so that the translator is fully acquainted with the interview flow and structure, the themes and key questions. Share the goals of the research and explain the rules.

3. *Select participants.* A local partner can aid in selecting participants. See the guidelines.

Prepare the interview:

4. *Assign roles.* Conduct the interview with at least two (a facilitator and a note taker / photographer) and a maximum of three researchers, and assign roles beforehand to clarify the purpose for each researcher.

5. *Decide on time and place.* Time and place of the interview should be at convenient to the participants and preferably conducted in their local context.

Conduct the interview:

6. *Introduce.* Introduce the design project, the interview, the translator and yourselves. Participants should be informed about the research and its goals. Giving your introduction in the local language helps to build rapport and to relax the atmosphere. It is important to be clear about compensation to set the right expectations for participants. People can be compensated for invested time or expenses, but if people start to ask for money, it is better to stop the interview. It must be noted that for some types of research it can be correct to pay participants, but for this type of research it is important that money does not become the incentive to participate. Communicate openness and being non-threatening, stress that there are no wrong answers and that not all questions have to be answered. Explain the participant that he or she is free to leave. Make the participants feel relevant in their roles by sharing yourself, verbally or with help from pictures. Try to limit the influence of audience.

7. *Ask for informed consent.* Ask for consent to record the interview, to take pictures and to use the data. Stress that participants are not obliged to participate, and can withdraw from the activity at any time.

8. *Ask for the participant's introduction.* Asking participants to say something about themselves provides an easy start and shows interest.

9. *Conduct a touchstone tour.* Let the participant show you around in their home or the environment where the interview is conducted. Use the show me technique: let the participants show you objects, spaces and tools.

10. *Sit down and…*

    a. *For the facilitator: …build dialogue.* Start with the participant's personal details, continue with the timeline of a participant's day and week, and then start collecting answers for the themes and questions using the drawing/mapping sheets and the answer sheets. Start with the current situation for one theme and from that point ask about changes in the past and aspirations for the future, before continuing to the next theme or topic.

    b. *For the note-taker: …document.* Record the interview, take notes and photographs.

11. *Thank the participant.* Thank participants for their invested time and effort and for sharing personal information. Bring a small gift to show appreciation. Providing a tangible gift allows the participant to show the gift to other people.

Process the outcomes:

12. *Document.* Note down anything surprising directly after each interview.

13. *Analyse, interpret and reflect with the team.* Share all information with the full design team after each interview. Analyse, interpret and reflect on the insights with the full team, and use the outcomes during the following interviews.

When using the ODK, all thirteen steps should be followed and step 4 to 13 should be repeated for each interview.

CDD guidelines

The following six guidelines designers are advised to follow when using the CDD approach:

A. *Select a variety of participants with different characteristics.* Variety in gender, social class and age are especially important to include. Be aware to not only select participants that are easy to access.

B. *Appropriate behaviour and attitude.* All team members should follow the tips and tricks for 'appropriate behaviour and attitude'. See: tips & tricks.

C. *Appropriate questioning.* The facilitator(s) should be trained on qualitative research skills (prerequisite). In order to guide them, the tips & tricks regarding 'appropriate questioning' should be followed. See: 'tips & tricks'.

D. *Document everything.* Note down characteristics of the participant (e.g., name, gender, social class, religion, age, occupation), of the activity (e.g., type of activity, the people present, date and location, materials used), and of everything that is seen, heard, felt, smelled, tasted, and / or surprising. Follow the tips and tricks for 'what to pay attention to'. See: tips & tricks.

E. *Bring along the required supplies.* The materials for the activities, recording devices, a notebook and pen should be brought along to the interview. Consider bringing pictures of yourself and your surroundings, as well as food, gifts and / or compensation for the participants.

F.   *Select and instruct a translator.* The tips and tricks for selecting and instructing a translator should be followed. See: 'tips & tricks'.

ODK guidelines

The following five guidelines designers are advised to follow when conducting ODK interviews:

A.   *Flexible but focused conversations.* The ODK provides steps, themes and guiding questions, but there is room for flexibility and unexpected turns in order to stimulate dialogue. There is no indicated order indicated for addressing the themes. Do not ask questions from a script, and feel free to add or change questions. The interview should feel like an open-ended, dynamic conversation to make participants feel comfortable. It is important to continue dialogue regarding topics that seem to be of interest to the participant, and regarding surprising, idiosyncratic or contradictory responses or behaviour from the participant. It might be useful to hide the list of questions and to learn the key questions by heart or keep them out of sight. Do, however, exert some control over activity topics.

B.   *Duration of interviews.* The interview should be sufficiently long to make participants feel to make participants feel they are being heard, but should not continue too long resulting in participants becoming tired and disinterested. End activities when no questions are left, or when you feel like delaying a participant. The ODK interview is scheduled to last approximately 2 hours. The participants should be properly informed before the interview about how much time the activity will take, before they give their consent. Participants can be compensated for their time, for example by providing food or compensate for expenses, and a gift can be provided. If an interview takes longer, participants should be informed and asked for additional consent. The participants can be offered a compensation for continuing the interview. If the participant is not willing to continue longer, the interview should be concluded.

C.   *Number of interviews.* The objective of the ODK interviews is to get to know people's available and valued beings and doings, and to become inspired. For the ODK interviews the number will mainly depend on the amount of time and resources available, but at least five interviews should be conducted to ensure some variety.

D.   *Consider to use specific questioning techniques.* These techniques are: 'Five Why's', 'Directed Storytelling', 'Guided Speculation', 'What-if-scenarios', 'Sacrificial Concepts', 'Talking Diaries', and 'Thinking Aloud' and are described under 'questioning techniques'.

E.   *Dealing with sensitive questions.* Sensitivity differs per culture, so it might be that the questions you think are sensitive, are not sensitive to the participant. Your own assumptions and feelings towards questions should not be leading. Discuss the questions beforehand with a local partner to identify sensitivities Start with more general and easy to answer questions, and later in the interview, when rapport has been build, it might be possible to pose sensitive questions and probe broader and deeper. However, be understanding and sensitive towards the feelings of participants and the potential of causing psychological harm for the participant. Try to rephrase a question when the participant is hesitant to answer it, or ignore the question if it leads to an uncomfortable situation.

Appendix C

Tips and tricks for behaviour and attitude

These tips and tricks have been derived from: Larsen and Flensborg (2011); Viitanen (2011); IDEO (2008a); Beyer and Holtzblatt (1995); Narayanasamy (2013); Handwerker (2001); Barab et al. (2004); Simanis and Hart (2008); Verdu-Isachsen (2012); Naidoo (2012); Beebe (2014); Chambers (2004); Pelto (2013); Van Boeijen et al. (2013); Kapoor (2012); d.School (2010); Von der Lippe (2012); IDEO (2008b); Johansson and Messeter (2005); Polak (2008); Ramberg (2012); Sperschneider and Bagger (2003); Martin and Hanington (2012); FrogDesign (2012); Freudenberger (1999); Nesset and Large (2004); Smart and Whiting (2001). These tips and tricks can elaborately be found in chapter 3.

The recommendations for designers' behaviour and attitude are:

- *Minimise hierarchy.* In order to minimise hierarchical perceptions:
  o Sit at the same height level as the participants;
  o Do not sit together if you are with more than one person;
  o Wear casual clothing with the same status as participants, which does not mean identical clothing
  o Avoid organization-branded clothing.
- *Build rapport.* Build relationships and trust with potential users early in the process and make them appreciate the work being done. This stimulates becoming accepted and motivates collaboration, resulting in a better understanding. It takes time to win trust and build rapport and this time should be taken in order to stimulate opening up of potential participants. To fasten the process of building rapport, follow the following tips:
  o Be aware of potential codes of behaviour;
  o Explain who you are;
  o Seek and listen carefully;
  o Demonstrate commitment;
  o Show respect towards the people, their culture, their customs, attitudes, beliefs and their way of life;
  o Do not criticize, correct or judge participants, but try to understand their perceptions and underlying reasons, appreciate how people live their lives;
  o Show humility;
  o Show interest;
  o Be honest;
  o Be open and clear about intentions and do not make false promises;
  o Develop a collaborative dialogue;
  o Be ready to learn and ask to be taught. Invite and answer questions;
  o Share yourself. By sharing personal experiences an open atmosphere is created that allows for vulnerability and gossip;
  o Share information, ideas and food;
  o Accept and give gifts if appropriate.

- *Demonstrate willingness to learn.* Go into the field with the recognition that indigenous knowledge is essential. Do not act as the expert knowing what is best and do not impose theories and insights on participants, but instead be willing to admit ignorance and threat the participants as the experts who should feel that the designers are open to learn from them, that their knowledge is relevant. Gain appreciation for the people, culture, customs and the way people live their lives and do not correct them.

- *Start with an open mind.* You are an 'outsider' who probably speaks a different language and has different perceptions of meanings due to different life experiences and cultures. Try to understand the insiders' perspective, learn about the categories that local people use to describe situations and inquire about local perceptions of the meaning of important denominators. Learn to think different about the world. To avoid carrying assumptions, it is important to enter the field with an open mind, willing to learn. Put aside what you know and look with fresh eyes, think like a child. Pay attention to detail, question everything, be truly curious, do not judge, look for interesting threads and themes that come up and truly listen. Even if you think you know the answer, pretend you do not know.

- *Listen with genuine interest.* Listen actively and attentively with genuine interest, enthusiasm and curiosity, without thinking about the next question or comment.

- *Encourage answering.* Encourage answering verbally and nonverbally. Say things like 'mmmm', 'uh-huh', 'I see' or 'really?', and use body language, such as head nodding, attentive forward leaning, and smiling.

- *Mind your body language.* While body language can be used to encourage participants to share stories, it can also communicate disinterest or lack of commitment. Be aware and careful about body language and keep an appropriate amount of eye contact.

- *Pay attention to body language.* Decide how to continue an activity based upon non-verbal behaviour of the participant.

- *Stimulate storytelling.* Stories indicate how participants think about the world. Do therefore not try to make participants answer brief and concise, but encourage them to tell stories in their own way - in all its complexity.

- *Encourage sharing of details and context.* Stimulate participants to share details and context to help you to understand which experiences have been significant to them and why they have been significant.

- *Sympathize.* Even if you do not agree, it might be useful to sympathize with the participant in order to make the participant open up more.

- *Limit interruption.* Play an active role in engaging users, but do not interrupt or rush them. Listen first and then talk. Do not be afraid of silence. Give participants the time to reflect, think and respond. However, do not let pauses become awkward.

- *Mind habitual behaviour.* Behave as an apprentice, do not lapse into the role of interviewer, expert or personal friend.

- *Avoid abstract talking.* When participants start to talk in abstract terms, make them talk about actual experiences again. It might be useful to ask participants about concrete examples.

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- *Make it relaxed.* The activities need to be conducted within limited time, but this does not mean that they should be rushed. Instead, interactions should be relaxed and conducted with commitment.
- *Learn from failures.* Things will not always go as anticipated. When things go wrong, learn from those failures and start building new plans based on the failed ones.

Tips and tricks for ethical behaviour

- The participant community should be central in the research process, the research should be participatory and conducted with respect for everyone, regardless of ethnicity, culture, religion, gender, class, sexual orientation, disability etc. The first responsibility is towards the participant community: their interests should be central to the study. Do not use your power to the disadvantage of participants, act responsibly.
- Different participants should be included in the research, not only the ones who are easily accessible.
- Permission to conduct research should be obtained, follow formal requirements and procedures. Review obligations of research plans in the designers' home country and in the country under study should be checked.
- Designers should explain who they are, what the nature and goals of the research are and what the programme and purpose of the activity is.
- Objectives, expected outcomes, source of funding, methods to be employed, output usage, risks and benefits should be shared to the community prior to conducting research. Their rights and responsibilities should also be shared. Designers should be open and honest, frank and realistic about research constraints and outcomes, do not make false promises, do not raise unreasonable or unrealistic expectations.
- Informed consent should be obtained. Preferably a written statement in the local language, but if most participants are illiterate, verbal consent is more ethically appropriate. Consent should be obtained for conducting the research activity, recording the activity, and using and sharing the – anonymised – outcomes.
- Designers should be aware of the risks and dangers that the research may pose to local communities and individuals and take appropriate action to eliminate them, in order to protect the weakest in a community. Participants' privacy should be protected. Data should be secured and anonymised in order to protect identities and locations of participants. It should be ensured that the data is protected from misuse and falling into the wrong hands. Designers should be careful to engage with organisations who might use research results against – certain members of – the participant community.
- Designers should conduct research that is sound, well-conducted and results in relevant and useful data, as it is unethical to incompetently invade participant's personal lives resulting in questionable data.
- Designers should recognise and respect people's sensitivities and rights, should not trick them into revealing dark, shameful, personal or sensitive information or feelings, should not be

intrusive or too demanding. The designers interests should not be placed ahead of those of the collaborators or the participants. Designers should not mine developing societies for data and should minimise social harm (e.g., intrusion, distress, indignity, physical discomfort, personal embarrassment, psychological harm) and maximize social benefit.

- Designers should be aware of their position, their background and training, power differentials, cultural distance, and the privileged position of power to influence situations through design, as these influence the way they think, the relationships with participants and the reactivity of participants.
- Designers should appreciate varying contexts, cultures, traditions, norms, mores, values, practices, systems and structures and be open to learn without judgement.
- Designers should try to limit inequalities: they should build local partnerships and collaborate on different levels, and try to contribute in a positive way, without making false promises.
- Designers should properly thank participants and local assistants, and provide appropriate compensation for time and effort taken. The research should not result in any material gain or loss for the participants. They should avoid making excessively high rates of payments, but provide appropriate compensation to participants and local assistants. Designers should provide gifts where this is culturally appropriate or expected, but should not end up in bribery or corruption. They should avoid exploitation of local assistants by providing them a fair return. The appropriate compensation can be discussed with local stakeholders.
- Designers should judge responses, but do so carefully. They should limit misinterpretation of outcomes due to preconceptions or misunderstandings, by triangulation, sharing of data, and consult stakeholders, participants and / or participant communities. They should be open about how interpretations are established.
- Designers should critically reflect on:
  o data limitations. E.g., regarding generalizability, errors;
  o method limitations. E.g., regarding the approach and methods used and the selection of participants;
  o designer limitations. E.g., regarding their position, established relationships, way of working, documentation, handling of delegated power, personal errors and mistakes;
  o project limitations. E.g., regarding the roles of participants, distributed power and agency.
- Designers should resist pressure from funding agencies or local authorities to make the outcomes match their needs or expectations: outcomes should be transparent, genuine and honest.
- Designers should make the research outputs available locally, ideally in a language and / or form that the communities can understand and use. This enhances transparency and openness, and facilitates mutual learning. Designers should acknowledge the contribution of everyone involved.
- Designers should provide follow-up / keep the people involved in an accessible and understandable manner, without making false promises.

Appendix C

Tips and tricks for questioning

These tips and tricks have been derived from: Martin and Hanington (2012); Narayanasamy (2013); FrogDesign (2012); IDEO (2008a); d.School (2013); Larsen and Flensborg (2011); Van Boeijen et al. (2013); Handwerker (2001); Chambers (2004); Johansson and Linde (2005); Beyer and Holtzblatt (1995); Freudenberger (1999); IDEO (2008b); Viitanen (2011); Barab et al. (2004). These tips and tricks can elaborately be found in chapter 3.

The recommendations for questioning are:
- *Pose questions that are*:
  o Neutral. Avoid steering participants' answers by implying a right or wrong answer, do not lead them towards an expected answer and avoid blaming questions which suggest the participant is wrong or at fault. Such oriented questions introduce bias;
  o Specific. Avoid using the word 'usually', but make questions more specific by asking about a specific instance or occurrence;
  o Naïve. Pretend you do not know to hear how people narrate things themselves;
  o Open-ended. To stimulate conversation and stories, questions should elicit answers that require more than one word. Open-ended questions often start with 'what?', 'when?', 'where?', 'who?', 'how?', and 'why?'. Why-questions make brings about reasons, intentions, and motivations, but often result in more abstract answering. 'How'-questions stimulate straightforward storytelling.
  o Simple, short and to the point;
- *Avoid questions that are*:
  o Insensitive;
  o Offensive;
  o Ambiguous;
  o Biased. Questions with built-in assumptions are not always corrected by participants, who might answer the question to please you;
  o Leading, blaming, or oriented;
  o Abstract, consider to explain them through a story;
  o Multiple questions in one;
  o Hypothetical;
- *Mind terminology.* Properly word and ask questions:
  o Avoid jargon and tricky language;
  o Avoid vague language that makes no sense to the participants;
  o Avoid terminology with multiple meanings attached to them that might different things to different participants;
  o Use local indicators and terminology;
- *Pose follow-up questions.* Probe into issues before continuing with the next topic. To improve understanding of how the participants view the world, it is useful to ask them why they say or do things;

- *Pose questions that stimulate description, discussion and depth.* Ask participants to tell more about a certain topic, echo answers in a question format, or retell answers or stories in order to stimulate further explanation and to elicit additional information;
- *Mix questions with discussions.*
- *Pose verifying questions.* Pose different types of questions about the same topic to verify participants' answers. Summarize answers to check understanding. Pay attention to and check inconsistencies and discrepancies, as they may hide interesting information. Admit confusion and ask for clarification;
- *Verify interpretations.* To avoid misinterpretation, check your interpretations of answers or observations by sharing them during the interview. Checking interpretations is not only useful for verification, but might also provide participants a starting point for providing additional insight;
- *Do not suggest answers.* Let the participants come up with answers themselves.

Questioning techniques

The following questioning techniques can be considered during interviewing to aid the designer to obtain deeper insight into the behaviour and reasoning of the participant and to provide information about aspirations and desires. These techniques are not obligatory to follow and are therefore not explicitly part of the ODK, but they can be useful to consider. These techniques have been derived from: (Barab et al. 2004; Gielen 2008; IDEO 2008b; Kensing, Simonsen, and Bødker 1998; Martin and Hanington 2012; Nesset and Large 2004; Park 2011).

These questioning techniques are:
- *The 'five why's'.* This technique means asking why five times in a row to probe deeper and detect underlying reasons for behaviour and attitudes.
- *'Directed storytelling'.* This technique means guiding the participant to tell a story about a certain topic with help from additional questions such as 'who?', 'what?', 'when?' 'where?' and 'how?'.
- *'Guided speculation'.* This technique means asking questions about hopes and fears for the future
- *'What-if-scenarios'.* This technique means putting forward scenarios or storylines for the participant to complete.
- *'Sacrificial concepts'.* If a question is abstract it can help to change the question to a concrete scenario with two options. For deeper insight the variables of the options can be changed.
- *'Talking diaries'.* Asking participants to describe important past events in their lives like reading from a diary.
- *'Thinking aloud'.* Asking participants to tell what they are doing and/or thinking when they are performing a specific task. This technique can, for example, be used during the scoring exercise.

Tips and tricks for 'What to pay attention to'

These tips and tricks have been derived from: Polak (2008); Van der Veer (2008); Diggins and Tolmie (2003); Beyer and Holtzblatt (1995); Handwerker (2001); FrogDesign (2012); IDEO (2008a);

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Narayanasamy (2013); Martin and Hanington (2012); d.School (2013); Beebe (2014); Pelto (2013); Liedtka (2011); Gielen (2008). These tips and tricks can elaborately be found in chapter 3.

Basically, learn everything there is to know. Relevant knowledge is not only with the participants, it is also present in the context. Try to understand the details of people's lives and practices and detect patterns and structure. Specific things to pay attention to are:

- Everything that is seen
  - Things that are physically present
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  - Unarticulated needs
  - Events and circumstances that shape experiences
  - Prior experiences, current experiences and how those are perceived and conceptualized
- Everything that is felt
  - Emotions, moments or things that participant react upon emotionally
  - Feelings
- Everything that is smelled
- Everything that is tasted
- Anything surprising: that changes assumptions or seems irrational
- Observable and explicit needs, but also tacit needs – which cannot be expressed verbally, and latent needs- which are subconscious. These can be detected by exercises where participants create or perform tasks.

Tips and tricks for selecting and instructing a translator

- Tips and tricks for selecting a translator: A translator should be selected based on having knowledge of the area, the local language and English. The translator should not have a stake in the research, but be interested in it. The translator's gender should preferably match the gender of the potential participant. Often, translators have to be paid for their services. Exceptions for

- Tips and tricks for instructing a translator: Designers should insist that the translator: properly translates both the questions and the participants' answers; should not rush the interview; should not interpret questions or answers; should not steer the participant by providing examples or indicating desired answers by tone or body language. The translator should, however, try to build rapport and show empathy. Designers should stress that a proper introduction and asking for consent are required for each interview.

C.4   Prerequisites, steps and guidelines 0.3

Below, the prerequisites, steps and guidelines of the CDD approach / ODK as established after the third iteration are listed.

Ten prerequisites

There are certain prerequisites regarding Capability Driven Design that are also relevant for using the ODK. These comprise the following:

A. *Multidisciplinary team.* In order to enhance data reliability and validity designers should triangulate data. Capability Driven Design already prescribes the use of multiple data sources, methods, tools and techniques, but to improve outcomes, team members from multiple disciplines should be included: designers with different backgrounds, skills and knowledge. This leads to a balanced perspective, access to a range of participants and speeding up of the process.

B. *Activities should be conducted in pairs.* In order to enhance data reliability and validity designers should triangulate data. Capability Driven Design already prescribes the use of multiple data sources, methods, tools and techniques, but to improve outcomes, activities should be conducted with multiple team members. By assigning one activity facilitator and one note taker, each of them can focus on their own specific task, while interpretations, experiences and perceptions can be compared, ensuring investigator triangulation. A third person can be added to take photographs or shoot video, but more people can overwhelm participants.

C. *In the field.* Potential users should be directly observed and interacted with in their natural settings in order to improve learning and understanding by building a shared language, capturing detail, gather concrete data, develop empathy and reduce bias and rationalization, filtering and distortion of information.

D. *Training.* In order to conduct sound, rigorous research that does not invade people's private lives in an incompetent way, and which results in valuable data, designers should have a solid and broad understanding of doing good research in the field. The research should be executed in a systematic, sceptical, ethical and rigorous manner and therefore need to follow a training to learn the right attitude, behaviour and questioning skills. Designers should also continuously examine their attitude, behaviour and questioning in order to improve upon them.

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E. *Participatory, simple and enjoyable activities.* Capability Driven Design techniques and tools can be tweaked by the designers to better fit their purpose. However, they should keep in mind that activities should be fun, interactive and simple in order to create an enabling atmosphere in which participants feel free to express themselves. It also aids to let participants perform tasks or to let them create things.

F. *Local partnerships.* Local partners are required in order to adjust quickly to the local circumstances, obtain information about the potential users, get advice on activities, gain access and build trust in communities. They can also aid in selecting participants and finding translators.

G. *Iterative data analysis.* As newly obtained information leads to new understanding, research goals and methods should be changed accordingly to obtain additional information. The research outcomes should therefore be analysed by the team after each activity to adjust the activities based on new insights.

H. *Sharing and checking outcomes.* The information, knowledge and interpretations should be shared with participants to point out misunderstanding and to improve data validity. If participants agree, they should also be shared with the community and local partners to keep stakeholders involved, enhance transparency and openness and improve data reliability.

I. *Critical reflection on limitations.* The data obtained, the methods used, the researchers involved and the project executed all have limitations and the researchers should reflect on them and be open and honest about them. For example about the generalizability of outcomes, errors in data collection, the role different people played in the process, and mistakes being made.

J. *Learn the themes and questions by heart.* In order to obtain broad insight into all aspects that comprise a person's life and context, the themes and topics are leading.

Fourteen steps

From the literature in chapter 3 and the selection of techniques, the steps that need to be executed in order to conduct semi-structured interviews are distilled. In total, they comprise seven steps which are the following:

1. *Get familiar with the ODK.* The team members must get acquainted with the flow and structure of the interview. This can be done by roleplaying the interview in the team, but also by conducting a local pilot in the field.

2. *Localize the content, if time permits.* To improve participants' understanding of the themes and to build relationships, the pictographs can be replaced by local visualizations. Be careful to select visualisations to which the participant can relate, but which do not steer the participant into a certain direction.

3. *Carefully select and properly instruct a translator (if required).* The translator should be thoroughly informed about the task at hand and his or her role. Go through all the themes and questions before the first interview so that the translator is fully acquainted with the interview flow and structure, the themes and key questions. Share the goals of the research and explain the rules.

4. *Select participants.* A local partner can aid in selecting participants. See the guidelines.

Prepare the interview:

5. *Assign roles.* Conduct the interview with at least two (a facilitator and a note taker / photographer) and a maximum of three researchers, and assign roles beforehand to clarify the purpose for each researcher.

6. *Decide on time and place.* Time and place of the interview should be at convenient to the participants and preferably conducted in their local context.

Conduct the interview:

7. *Introduce.* Introduce the design project, the interview, the translator and yourselves. Participants should be informed about the research and its goals. Giving your introduction in the local language helps to build rapport and to relax the atmosphere. It is important to be clear about compensation to set the right expectations for participants. People can be compensated for invested time or expenses, but if people start to ask for money, it is better to stop the interview. It must be noted that for some types of research it can be correct to pay participants, but for this type of research it is important that money does not become the incentive to participate. Communicate openness and being non-threatening, stress that there are no wrong answers and that not all questions have to be answered. Explain the participant that he or she is free to leave. Make the participants feel relevant in their roles by sharing yourself, verbally or with help from pictures. Try to limit the influence of audience.

8. *Ask for informed consent.* Ask for consent to record the interview, to take pictures and to use the data. Stress that participants are not obliged to participate, and can withdraw from the activity at any time.

9. *Ask for the participant's introduction.* Asking participants to say something about themselves provides an easy start and shows interest.

10. *Conduct a touchstone tour.* Let the participant show you around in their home or the environment where the interview is conducted. Use the show me technique: let the participants show you objects, spaces and tools.

11. *Sit down and…*

    a. *For the facilitator: …build dialogue.*

        ➢ *Start with personal details.* Ask the participant's name, age, place of residence and religion.

        ➢ *Continue with the timeline.* Ask what the participants do during a day. The timeline can be combined with the visualization cards and erasable markers to create an overview of their day. Try to let participants create, but if they are unwilling to do so, the note taker can draw or visualize the participant's answers.

        ➢ *Continue with the question cards.* Use the drawing sheet, the visualization cards and the erasable markers to visualize the participant's answers. Start with the current situation for one theme and from that point ask about changes in the past and aspirations for the future, before continuing to the next theme or topic. When discussing a theme, explain what the pictograph / local visualization is about. Again, try to let participants create, if they are unwilling to do so, the note taker can draw or visualize the participant's answers.

There is no indicated order for discussing the themes, although 'Accommodation' is an easy theme to start with. The questions for each theme are mere options for starting conversations than exact questions that need to be asked. However, the questions should be kept general enough to stimulate conversation, and focused enough to reveal the desired information. Questions can be left out and for each theme it is also important to ask questions in different ways, to pose questions about topics and experiences that come up during the conversation.

➢ *Conclude the conversation with the sorting exercise.* Use the sorting cards and let participants place these cards on the ranking sheet, based on their importance: not important (.), less important (!), important (!!) or very important (!!!). For each sorting card, explain what the pictograph / local visualization means. The sorting exercise works as a confirmation of the things being told during the interview and provides insight in what and how participants value.

b. *For the note-taker: …document.* Record the interview, take notes and photographs.

12. *Thank the participant.* Thank participants for their invested time and effort and for sharing personal information. Bring a small gift to show appreciation. Providing a tangible gift allows the participant to show the gift to other people.

Process the outcomes:

13. *Document.* Note down anything surprising directly after each interview.

14. *Analyse, interpret and reflect with the team.* Share all information with the full design team after each interview. Analyse, interpret and reflect on the insights with the full team, and use the outcomes during the following interviews.

When using the ODK, all fourteen steps should be followed and step 5 to 14 should be repeated for each interview.

CDD guidelines

The following six guidelines designers are advised to follow when using the CDD approach:

A. *Select a variety of participants with different characteristics.* Variety in gender, social class and age are especially important to include. Be aware to not only select participants that are easy to access.

B. *Appropriate behaviour and attitude.* All team members should follow the tips and tricks for 'appropriate behaviour and attitude'. See: tips & tricks.

C. *Appropriate questioning.* The facilitator(s) should be trained on qualitative research skills (prerequisite). In order to guide them, the tips & tricks regarding 'appropriate questioning' should be followed. See: 'tips & tricks'.

D. *Document everything.* Note down characteristics of the participant (e.g., name, gender, social class, religion, age, occupation), of the activity (e.g., type of activity, the people present, date and location, materials used), and of everything that is seen, heard, felt, smelled, tasted, and / or surprising. Follow the tips and tricks for 'what to pay attention to'. See: tips & tricks.

E. *Bring along the required supplies.* The materials for the activities, recording devices, a notebook and pen should be brought along to the interview. Consider bringing pictures of yourself and your surroundings, as well as food, gifts and / or compensation for the participants.

F. *Select and instruct a translator.* The tips and tricks for selecting and instructing a translator should be followed. See: 'tips & tricks'.

ODK guidelines

The following five guidelines designers are advised to follow when conducting ODK interviews:

A. *Flexible but focused conversations.* The ODK provides steps, themes and guiding questions, but there is room for flexibility and unexpected turns in order to stimulate dialogue. There is no indicated order indicated for addressing the themes. Do not ask questions from a script, and feel free to add or change questions. The interview should feel like an open-ended, dynamic conversation to make participants feel comfortable. It is important to continue dialogue regarding topics that seem to be of interest to the participant, and regarding surprising, idiosyncratic or contradictory responses or behaviour from the participant. It might be useful to hide the list of questions and to learn the key questions by heart or keep them out of sight. Do, however, exert some control over activity topics.

B. *Duration of interviews.* The interview should be sufficiently long to make participants feel to make participants feel they are being heard, but should not continue too long resulting in participants becoming tired and disinterested. End activities when no questions are left, or when you feel like delaying a participant. The ODK interview is scheduled to last between 1.5 and 3 hours. The participants should be properly informed before the interview about how much time the activity will take, before they give their consent. Participants can be compensated for their time, for example by providing food or compensate for expenses, and a gift can be provided. If an interview takes longer, participants should be informed and asked for additional consent. The participants can be offered a compensation for continuing the interview. If the participant is not willing to continue longer, the interview should be concluded.

C. *Number of interviews.* The objective of the ODK interviews is to get to know people's available and valued beings and doings, and to become inspired. For the ODK interviews the number will depend on the amount of time and resources available, but should depend mainly on the context, the results and the variety of participants that can be included.

D. *Consider to use specific questioning techniques.* These techniques are: 'Five Why's', 'Directed Storytelling', 'Guided Speculation', 'What-if-scenarios', 'Sacrificial Concepts', 'Talking Diaries', and 'Thinking Aloud' and are described under 'questioning techniques'.

E. *Dealing with sensitive questions.* Sensitivity differs per culture, so it might be that the questions you think are sensitive, are not sensitive to the participant. Your own assumptions and feelings towards questions should not be leading. Discuss the questions beforehand with a local partner to identify sensitivities Start with more general and easy to answer questions, and later in the interview, when rapport has been build, it might be possible to pose sensitive questions and probe broader and deeper. However, be understanding and sensitive towards the feelings of participants

and the potential of causing psychological harm for the participant. Try to rephrase a question when the participant is hesitant to answer it, or ignore the question if it leads to an uncomfortable situation.

Tips and tricks for behaviour and attitude

These tips and tricks have been derived from: Larsen and Flensborg (2011); Viitanen (2011); IDEO (2008a); Beyer and Holtzblatt (1995); Narayanasamy (2013); Handwerker (2001); Barab et al. (2004); Simanis and Hart (2008); Verdu-Isachsen (2012); Naidoo (2012); Beebe (2014); Chambers (2004); Pelto (2013); Van Boeijen et al. (2013); Kapoor (2012); d.School (2010); Von der Lippe (2012); IDEO (2008b); Johansson and Messeter (2005); Polak (2008); Ramberg (2012); Sperschneider and Bagger (2003); Martin and Hanington (2012); FrogDesign (2012); Freudenberger (1999); Nesset and Large (2004); Smart and Whiting (2001). These tips and tricks can elaborately be found in chapter 3.

The recommendations for designers' behaviour and attitude are:
- *Minimise hierarchy.* In order to minimise hierarchical perceptions:
  - Sit at the same height level as the participants;
  - Do not sit together if you are with more than one person;
  - Wear casual clothing with the same status as participants, which does not mean identical clothing
  - Avoid organization-branded clothing.
- *Build rapport.* Build relationships and trust with potential users early in the process and make them appreciate the work being done. This stimulates becoming accepted and motivates collaboration, resulting in a better understanding. It takes time to win trust and build rapport and this time should be taken in order to stimulate opening up of potential participants. To fasten the process of building rapport, follow the following tips:
  - Be aware of potential codes of behaviour;
  - Explain who you are;
  - Seek and listen carefully;
  - Demonstrate commitment;
  - Show respect towards the people, their culture, their customs, attitudes, beliefs and their way of life;
  - Do not criticize, correct or judge participants, but try to understand their perceptions and underlying reasons, appreciate how people live their lives;
  - Show humility;
  - Show interest;
  - Be honest;
  - Be open and clear about intentions and do not make false promises;
  - Develop a collaborative dialogue;
  - Be ready to learn and ask to be taught. Invite and answer questions;

- o Share yourself. By sharing personal experiences an open atmosphere is created that allows for vulnerability and gossip;
- o Share information, ideas and food;
- o Accept and give gifts if appropriate.

- *Demonstrate willingness to learn.* Go into the field with the recognition that indigenous knowledge is essential. Do not act as the expert knowing what is best and do not impose theories and insights on participants, but instead be willing to admit ignorance and threat the participants as the experts who should feel that the designers are open to learn from them, that their knowledge is relevant. Gain appreciation for the people, culture, customs and the way people live their lives and do not correct them.

- *Start with an open mind.* You are an 'outsider' who probably speaks a different language and has different perceptions of meanings due to different life experiences and cultures. Try to understand the insiders' perspective, learn about the categories that local people use to describe situations and inquire about local perceptions of the meaning of important denominators. Learn to think different about the world. To avoid carrying assumptions, it is important to enter the field with an open mind, willing to learn. Put aside what you know and look with fresh eyes, think like a child. Pay attention to detail, question everything, be truly curious, do not judge, look for interesting threads and themes that come up and truly listen. Even if you think you know the answer, pretend you do not know.

- *Listen with genuine interest.* Listen actively and attentively with genuine interest, enthusiasm and curiosity, without thinking about the next question or comment.

- *Encourage answering.* Encourage answering verbally and nonverbally. Say things like 'mmmm', 'uh-huh', 'I see' or 'really?', and use body language, such as head nodding, attentive forward leaning, and smiling.

- *Mind your body language.* While body language can be used to encourage participants to share stories, it can also communicate disinterest or lack of commitment. Be aware and careful about body language and keep an appropriate amount of eye contact.

- *Pay attention to body language.* Decide how to continue an activity based upon non-verbal behaviour of the participant.

- *Stimulate storytelling.* Stories indicate how participants think about the world. Do therefore not try to make participants answer brief and concise, but encourage them to tell stories in their own way - in all its complexity.

- *Encourage sharing of details and context.* Stimulate participants to share details and context to help you to understand which experiences have been significant to them and why they have been significant.

- *Sympathize.* Even if you do not agree, it might be useful to sympathize with the participant in order to make the participant open up more.

- *Limit interruption.* Play an active role in engaging users, but do not interrupt or rush them. Listen first and then talk. Do not be afraid of silence. Give prerticipants the time to reflect, think and respond. However, do not let pauses become awkward.

Appendix C

- *Mind habitual behaviour.* Behave as an apprentice, do not lapse into the role of interviewer, expert or personal friend.
- *Avoid abstract talking.* When participants start to talk in abstract terms, make them talk about actual experiences again. It might be useful to ask participants about concrete examples.
- *Make it relaxed.* The activities need to be conducted within limited time, but this does not mean that they should be rushed. Instead, interactions should be relaxed and conducted with commitment.
- *Learn from failures.* Things will not always go as anticipated. When things go wrong, learn from those failures and start building new plans based on the failed ones.

Tips and tricks for ethical behaviour

- The participant community should be central in the research process, the research should be participatory and conducted with respect for everyone, regardless of ethnicity, culture, religion, gender, class, sexual orientation, disability etc. The first responsibility is towards the participant community: their interests should be central to the study. Do not use your power to the disadvantage of participants, act responsibly.
- Different participants should be included in the research, not only the ones who are easily accessible.
- Permission to conduct research should be obtained, follow formal requirements and procedures. Review obligations of research plans in the designers' home country and in the country under study should be checked.
- Designers should explain who they are, what the nature and goals of the research are and what the programme and purpose of the activity is.
- Objectives, expected outcomes, source of funding, methods to be employed, output usage, risks and benefits should be shared to the community prior to conducting research. Their rights and responsibilities should also be shared. Designers should be open and honest, frank and realistic about research constraints and outcomes, do not make false promises, do not raise unreasonable or unrealistic expectations.
- Informed consent should be obtained. Preferably a written statement in the local language, but if most participants are illiterate, verbal consent is more ethically appropriate. Consent should be obtained for conducting the research activity, recording the activity, and using and sharing the – anonymised – outcomes.
- Designers should be aware of the risks and dangers that the research may pose to local communities and individuals and take appropriate action to eliminate them, in order to protect the weakest in a community. Participants' privacy should be protected. Data should be secured and anonymised in order to protect identities and locations of participants. It should be ensured that the data is protected from misuse and falling into the wrong hands. Designers should be careful to engage with organisations who might use research results against – certain members of – the participant community.

- Designers should conduct research that is sound, well-conducted and results in relevant and useful data, as it is unethical to incompetently invade participant's personal lives resulting in questionable data.

- Designers should recognise and respect people's sensitivities and rights, should not trick them into revealing dark, shameful, personal or sensitive information or feelings, should not be intrusive or too demanding. The designers interests should not be placed ahead of those of the collaborators or the participants. Designers should not mine developing societies for data and should minimise social harm (e.g., intrusion, distress, indignity, physical discomfort, personal embarrassment, psychological harm) and maximize social benefit.

- Designers should be aware of their position, their background and training, power differentials, cultural distance, and the privileged position of power to influence situations through design, as these influence the way they think, the relationships with participants and the reactivity of participants.

- Designers should appreciate varying contexts, cultures, traditions, norms, mores, values, practices, systems and structures and be open to learn without judgement.

- Designers should try to limit inequalities: they should build local partnerships and collaborate on different levels, and try to contribute in a positive way, without making false promises.

- Designers should properly thank participants and local assistants, and provide appropriate compensation for time and effort taken. The research should not result in any material gain or loss for the participants. They should avoid making excessively high rates of payments, but provide appropriate compensation to participants and local assistants. Designers should provide gifts where this is culturally appropriate or expected, but should not end up in bribery or corruption. They should avoid exploitation of local assistants by providing them a fair return. The appropriate compensation can be discussed with local stakeholders.

- Designers should judge responses, but do so carefully. They should limit misinterpretation of outcomes due to preconceptions or misunderstandings, by triangulation, sharing of data, and consult stakeholders, participants and / or participant communities. They should be open about how interpretations are established.

- Designers should critically reflect on:
  - data limitations. E.g., regarding generalizability, errors;
  - method limitations. E.g., regarding the approach and methods used and the selection of participants;
  - designer limitations. E.g., regarding their position, established relationships, way of working, documentation, handling of delegated power, personal errors and mistakes;
  - project limitations. E.g., regarding the roles of participants, distributed power and agency.

- Designers should resist pressure from funding agencies or local authorities to make the outcomes match their needs or expectations: outcomes should be transparent, genuine and honest.

- Designers should make the research outputs available locally, ideally in a language and / or form that the communities can understand and use. This enhances transparency and openness, and facilitates mutual learning. Designers should acknowledge the contribution of everyone involved.

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- Designers should provide follow-up / keep the people involved in an accessible and understandable manner, without making false promises.

Tips and tricks for questioning

These tips and tricks have been derived from: Martin and Hanington (2012); Narayanasamy (2013); FrogDesign (2012); IDEO (2008a); d.School (2013); Larsen and Flensborg (2011); Van Boeijen et al. (2013); Handwerker (2001); Chambers (2004); Johansson and Linde (2005); Beyer and Holtzblatt (1995); Freudenberger (1999); IDEO (2008b); Viitanen (2011); Barab et al. (2004). These tips and tricks can elaborately be found in chapter 3.

The recommendations for questioning are:

- *Pose questions that are*:
  - Neutral. Avoid steering participants' answers by implying a right or wrong answer, do not lead them towards an expected answer and avoid blaming questions which suggest the participant is wrong or at fault. Such oriented questions introduce bias;
  - Specific. Avoid using the word 'usually', but make questions more specific by asking about a specific instance or occurrence;
  - Naïve. Pretend you do not know to hear how people narrate things themselves;
  - Open-ended. To stimulate conversation and stories, questions should elicit answers that require more than one word. Open-ended questions often start with 'what?', 'when?', 'where?', 'who?', 'how?', and 'why?'. Why-questions make brings about reasons, intentions, and motivations, but often result in more abstract answering. 'How'-questions stimulate straightforward storytelling.
  - Simple, short and to the point;
- *Avoid questions that are*:
  - Insensitive;
  - Offensive;
  - Ambiguous;
  - Biased. Questions with built-in assumptions are not always corrected by participants, who might answer the question to please you;
  - Leading, blaming, or oriented;
  - Abstract, consider to explain them through a story;
  - Multiple questions in one;
  - Hypothetical;
- *Mind terminology.* Properly word and ask questions:
  - Avoid jargon and tricky language;
  - Avoid vague language that makes no sense to the participants;
  - Avoid terminology with multiple meanings attached to them that might different things to different participants;
  - Use local indicators and terminology;

- *Pose follow-up questions*. Probe into issues before continuing with the next topic. To improve understanding of how the participants view the world, it is useful to ask them why they say or do things;
- *Pose questions that stimulate description, discussion and depth*. Ask participants to tell more about a certain topic, echo answers in a question format, or retell answers or stories in order to stimulate further explanation and to elicit additional information;
- *Mix questions with discussions.*
- *Pose verifying questions*. Pose different types of questions about the same topic to verify participants' answers. Summarize answers to check understanding. Pay attention to and check inconsistencies and discrepancies, as they may hide interesting information. Admit confusion and ask for clarification;
- *Verify interpretations*. To avoid misinterpretation, check your interpretations of answers or observations by sharing them during the interview. Checking interpretations is not only useful for verification, but might also provide participants a starting point for providing additional insight;
- *Do not suggest answers*. Let the participants come up with answers themselves.

Questioning techniques

The following questioning techniques can be considered during interviewing to aid the designer to obtain deeper insight into the behaviour and reasoning of the participant and to provide information about aspirations and desires. These techniques are not obligatory to follow and are therefore not explicitly part of the ODK, but they can be useful to consider. These techniques have been derived from: (Barab et al. 2004; Gielen 2008; IDEO 2008b; Kensing, Simonsen, and Bødker 1998; Martin and Hanington 2012; Nesset and Large 2004; Park 2011).

These questioning techniques are:
- *The 'five why's'*. This technique means asking why five times in a row to probe deeper and detect underlying reasons for behaviour and attitudes.
- *'Directed storytelling'*. This technique means guiding the participant to tell a story about a certain topic with help from additional questions such as 'who?', 'what?', 'when?' 'where?' and 'how?'.
- *'Guided speculation'*. This technique means asking questions about hopes and fears for the future
- *'What-if-scenarios'*. This technique means putting forward scenarios or storylines for the participant to complete.
- *'Sacrificial concepts'*. If a question is abstract it can help to change the question to a concrete scenario with two options. For deeper insight the variables of the options can be changed.
- *'Talking diaries'*. Asking participants to describe important past events in their lives like reading from a diary.
- *'Thinking aloud'*. Asking participants to tell what they are doing and/or thinking when they are performing a specific task. This technique can, for example, be used during the scoring exercise.

Tips and tricks for 'What to pay attention to'

Appendix C

These tips and tricks have been derived from: Polak (2008); Van der Veer (2008); Diggins and Tolmie (2003); Beyer and Holtzblatt (1995); Handwerker (2001); FrogDesign (2012); IDEO (2008a); Narayanasamy (2013); Martin and Hanington (2012); d.School (2013); Beebe (2014); Pelto (2013); Liedtka (2011); Gielen (2008). These tips and tricks can elaborately be found in chapter 3.

Basically, learn everything there is to know. Relevant knowledge is not only with the participants, it is also present in the context. Try to understand the details of people's lives and practices and detect patterns and structure. Specific things to pay attention to are:

- Everything that is seen
  - Things that are physically present
  - Objects participants care about
  - Body language
  - Factual behaviour and things that change behaviour
  - Interactions with the environment
  - Adaptations and work-arounds
- Everything that is heard
  - Language, vocabulary, words and categories
  - Expressions
  - Motivations
  - Perceptions
  - Issues, difficulties or obstacles
  - Interactions
  - Social actors
  - Unarticulated needs
  - Events and circumstances that shape experiences
  - Prior experiences, current experiences and how those are perceived and conceptualized
- Everything that is felt
  - Emotions, moments or things that participant react upon emotionally
  - Feelings
- Everything that is smelled
- Everything that is tasted
- Anything surprising: that changes assumptions or seems irrational
- Observable and explicit needs, but also tacit needs – which cannot be expressed verbally, and latent needs- which are subconscious. These can be detected by exercises where participants create or perform tasks.

Tips and tricks for selecting and instructing a translator

- Tips and tricks for selecting a translator: A translator should be selected based on having knowledge of the area, the local language and English. The translator should not have a stake in the research, but be interested in it. The translator's gender should preferably match the gender of

the potential participant. Often, translators have to be paid for their services. Exceptions for paying a translator are, for example, when translators are connected to the project or paid for by the partner organisation.

- Tips and tricks for instructing a translator: Designers should insist that the translator: properly translates both the questions and the participants' answers; should not rush the interview; should not interpret questions or answers; should not steer the participant by providing examples or indicating desired answers by tone or body language. The translator should, however, try to build rapport and show empathy. Designers should stress that a proper introduction and asking for consent are required for each interview.

C.5   Prerequisites, steps and guidelines 1.0

Below, the prerequisites, steps and guidelines of the CDD approach / ODK as established after the fourth and final iteration are listed.

Ten prerequisites

There are certain prerequisites regarding Capability Driven Design that are also relevant for using the ODK. These comprise the following:

A. *Multidisciplinary team.* In order to enhance data reliability and validity designers should triangulate data. Capability Driven Design already prescribes the use of multiple data sources, methods, tools and techniques, but to improve outcomes, team members from multiple disciplines should be included: designers with different backgrounds, skills and knowledge. This leads to a balanced perspective, access to a range of participants and speeding up of the process.

B. *Activities should be conducted in pairs.* In order to enhance data reliability and validity designers should triangulate data. Capability Driven Design already prescribes the use of multiple data sources, methods, tools and techniques, but to improve outcomes, activities should be conducted with a minimum of two persons, even when the researchers are familiar to the ODK and bring recording devices. By assigning one activity facilitator and one note taker, each of them can focus on their own specific task, while interpretations, experiences and perceptions can be compared, ensuring investigator triangulation and improved data reliability. A third person can be added to take photographs or shoot video, but more people can overwhelm participants.

C. *In the field.* Potential users should be directly observed and interacted with in their natural settings in order to improve learning and understanding by building a shared language, capturing detail, gather concrete data, develop empathy and reduce bias and rationalization, filtering and distortion of information. Preferably, the design team will be in the field throughout the design project, but if that is not possible, at least at the beginning, prior to problem definition, and during prototyping, in order to obtain feedback and make adjustments to the design.

D. *Training.* In order to conduct sound, rigorous research that does not invade people's private lives in an incompetent way, and which results in valuable data, designers should have a solid and broad understanding of doing good research in the field. The research should be executed in a

systematic, sceptical, ethical and rigorous manner. Therefore, designers need to follow a training to learn the right attitude, behaviour and questioning skills. Designers should also continuously examine their attitude, behaviour and questioning in order to improve upon them.

E. *Participatory, simple and enjoyable activities.* Capability Driven Design techniques and tools can be tweaked by the designers to better fit their purpose. However, they should keep in mind that activities should be fun, interactive and simple in order to create an enabling atmosphere in which participants feel free to express themselves. It also aids to let participants perform tasks or to let them create things.

F. *Local partnerships.* Local partners are required in order to adjust quickly to the local circumstances, obtain information about the potential users and community structures, get advice on activities, help figuring out what to do, be properly introduced in the community, help provide access to an unbiased selection of participants, build trust in communities, and to be properly introduced to the local people. They can also aid in selecting participants and finding translators. A community partner should be someone who understands local things and is respected by the people.

G. *Iterative data analysis.* As newly obtained information leads to new understanding, research goals and methods should be changed accordingly to obtain additional information. The research outcomes should therefore be analysed by the team after each activity to adjust the activities based on new insights.

H. *Sharing and checking outcomes.* The information, knowledge and interpretations should be shared with participants to point out misunderstanding and to improve data validity. If participants agree, they should also be shared with the community and local partners to keep stakeholders involved, enhance transparency and openness and improve data reliability.

I. *Critical reflection on limitations.* The data obtained, the methods used, the researchers involved and the project executed all have limitations and the researchers should reflect on them and be open and honest about them. For example about the generalizability of outcomes, errors in data collection, the role different people played in the process, and mistakes being made.

J. *Learn the themes and questions by heart.* In order to obtain broad insight into all aspects that comprise a person's life and context, the themes and topics are leading.

Sixteen steps

From the literature in chapter 3 and the selection of techniques, the steps that need to be executed in order to conduct semi-structured interviews are distilled. In total, they comprise seven steps which are the following:

1. *Get familiar with the ODK*. The team members must get acquainted with the flow and structure of the interview. By being familiar with the themes and questions, it is easier to switch between them, offering flexibility which improves dialogue building. Roleplay the interview within the team.

2. *Obtain meso and macro data beforehand.* To get out the most from the ODK interviews, it is important to become familiar with general information about the potential users and their

context, such as political systems, 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 gathered from internet and literature searches, by consulting people from the area, people who have worked in the area, and people who are familiar with 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. Thereby, by collecting information designers have to be aware not to become biased and take along assumptions and preconceptions.

3. *Localize the content, if time permits.* Locally discuss the ODK contents beforehand. As accents, words, expressions, dialects and pronunciations might be different, and words might mean different things in different regions, it is important to make sure the translator and the participant have the same understanding of themes and questions. To adjust wordings to local dialects and to become aware of sensitivities, it is important to discuss the themes and topics with people familiar to the potential users and their context. To improve participants' understanding of the themes and to build relationships, the pictographs can be replaced by local visualizations. Be careful to select visualisations to which the participant can relate, but which do not steer the participant into a certain direction.

4. *Carefully select and properly instruct a translator (if required).* The translator should be thoroughly informed about the task at hand and his or her role. Share the goals of the research and explain the rules. The translator should also get acquainted with the ODK content and procedure. If step 5 (conduct a local pilot) is not feasible: go through all the themes and questions before the first interview to get the translator acquainted with the interview flow and structure, the themes and key questions.

5. *Conduct a local pilot in the field.* By conducting a pilot, the designer becomes familiar with the ODK content and procedure. This pilot can be done in the home country, but by conducting a local pilot, sensitivities and terminology becomes clear. Especially when using a translator, it is relevant to conduct the pilot locally, as in this way the translator also becomes familiar with the ODK content and procedure.

6. *Select participants.* A local partner can aid in selecting participants. See the guidelines.

Prepare the interview:

7. *Assign roles.* Conduct the interview with at least two (a facilitator and a note taker / photographer) and a maximum of three researchers, and assign roles beforehand to clarify the purpose for each researcher.

8. *Decide on time and place.* Time and place of the interview should be at convenient to the participants and preferably conducted in their local context.

Conduct the interview:

9. *Introduce.* Introduce the design project, the interview, the translator and yourselves. Giving your introduction in the local language helps to build rapport and to relax the atmosphere. Participants should be informed about the research, its goals and about the interview. In order to manage participant and translator expectations, clarify how much time the interview will approximately

take, based on the local pilot. It is important to be clear about compensation to set the right expectations for participants. People can be compensated for invested time or expenses, but if people start to ask for money, it is better to stop the interview. It must be noted that for some types of research it can be correct to pay participants, but for this type of research it is important that money does not become the incentive to participate. Communicate openness and being non-threatening, stress that there are no wrong answers and that not all questions have to be answered. Explain the participant that he or she is free to leave. Make the participants feel relevant in their roles by sharing yourself, verbally or with help from pictures. Try to limit the influence of audience.

10. *Ask for informed consent*. Ask for consent to record the interview, to take pictures and to use the data. Stress that participants are not obliged to participate, and can withdraw from the activity at any time.

11. *Ask for the participant's introduction*. Asking participants to say something about themselves provides an easy start and shows interest.

12. *Conduct a touchstone tour*. Let the participant show you around in their home or the environment where the interview is conducted. Use the show me technique: let the participants show you objects, spaces and tools.

13. *Sit down and…*

    a. *For the facilitator: …build dialogue.*

       ➢ *Start with personal details.* Ask the participant's name, age, place of residence and religion. Share pictures that you brought from your home country. Be aware that the pictures can also emphasise power differences, and therefore carefully select those pictures. It is important to connect to the local people and become comfortable with each other. Look at the tips & tricks for appropriate behaviour and attitude to help you to build a comfortable and relaxed atmosphere. Have an open mind and do not assume anything.

       ➢ *Continue with the timeline*. Ask what the participants do during a day. The timeline can be combined with the visualization cards and erasable markers to create an overview of their day. Try to let participants create, but if they are unwilling to do so, the note taker can draw or visualize the participant's answers.

       ➢ *Continue with the question cards.* Use the drawing sheet, the visualization cards and the erasable markers to visualize the participant's answers. Start with the current situation for one theme and from that point ask about changes in the past and aspirations for the future, before continuing to the next theme or topic. When discussing a theme, explain what the pictograph / local visualization is about. Again, try to let participants create, if they are unwilling to do so, the note taker can draw or visualize the participant's answers. There is no indicated order for discussing the themes, although 'Accommodation' is an easy theme to start with. It is useful to start with the themes and questions that the participants find important. The questions for each theme are mere options for starting conversations than exact questions that need to be asked. However, the questions should be kept general enough to stimulate conversation, and focused enough to reveal the

desired information. Questions can be left out and for each theme it is also important to ask questions in different ways, to pose questions about topics and experiences that come up during the conversation.

➢ *Conclude the conversation with the sorting exercise.* Use the sorting cards and let participants place these cards on the ranking sheet, based on their importance: not important (.), less important (!), important (!!) or very important (!!!). For each sorting card, explain what the pictograph / local visualization means. The sorting exercise works as a confirmation of the things being told during the interview and provides insight in what and how participants value.

b. *For the note-taker: …document.* Record the interview, take notes and photographs.

14. *Thank the participant.* Thank participants for their invested time and effort and for sharing personal information. Bring a small gift to show appreciation. Providing a tangible gift allows the participant to show the gift to other people. Compensation, food and gifts,depend on the context, and on the duration of the interview. It is important to find out what the people in the area find valuable. This can be decided on in collaboration with local partners.

Process the outcomes:

15. *Document.* Note down anything surprising directly after each interview, before things become 'normal' to you, which makes you unaware of them. The notes aid to detect design opportunities and to communicate outcomes to team members. Look at the tips & tricks about 'what to pay attention to'.

16. *Analyse, interpret and reflect with the team.* Share all information with the full design team after each interview. Analyse, interpret and reflect on the insights with the full team, and use the outcomes during the following interviews.

When using the ODK, all sixteen steps should be followed and step 7 to 16 should be repeated for each interview.

CDD guidelines

The following eight guidelines designers are advised to follow when using the CDD approach:

A. *Select a variety of participants with different characteristics.* Variety in gender, social class and age are especially important to include. Be aware to not only select participants that are easy to access to avoid bias. It is, however, not always possible to talk to an unbiased sample of participants, as some people are difficult or even impossible to reach. It often depends on the community partner what is possible.

B. *Appropriate behaviour and attitude.* All team members should follow the tips and tricks for 'appropriate behaviour and attitude'. It is important to have an open mind, to build trust, to respect participants and their time, to treat them as experts and to truly listen without beliefs, biases, and making assumptions. See: 'tips & tricks'.

C. *Appropriate questioning.* The facilitator(s) should be trained on qualitative research skills (prerequisite). In order to guide them, the tips & tricks regarding 'appropriate questioning' should be followed. See: 'tips & tricks'.

D. *Observe, listen, and document everything.* Note down characteristics of the participant (e.g., name, gender, social class, religion, age, occupation), of the activity (e.g., type of activity, the people present, date and location, materials used), and of everything that is seen, heard, felt, smelled, tasted, and / or surprising. Observations during the interviews are a useful means to check and interpret answers, and valuable when starting and continuing the dialogue. Observe during the touchstone tour, but also observe the participant's behaviour and body language. Keep an eye on intonation. Follow the tips and tricks for 'what to pay attention to'. See: tips & tricks.

E. *Bring along the required supplies.* The materials for the activities, recording devices, a notebook and pen should be brought along to the interview. Consider bringing pictures of yourself and your surroundings, as well as food, gifts and / or compensation for the participants.

F. *Select, instruct and work with a translator.* A translator forms a disconnect between you and the participant, as participants often focus on the translator. This limits the building of rapport. Translators differ in motivation, understanding and skills. Therefore, the tips and tricks for selecting, instructing, and working with a translator should be followed. See: 'tips & tricks'. It is not always possible to control all translator characteristics, but with a proper instruction the translator can be guided to diminish his/her influence on the outcomes.

G. *Schedule more time than planned.* Things often take more time in the field, due to, for example, dependency on other people, differences in punctuality, religious breaks, unavailability of electricity, internet access or the required materials, limited infrastructure, and limited access to stakeholders.

H. *Be aware of your position.* Local people perceive you in a certain way. Because you are an 'outsider', you might be perceived as interesting to talk to, as a professional or expert, or you can be distrusted or not being taken seriously. It might even be dangerous to walk around and talk to people. It is important to be aware of the influence of age, gender and clothing, and how these are perceived by participants.

ODK guidelines

The following six guidelines designers are advised to follow when conducting ODK interviews:

A. *Time and place of the interview.* It is useful to conduct interviews at homes to combine interviews with observation and to create a comfortable setting.

B. *Flexible but focused conversations.* The ODK provides steps, themes and guiding questions, but there is room for flexibility and unexpected turns in order to stimulate dialogue. There is no indicated order indicated for addressing the themes. Do not ask questions from a script, and feel free to add or change questions. The interview should feel like an open-ended, dynamic conversation to make participants feel comfortable. It is important to continue dialogue regarding topics that seem to be of interest to the participant, and regarding surprising, idiosyncratic or contradictory responses or behaviour from the participant. It might be useful to hide the list of questions and to learn the key questions by heart or keep them out of sight. Do, however, exert some control over activity topics.

C. *Duration of interviews.* The interview should be sufficiently long to make participants feel to make participants feel they are being heard, but should not continue too long resulting in participants becoming tired and disinterested. Follow up on answers, but also keep focus: if focus is lost, the interview can become overly long without obtaining useful information. End the interview when no questions are left, or when you feel like delaying a participant. The ODK interview is scheduled to last between 1.5 and 2.5 hours. The participants should be properly informed before the interview about how much time the activity will take, before they give their consent. Participants can be compensated for their time, for example by providing food or compensate for expenses, and a gift can be provided. If an interview takes longer, participants should be informed and asked for additional consent. The participants can be offered a compensation for continuing the interview. If the participant is not willing to continue longer, the interview should be concluded.

D. *Number of interviews.* The objective of the ODK interviews is to get to know people's available and valued beings and doings, and to become inspired. For the ODK interviews the number will depend on the amount of time and resources available, but should depend mainly on the context, the results and the variety of participants that can be included.

E. *Consider to use specific questioning techniques.* These techniques are: 'Five Why's', 'Directed Storytelling', 'Guided Speculation', 'What-if-scenarios', 'Sacrificial Concepts', 'Talking Diaries', and 'Thinking Aloud' and are described under 'questioning techniques'.

F. *Dealing with sensitive questions.* Sensitivity differs per culture, so it might be that the questions you think are sensitive, are not sensitive to the participant. Your own assumptions and feelings towards questions should not be leading. Discuss the questions beforehand with a local partner to identify sensitivities Start with more general and easy to answer questions, and later in the interview, when rapport has been build, it might be possible to pose sensitive questions and probe broader and deeper. However, be understanding and sensitive towards the feelings of participants and the potential of causing psychological harm for the participant. Try to rephrase a question when the participant is hesitant to answer it, or ignore the question if it leads to an uncomfortable situation. Sensitive questions should not be forcefully asked, just because they are in the ODK. It is not always possible to obtain answers to all questions, but that is also not required. Participants must be free to share what they want and remain comfortable. An unwillingness to answer questions also provides valuable information.

Tips and tricks for behaviour and attitude

These tips and tricks have been derived from: Larsen and Flensborg (2011); Viitanen (2011); IDEO (2008a); Beyer and Holtzblatt (1995); Narayanasamy (2013); Handwerker (2001); Barab et al. (2004); Simanis and Hart (2008); Verdu-Isachsen (2012); Naidoo (2012); Beebe (2014); Chambers (2004); Pelto (2013); Van Boeijen et al. (2013); Kapoor (2012); d.School (2010); Von der Lippe (2012); IDEO (2008b); Johansson and Messeter (2005); Polak (2008); Ramberg (2012); Sperschneider and Bagger (2003); Martin and Hanington (2012); FrogDesign (2012); Freudenberger (1999); Nesset and Large (2004); Smart and Whiting (2001). These tips and tricks can elaborately be found in chapter 3.

Appendix C

The recommendations for designers' behaviour and attitude are:

- *Minimise hierarchy.* In order to minimise hierarchical perceptions:
  - Sit at the same height level as the participants;
  - Do not sit together if you are with more than one person;
  - Wear casual clothing with the same status as participants, which does not mean identical clothing
  - Avoid organization-branded clothing.
- *Build rapport.* Build relationships and trust with potential users early in the process and make them appreciate the work being done. This stimulates becoming accepted and motivates collaboration, resulting in a better understanding. It takes time to win trust and build rapport and this time should be taken in order to stimulate opening up of potential participants. To fasten the process of building rapport, follow the following tips:
  - Be aware of potential codes of behaviour;
  - Explain who you are;
  - Seek and listen carefully;
  - Demonstrate commitment;
  - Show respect towards the people, their culture, their customs, attitudes, beliefs and their way of life;
  - Do not criticize, correct or judge participants, but try to understand their perceptions and underlying reasons, appreciate how people live their lives;
  - Show humility;
  - Show interest;
  - Be honest;
  - Be open and clear about intentions and do not make false promises;
  - Develop a collaborative dialogue;
  - Be ready to learn and ask to be taught. Invite and answer questions;
  - Share yourself. By sharing personal experiences an open atmosphere is created that allows for vulnerability and gossip;
  - Share information, ideas and food;
  - Accept and give gifts if appropriate.
- *Demonstrate willingness to learn.* Go into the field with the recognition that indigenous knowledge is essential. Do not act as the expert knowing what is best and do not impose theories and insights on participants, but instead be willing to admit ignorance and threat the participants as the experts who should feel that the designers are open to learn from them, that their knowledge is relevant. Gain appreciation for the people, culture, customs and the way people live their lives and do not correct them.
- *Start with an open mind.* You are an 'outsider' who probably speaks a different language and has different perceptions of meanings due to different life experiences and cultures. Try to understand the insiders' perspective, learn about the categories that local people use to describe situations and

inquire about local perceptions of the meaning of important denominators. Learn to think different about the world. To avoid carrying assumptions, it is important to enter the field with an open mind, willing to learn. Put aside what you know and look with fresh eyes, think like a child. Pay attention to detail, question everything, be truly curious, do not judge, look for interesting threads and themes that come up and truly listen. Even if you think you know the answer, pretend you do not know.

- *Listen with genuine interest.* Listen actively and attentively with genuine interest, enthusiasm and curiosity, without thinking about the next question or comment.
- *Encourage answering.* Encourage answering verbally and nonverbally. Say things like 'mmmm', 'uh-huh', 'I see' or 'really?', and use body language, such as head nodding, attentive forward leaning, and smiling.
- *Mind your body language.* While body language can be used to encourage participants to share stories, it can also communicate disinterest or lack of commitment. Be aware and careful about body language and keep an appropriate amount of eye contact.
- *Pay attention to body language.* Decide how to continue an activity based upon non-verbal behaviour of the participant.
- *Stimulate storytelling.* Stories indicate how participants think about the world. Do therefore not try to make participants answer brief and concise, but encourage them to tell stories in their own way - in all its complexity.
- *Encourage sharing of details and context.* Stimulate participants to share details and context to help you to understand which experiences have been significant to them and why they have been significant.
- *Sympathize.* Even if you do not agree, it might be useful to sympathize with the participant in order to make the participant open up more.
- *Limit interruption.* Play an active role in engaging users, but do not interrupt or rush them. Listen first and then talk. Do not be afraid of silence. Give participants the time to reflect, think and respond. However, do not let pauses become awkward.
- *Mind habitual behaviour.* Behave as an apprentice, do not lapse into the role of interviewer, expert or personal friend.
- *Avoid abstract talking.* When participants start to talk in abstract terms, make them talk about actual experiences again. It might be useful to ask participants about concrete examples.
- *Make it relaxed.* The activities need to be conducted within limited time, but this does not mean that they should be rushed. Instead, interactions should be relaxed and conducted with commitment.
- *Learn from failures.* Things will not always go as anticipated. When things go wrong, learn from those failures and start building new plans based on the failed ones.

Tips and tricks for ethical behaviour
- The participant community should be central in the research process, the research should be participatory and conducted with respect for everyone, regardless of ethnicity, culture, religion,

gender, class, sexual orientation, disability etc. The first responsibility is towards the participant community: their interests should be central to the study. Do not use your power to the disadvantage of participants, act responsibly.

- Different participants should be included in the research, not only the ones who are easily accessible.

- Permission to conduct research should be obtained, follow formal requirements and procedures. Review obligations of research plans in the designers' home country and in the country under study should be checked.

- Designers should explain who they are, what the nature and goals of the research are and what the programme and purpose of the activity is.

- Objectives, expected outcomes, source of funding, methods to be employed, output usage, risks and benefits should be shared to the community prior to conducting research. Their rights and responsibilities should also be shared. Designers should be open and honest, frank and realistic about research constraints and outcomes, do not make false promises, do not raise unreasonable or unrealistic expectations.

- Informed consent should be obtained. Preferably a written statement in the local language, but if most participants are illiterate, verbal consent is more ethically appropriate. Consent should be obtained for conducting the research activity, recording the activity, and using and sharing the – anonymised – outcomes.

- Designers should be aware of the risks and dangers that the research may pose to local communities and individuals and take appropriate action to eliminate them, in order to protect the weakest in a community. Participants' privacy should be protected. Data should be secured and anonymised in order to protect identities and locations of participants. It should be ensured that the data is protected from misuse and falling into the wrong hands. Designers should be careful to engage with organisations who might use research results against – certain members of – the participant community.

- Designers should conduct research that is sound, well-conducted and results in relevant and useful data, as it is unethical to incompetently invade participant's personal lives resulting in questionable data.

- Designers should recognise and respect people's sensitivities and rights, should not trick them into revealing dark, shameful, personal or sensitive information or feelings, should not be intrusive or too demanding. The designers interests should not be placed ahead of those of the collaborators or the participants. Designers should not mine developing societies for data and should minimise social harm (e.g., intrusion, distress, indignity, physical discomfort, personal embarrassment, psychological harm) and maximize social benefit.

- Designers should be aware of their position, their background and training, power differentials, cultural distance, and the privileged position of power to influence situations through design, as these influence the way they think, the relationships with participants and the reactivity of participants.

- Designers should appreciate varying contexts, cultures, traditions, norms, mores, values, practices, systems and structures and be open to learn without judgement.

- Designers should try to limit inequalities: they should build local partnerships and collaborate on different levels, and try to contribute in a positive way, without making false promises.

- Designers should properly thank participants and local assistants, and provide appropriate compensation for time and effort taken. The research should not result in any material gain or loss for the participants. They should avoid making excessively high rates of payments, but provide appropriate compensation to participants and local assistants. Designers should provide gifts where this is culturally appropriate or expected, but should not end up in bribery or corruption. They should avoid exploitation of local assistants by providing them a fair return. The appropriate compensation can be discussed with local stakeholders.

- Designers should judge responses, but do so carefully. They should limit misinterpretation of outcomes due to preconceptions or misunderstandings, by triangulation, sharing of data, and consult stakeholders, participants and / or participant communities. They should be open about how interpretations are established.

- Designers should critically reflect on:
  o data limitations. E.g., regarding generalizability, errors;
  o method limitations. E.g., regarding the approach and methods used and the selection of participants;
  o designer limitations. E.g., regarding their position, established relationships, way of working, documentation, handling of delegated power, personal errors and mistakes;
  o project limitations. E.g., regarding the roles of participants, distributed power and agency.

- Designers should resist pressure from funding agencies or local authorities to make the outcomes match their needs or expectations: outcomes should be transparent, genuine and honest.

- Designers should make the research outputs available locally, ideally in a language and / or form that the communities can understand and use. This enhances transparency and openness, and facilitates mutual learning. Designers should acknowledge the contribution of everyone involved.

- Designers should provide follow-up / keep the people involved in an accessible and understandable manner, without making false promises.

Tips and tricks for questioning

These tips and tricks have been derived from: Martin and Hanington (2012); Narayanasamy (2013); FrogDesign (2012); IDEO (2008a); d.School (2013); Larsen and Flensborg (2011); Van Boeijen et al. (2013); Handwerker (2001); Chambers (2004); Johansson and Linde (2005); Beyer and Holtzblatt (1995); Freudenberger (1999); IDEO (2008b); Viitanen (2011); Barab et al. (2004). These tips and tricks can elaborately be found in chapter 3.

The recommendations for questioning are:

- *Pose questions that are*:

- o Neutral. Avoid steering participants' answers by implying a right or wrong answer, do not lead them towards an expected answer and avoid blaming questions which suggest the participant is wrong or at fault. Such oriented questions introduce bias;
- o Specific. Avoid using the word 'usually', but make questions more specific by asking about a specific instance or occurrence;
- o Naïve. Pretend you do not know to hear how people narrate things themselves;
- o Open-ended. To stimulate conversation and stories, questions should elicit answers that require more than one word. Open-ended questions often start with 'what?', 'when?', 'where?', 'who?', 'how?', and 'why?'. Why-questions make brings about reasons, intentions, and motivations, but often result in more abstract answering. 'How'-questions stimulate straightforward storytelling.
- o Simple, short and to the point;
- *Avoid questions that are*:
  - o Insensitive;
  - o Offensive;
  - o Ambiguous;
  - o Biased. Questions with built-in assumptions are not always corrected by participants, who might answer the question to please you;
  - o Leading, blaming, or oriented;
  - o Abstract, consider to explain them through a story;
  - o Multiple questions in one;
  - o Hypothetical;
- *Mind terminology.* Properly word and ask questions:
  - o Avoid jargon and tricky language;
  - o Avoid vague language that makes no sense to the participants;
  - o Avoid terminology with multiple meanings attached to them that might different things to different participants;
  - o Use local indicators and terminology;
- *Start with easy questions that are important to them.* Start with themes and questions that the participants find important. For example, if family is important to them, ask them about their family members and how they are doing first, before diving into the other themes.
- *Pose follow-up questions*. Probe into issues before continuing with the next topic. To improve understanding of how the participants view the world, it is useful to ask them why they say or do things;
- *Pose questions that stimulate description, discussion and depth*. Ask participants to tell more about a certain topic, echo answers in a question format, or retell answers or stories in order to stimulate further explanation and to elicit additional information;
- *Mix questions with discussions.*
- *Pose verifying questions*. Pose different types of questions about the same topic to verify participants' answers. Summarize answers to check understanding. Pay attention to and check

inconsistencies and discrepancies, as they may hide interesting information. Admit confusion and ask for clarification;

- *Verify interpretations.* To avoid misinterpretation, check your interpretations of answers or observations by sharing them during the interview. Checking interpretations is not only useful for verification, but might also provide participants a starting point for providing additional insight;

- *Do not suggest answers.* Let the participants come up with answers themselves.

Questioning techniques

The following questioning techniques can be considered during interviewing to aid the designer to obtain deeper insight into the behaviour and reasoning of the participant and to provide information about aspirations and desires. These techniques are not obligatory to follow and are therefore not explicitly part of the ODK, but they can be useful to consider. These techniques have been derived from: (Barab et al. 2004; Gielen 2008; IDEO 2008b; Kensing, Simonsen, and Bødker 1998; Martin and Hanington 2012; Nesset and Large 2004; Park 2011).

These questioning techniques are:

- *The 'five why's'.* This technique means asking why five times in a row to probe deeper and detect underlying reasons for behaviour and attitudes.

- *'Directed storytelling'.* This technique means guiding the participant to tell a story about a certain topic with help from additional questions such as 'who?', 'what?', 'when?' 'where?' and 'how?'.

- *'Guided speculation'.* This technique means asking questions about hopes and fears for the future

- *'What-if-scenarios'.* This technique means putting forward scenarios or storylines for the participant to complete.

- *'Sacrificial concepts'.* If a question is abstract it can help to change the question to a concrete scenario with two options. For deeper insight the variables of the options can be changed.

- *'Talking diaries'.* Asking participants to describe important past events in their lives like reading from a diary.

- *'Thinking aloud'.* Asking participants to tell what they are doing and/or thinking when they are performing a specific task. This technique can, for example, be used during the scoring exercise.

Tips and tricks for 'What to pay attention to'

These tips and tricks have been derived from: Polak (2008); Van der Veer (2008); Diggins and Tolmie (2003); Beyer and Holtzblatt (1995); Handwerker (2001); FrogDesign (2012); IDEO (2008a); Narayanasamy (2013); Martin and Hanington (2012); d.School (2013); Beebe (2014); Pelto (2013); Liedtka (2011); Gielen (2008). These tips and tricks can elaborately be found in chapter 3.

Basically, learn everything there is to know. Relevant knowledge is not only with the participants, it is also present in the context. Try to understand the details of people's lives and practices and detect patterns and structure. Specific things to pay attention to are:

- Everything that is seen

Appendix C

- o Things that are physically present
- o Objects participants care about
- o Body language
- o Factual behaviour and things that change behaviour
- o Interactions with the environment
- o Adaptations and work-arounds
- Everything that is heard
  - o Language, vocabulary, words and categories
  - o Expressions
  - o Motivations
  - o Perceptions
  - o Issues, difficulties or obstacles
  - o Interactions
  - o Social actors
  - o Unarticulated needs
  - o Events and circumstances that shape experiences
  - o Prior experiences, current experiences and how those are perceived and conceptualized
  - o Intonation
- Everything that is felt
  - o Emotions, moments or things that participant react upon emotionally
  - o Feelings
- Everything that is smelled
- Everything that is tasted
- Anything surprising: that changes assumptions or seems irrational
- Observable and explicit needs, but also tacit needs – which cannot be expressed verbally, and latent needs- which are subconscious. These can be detected by exercises where participants create or perform tasks.

Tips and tricks for selecting, instructing and working with a translator

- Tips and tricks for selecting a translator: A translator should be selected based on having knowledge of the area, the local language and English. The translator should not have a stake in the research, but be interested in it. The translator's gender should preferably match the gender of the potential participant. Often, translators have to be paid for their services. Exceptions for paying a translator are, for example, when translators are connected to the project or paid for by the partner organisation.
- Tips and tricks for instructing a translator: Designers should insist that the translator: properly translates both the questions and the participants' answers; should not rush the interview; should

not interpret questions or answers; should not steer the participant by providing examples or indicating desired answers by tone or body language. The translator should, however, try to build rapport and show empathy. Designers should stress that a proper introduction and asking for consent are required for each interview.

- Tips and tricks for working with a translator: It is difficult to decide at whom to look. Do not forget that the participant is the one being interviewed, not the translator! Be aware of the way you ask questions to the translator, especially if the translator directly translates everything said.

C.6   Prerequisites, steps and guidelines 2.0

Below, the prerequisites, steps and guidelines of the CDD approach / ODK as established after the evaluation are listed.

Prerequisites

There are certain prerequisites regarding Capability Driven Design that are also relevant for using the ODK. These comprise the following:

A. *Triangulate for data reliability and validity*. In order to enhance data reliability and validity designers should triangulate data. There are multiple types of triangulation:

- Discipline triangulation: involving designers from multiple disciplines to look from different perspectives and in this way reduce errors (prerequisite B);
- Investigator triangulation: conduct the research with multiple designers (varying in gender, age, colour, status, insider/outsider role) to cross-verify observations and descriptions (prerequisite C);
- Data triangulation: using different data sources (e.g., from different people, places) (prerequisite H);
- Theory and methodology triangulation: using multiple methods, for example a combination of observations with interviews and discussions (prescribed by Capability Driven Design approach)
- Tool and technique triangulation: using multiple tools and sources of confirmation, for example by asking different type of questions about the same topic, by using drawings and showing pictures (prescribed by Capability Driven Design approach)

Capability Driven Design already prescribes the use of multiple data sources, methods, tools and techniques, and prerequisites B, C and F ensure discipline, investigator and data triangulation. This prerequisite is mainly added to stress the importance of these different types of triangulation.

B. *Multidisciplinary team.* In order to enhance data reliability and validity designers should triangulate data. Capability Driven Design already prescribes the use of multiple data sources, methods, tools and techniques, to improve data reliability and validity. To further improve outcomes, designers from multiple disciplines should be included in the design team: they should have different backgrounds, skills and knowledge. This leads to a balanced perspective, access to a

range of participants. Thereby, when team members conduct activities - in pairs – at the same time, the process of user context exploration is sped up.

C. *Establish local partnerships*. Local partners are required in order to adjust quickly to the local circumstances, obtain information about the potential users and community structures, get advice on activities, help figuring out what to do, be properly introduced in the community, help provide access to an unbiased selection of participants, build trust in communities, and to be properly introduced to the local people. They can also aid in selecting participants and finding translators. A community partner should be someone who understands local things and is respected by the people.

D. *Get the team, client and translator on board.* It is important for all those involved to see the relevance of the CDD approach to ensure reliable, rigorous data collection.

E. *Follow qualitative research and ethics training.* In order to conduct sound, rigorous research that does not invade people's private lives in an incompetent way, and which results in valuable data, designers should have a solid and broad understanding of doing good research in the field. The research should be executed in a systematic, sceptical, ethical and rigorous manner. Designers should not conduct extractive research, but ensure an interactive, participative process together with the potential end-users to their mutual benefit. Therefore designers need to follow a training in which they are taught the right attitude, behaviour and questioning skills, and during which they practice their learned skills and techniques. Designers should also continuously examine their attitude, behaviour and questioning when conducting user context research in order to improve upon them. Capability Driven Design contains a 'training module' that designers can use to learn about doing good research in the field. In addition, a card with the most important interviewing rules will be added to the ODK toolkit. This module and card, however, do not replace practical training under guidance of an expert.

F. *Learn the themes by heart.* In order to obtain broad insight into all aspects that comprise a person's life and context, the themes and topics are leading. The themes should therefore be learned by heart, in order to allow for quick changes in conversation topics and establishing a fluent dialogue in which participants truly open up. They also help to pay attention to a comprehensive set of aspects when observing potential users in their natural settings. It helps to study the themes and questions, to roleplay them and to pilot them in the field. The facilitator and / or note-taker can keep track of the themes and questions by using the question cards.

G. *Plan for it.* Conducting user context research takes time, especially in developing regions where 'things do not always go as planned', and often time is needed for travel, for establishing contacts to obtain access, and for acclimatisation to the local situation. It should not be a 'side-activity'. Preparation takes time, conducting activities takes time, and data analysis and validation take time. Plan sufficient time to properly follow all the steps and to conduct rigorous user context research.

H. *Select a variety of participants with different characteristics for a broad range of insights.* Especially a variety in gender, ethnicity, social class, age, and religion are important to include. Do not only include potential users, but obtain a broader picture to learn more about task distributions and

perceptions of the broader community. Be aware not to only select participants that are easy to access, as this results in bias. It is, however, not always possible to talk to an unbiased sample of participants, as some people are truly difficult or even impossible to reach. It often depends on the community partner what is possible.

I. *Activities should be conducted in pairs and preferably be recorded.* Capability Driven Design already prescribes the use of multiple data sources, methods, tools and techniques, to improve data reliability and validity. To further improve outcomes, each activity should be conducted with a minimum of two persons, even when the researchers are familiar to the ODK and bring recording devices. By assigning one activity facilitator and one note taker, each of them can focus on their own specific task, while interpretations, experiences and perceptions can be compared, ensuring investigator triangulation and improved data reliability. A third person can be added to take photographs or shoot video (when consent is given), but more people can overwhelm participants. Activities should preferably be recorded, to enable the note-taker to focus on behaviour, body language and the environment. When it is not possible to conduct an activity with multiple team members present, for example when a situation with solely women needs to be created and there is only one female team member, the activity should be recorded to allow for the designer to focus on the activity and the participant and to enable other team members to listen back to the things being said. However, only when consent for recording is given by the participant.

K. *Activities should be conducted in participants' natural setting.* Potential users should be directly observed and interacted with in their natural settings in order to improve learning and understanding by building a shared language, capturing detail, gather concrete data, develop empathy and reduce bias and rationalization, filtering and distortion of information. Preferably, the design team will be in the field throughout the design project, but if that is not possible, at least at the beginning, prior to problem definition, and during prototyping, in order to obtain feedback and make adjustments to the design.

J. *Participatory, simple and enjoyable activities.* Capability Driven Design stimulates the use of a variety of techniques and tools, which can be tweaked by the designers to better fit their purpose. For the ODK interview method, techniques and tools have been selected and defined, but can still be changed. When designers develop or adjust techniques and tools, it should be kept in mind that multiple techniques and tools should be used (prerequisite A), and that activities should be simple, engaging and interactive, in order to create an enabling atmosphere in which participants feel free to express themselves. It is advised to let participants perform tasks or to let them create things, to stimulate expression of latent and tacit needs and desires.

K. *Use insights to inform the next activity.* As newly obtained information leads to new understanding, research goals and methods should be changed accordingly to obtain additional information. The research outcomes should therefore be analysed by the team after each activity to adjust the activities based on new insights.

L. *Discuss outcomes in a larger group to improve their value.* The information, knowledge and interpretations should be shared with participants to point out misunderstanding and to improve

data validity. If participants agree, they should also be shared with the community and local partners to keep stakeholders involved, enhance transparency and openness and improve data reliability.

M. *Critical reflection on limitations.* The data obtained, the methods used, the researchers involved and the project executed all have limitations and the researchers should reflect on them and be open and honest about them. These limitations can depend on the following:

   o   The facilitator's quality, skills, behaviour, bias, subjectivity and terminology used;

   o   The design team's presence, characteristics, agenda and perspective;

   o   The participant's character, motivation, interest, well-being, feelings, emotions, etiquette, availability of time, scepticism, distrust, suspicion, prior experiences, cultural background and values;

   o   The setting of the interview, the audience present, gatekeepers present, disturbances and distractions from outside;

   o   The translator's presence, biases, skills, interest in and understanding of the project;

   o   The amount of distortion due to translation;

   o   The presence of recording devices.

Fourteen steps

The steps that need to be executed in order to conduct semi-structured interviews are the following:

Prepare the interview

1. *Get familiar with the ODK procedure, techniques and tools*. The team members must become acquainted with the flow and structure of the interview. By being familiar to the themes and questions it is easier to switch between them, offering flexibility which improves the building of dialogue. Roleplay the interview in the team, pilot the interview and read the full manual to get the most out of the interviews.

2. *Include general product questions in the ODK*. During the ODK interviews, 'generic' product questions can be posed. Product questions can be added when certain themes are discussed that are obviously related to the product or service to be developed. For example, when a solar charging station for mobile phones needs to be developed, questions about mobile phones ('Products'), connectivity ('Mobility', 'Significant Relationships', 'Family' or 'Services') and energy ('Services') can be posed. More specific questions, for example about aesthetic preferences for the charging station, are not adequate to pose during the ODK interviews, they will make the interview too long and focused on the product, while it is meant for a comprehensive insight.

3. *Localize the content and conduct a local pilot*. Locally discuss the ODK contents beforehand. As accents, words, expressions, dialects and pronunciations might be different and words might mean different things in different regions, it is important to make sure the translator and the participant have the same understanding of the themes and questions. To adjust wordings to local dialects and to point out sensitivities it is important to discuss the themes and topics with people familiar to the potential users and their context. To improve participants' understanding of the

themes and build relationship, the pictographs can best be replaced by local visualizations. Be careful to select visualisations to which the participant can relate, but which do not steer the participant into a certain direction. Adjusting the ODK to the local context results in better dialogue and better outcomes. After adjusting the ODKs contents, a local pilot should be executed in the field. By conducting a pilot in the field, the designer becomes familiar to the ODK content and procedure. Moreover, sensitivities and terminology become even more clear. Especially when using a translator it is relevant to conduct the pilot locally, as in this way the translator also becomes familiar to the ODK content and procedure. Tips & tricks for contextualizing visualizations are provided in the manual.

4. *Carefully select and instruct a translator (if required).* Follow the tips & tricks in the manual. The translator should be thoroughly informed about the task at hand and his or her role. Share the goals of the research and explain the rules. If step 5 (conduct a local pilot) is not feasible: go through all the themes and questions before the first interview to get the translator acquainted with the interview flow and structure, the themes and key questions. It is best to use one and the same translator for every interview, as this reduces training and interview time. Moreover, when the translator is familiar to the participants, but does not have a stake in the interview, it is easier for participants to open up.

5. *Select participants.* A local partner, translators or other participants can aid in selecting participants. However, the selection criteria should be followed. As stated in prerequisite H, a variety of participants should be selected, also outside the potential user group.

Conduct the interview

6. *Assign roles.* Conduct the interview with at least two (a facilitator and a note taker / photographer) and a maximum of three designers and assign roles beforehand to clarify the purpose for each researcher. Appoint a facilitator who resembles the participant most (e.g., in gender, age social class, religion and ethnicity), when possible.

7. *Decide on time and place.* Time and place of the interview should be at convenience of the participants and preferably in their local context. Try to prevent to conduct interviews with participants who are busy and distracted (e.g. because of work, time limitations), and interviews that suffer from interruption by audience. Try to not bring employees from the client organization, as they have a stake in the research outcomes and might influence the participant's answering. Make sure there is sufficient space to use the ODK techniques and tools.

8. *Bring along the required supplies.* The materials for the activities, recording devices, a notebook and pen should be brought along to the interview. Consider to bring along pictures of yourself and your surroundings and food for the participant as well.

9. *Introduce & ask for consent.* Introduce the research, the interview, the translator and yourselves. Be honest and explain the research goals and why comprehensive user insight is required to be able to develop a product and / or service that suits the people's needs and wants. Explain that they are the experts and that the interview is to learn from them. Giving your introduction in the local language helps to build rapport and to establish a more relaxed atmosphere. Participants

should be informed about the research and its goals and about the activity. Ask for consent to record the interview, to take pictures and to use the data. Stress that participants are not obliged to participate and can withdraw from the activity at any time. Clarify how much time the interview will approximately take, based on the local pilot. It is very important to be clear about compensation to set the right expectations for participants. Communicate openness and being non-threatening, stress that there are no wrong answers and that not all questions have to be answered. Explain the participant that he or she is free to leave. Make the participants feel relevant as participants by sharing yourself, verbally or with help from pictures.

10. *Ask for the participant's introduction.* Asking participants to tell something about themselves provides an easy start and shows interest. Learn participants' names, age, place of residence, job and religion and note this down, in order to acknowledge the participant and make him or her feel relevant.

11. *Conduct a touchstone tour.* Let the participant show you around in their house or the environment where the interview is conducted. Use the show me technique: let the participants show you objects, spaces and tools. Conducting a touchstone tour results in better outcomes, as the observations made can be used to establish dialogue and to cross-check the information that participants share.

12. *Sit down and…*

    When multiple team members are present, try to not sit together and do not discuss things in your mother tongue. Also try to limit discussions in English with the translator. The participant should be the one talking.

    a. *For the facilitator: …build dialogue.*

    ➢ *Start with personal details.* Ask the participant's name, age, place of residence and religion. Share pictures that you brought from your home country. Look at the tips & tricks for appropriate behaviour and attitude to help you to build a comfortable and relaxed atmosphere.

    ➢ *Continue with the timeline.* Ask what the participants do during a day. The timeline can be combined with the visualization cards and erasable markers to create an overview of their day. Try to let participants create, if they are unwilling let the note taker create.

    ➢ *Continue with the question cards.* Use the drawing sheet, the visualization cards and the erasable markers to visualize the answers. Start with the current situation for one theme and from that point ask about changes in the past and aspirations for the future, before continuing to the next theme. When discussing a theme, explain what the pictograph/local visualization is about. Again, try to let participants create, if they are unwilling let the note taker create. There is no indicated order for discussing the themes, but start with an 'easy' theme or topic and also end with an 'easy' theme or topic (which themes are 'easy' can be found out by discussing the themes with a local partner and / or conducting a local pilot). The questions for each theme are mere options for starting conversations than exact questions that need to be asked. However, the questions should be kept general enough to stimulate conversation, and focused enough to reveal the desired information. Questions can

be left out and for each theme it is also important to ask questions in different ways, to pose questions about topics and experiences that come up during the conversation. Pose follow-up questions to follow-up on the unexpected, and on topics that the participant finds interesting. When participants have difficulty opening up, fall back to 'easy' topics or use drawings to elicit more response. When certain topics are clearly sensitive or close down the participant, switch topic. Any question affecting the dignity of participants must not be pursued. It is important to consider and respect people's privacy, and their personal space. If participants do not allow the designers to enter that personal space, that should be respected.

> *Conclude the conversation with the sorting exercise.* Use the sorting cards and let participants place these cards on the ranking sheet, based on their importance: not important (.), less important (!), important (!!) or very important (!!!). For each sorting card, explain what the pictograph/local visualization means. The ranking exercise works as a confirmation of the things being told during the interview and provides insight in what and how participants value.

b. *For the note-taker: …document.* Let the interview preferably be recorded by a recording device (but be aware of the possible effects of recording devices: participants becoming shy or holding back) and take notes to document anything surprising and participants' behaviour, attitude, body language and interpretations. The note-taker can also draw, and capture photographs and video. Look at the tips & tricks about 'what to pay attention to'.

13. *Thank the participant.* Thank participants for their invested time and effort and for sharing personal information. Bring a small gift, food and / or money to show appreciation and compensate for time and costs (see ODK guideline C).

14. *Analyse, interpret, discuss and reflect immediately.* Analyse and interpret the data after each interview and discuss the interview outcomes, the most striking insights and perceptions with the design team directly after each interview, before things become 'normal'. This aids to verify insights and detect design opportunities. The insights can also be discussed with the translator and the local partner(s). Reflect on the insights (see prerequisite N) with the full team and use the outcomes during the following interviews.

When using the ODK, all fourteen steps should be followed and step five to thirteen should be repeated for each interview.

CDD guidelines

The following eight guidelines designers are advised to follow when using the CDD approach:

A. *Appropriate behaviour and attitude.* All team members should follow the tips and tricks for 'appropriate behaviour and attitude'. It is important to have an open mind, to build trust, to respect participants and their time, to treat them as experts and to truly listen without beliefs, biases, and making assumptions. Be honest about goals, keep participants informed about the progress made regarding the design project, properly thank and compensate participants for their invested time and effort. See: 'tips & tricks'.

B. *Compensation*. Compensation can and should be provided to participants for their lost time and possible transportation costs, but be aware that money does not become an incentive to participate, as this influences the interview outcomes. Money, food and gifts to bring depend on the activity and on the context. Providing a tangible gift allows the participant to show the gift to other people, but might not be appreciated everywhere. It is important to find out what the people in the area find valuable. The compensation can be decided upon in collaboration with local partners.

C. *Appropriate questioning.* The facilitator(s) should be trained on qualitative research skills (prerequisite). In order to guide the facilitator, the tips & tricks regarding 'appropriate questioning' should be followed. See: 'tips & tricks'.

D. *Observe, listen, and document everything.* Note down characteristics of the participant (e.g., name, gender, social class, religion, age, occupation), of the activity (e.g., type of activity, the people present, date and location, materials used), and of everything that is seen, heard, felt, smelled, tasted, and / or surprising. Observations during the interviews are a useful means to check and interpret answers, and valuable when starting and continuing the dialogue. Observe during the touchstone tour, but also observe the participant's behaviour and body language. Keep an eye on intonation. Follow the tips and tricks for 'what to pay attention to'. See: tips & tricks.

E. *Selecting, instructing and working with a translator.* A translator forms a disconnect between you and the participant, as participants often focus on the translator. This limits the building of rapport. Translators differ in motivation, understanding and skills. Their age, gender, social class, clothing, religion and ethnicity of the translator with reference to the participant plays a role. Therefore, the tips and tricks for selecting, instructing, and working with a translator should be followed. See: 'tips & tricks'. It is not always possible to control all translator characteristics, but by building rapport with the translator, and with a proper instruction the translator can be guided to diminish his / her influence on the outcomes.

F. *Schedule more time than planned.* Things often take more time in the field, due to, for example, dependency on other people, differences in punctuality, religious breaks, unavailability of electricity, internet access or the required materials, limited infrastructure, and limited access to stakeholders.

G. *Be aware of your position.* Local people perceive you in a certain way. Because you are an 'outsider', you might be perceived as interesting to talk to, as a professional or expert, or you can be distrusted or not being taken seriously. It might even be dangerous to walk around and talk to people. People might also see you as a source of help (financial or otherwise) and therefore try to convince you of their misery, or they might be embarrassed and try to hide their situation from you. Your age, gender, social class, religion, ethnicity and with reference to the participant plays a role. It is important to build rapport and behave and interact appropriately (tips & tricks). It is important to be aware of the influence of age, gender and clothing, and how these are perceived by participants, to limit its influences on the interview outcomes and to at least take this influence into consideration during data analysis and interpretation.

H. *NEW - Influence of recordings.* Using video, voice recording and / or photography have several benefits and disadvantages. They might result in participants becoming shy or hiding information in order to not let it be recorded. On the other hand, they provide visuals and dialogue which aid the designers to analyse and interpret the data and to communicate the data to their team members. The design team can decide to secretly record observations and interviews, but should always ask permission afterwards for using these, and must realise that secret recordings can seriously damage the relationship with the potential users.

I. *NEW* – Contextualising visualisations. As the intended 'receivers' of the message displayed in the visualization vary, it is difficult to develop one universal set of visualizations suitable for every context. Therefore, contextualizing the visualisations might stimulate discussion. See: tips & tricks for developing these visualizations.

ODK guidelines

The following XXXX guidelines designers are advised to follow when conducting ODK interviews:

A. *Start broad, then go deeper.* During the first interviews it is important to touch upon all themes and topics. After some initial interviews, some of the topics and questions can be left out in order to deeper investigate the topics and questions that seem surprising or interesting for the design project.

B. *Time and place of the interview.* It is useful to conduct interviews at homes to combine interviews with observation and to create a comfortable setting. However, if the home setting results in shyness, embarrassment, is too hot, or results in a lot of audience or other disturbances, it might be better to conduct the interview in a more contained space.

C. *Flexible but focused individual conversations.* The ODK provides steps, themes and guiding questions, but there is room for flexibility and unexpected turns in order to stimulate dialogue. There is no indicated order indicated for addressing the themes. Do not ask questions from a script, and feel free to add or change questions. The interview should feel like an open-ended, dynamic conversation to make participants feel comfortable. It is important to continue dialogue regarding topics that seem to be of interest to the participant, and regarding surprising, idiosyncratic or contradictory responses or behaviour from the participant. It might be useful to hide the list of questions and to learn the key questions by heart or keep them out of sight. Do, however, exert some control over activity topics. Use the question cards and drawings to keep an overview of the themes and topics discussed and preferably start and end with 'easy' to discuss themes.

D. *Duration of interviews.* The interview should be sufficiently long to make participants feel to make participants feel they are being heard, but should not continue too long resulting in participants becoming tired and disinterested. Follow up on answers, but also keep focus: if focus is lost, the interview can become overly long without obtaining useful information. End the interview when no questions are left, or when you feel like delaying a participant. The ODK interview is scheduled to last between 1.5 and 3 hours. The participants should be properly informed before the interview about how much time the activity will take, before they give their consent. Participants

can be compensated for their time, for example by providing food or compensation for expenses, and a gift can be provided. If an interview takes longer, participants should be informed and asked for additional consent. The participants can be offered a compensation for continuing the interview. If the participant is not willing to continue longer, the interview should be concluded. When being familiar to the themes and questions, interviews can be conducted quicker. When more drawings are being made and more follow-up questions are posed, interviews become longer. Decide, based on the participant's behaviour and attitude, how to approach the interview.

E. *Number of interviews.* The objective of the ODK interviews is to get to know people's available and valued beings and doings, and to become inspired. The number of interviews is not fixed and it is up to the team to decide when sufficient insight is obtained. The context, the project, the participants, the translator, the variety of participants that can and should be included, and the skills of the facilitator all influence the outcomes and therefore the number of interviews required. It is not the intention to obtain statistically generalizable data, and after the first few interviews the amount of new insights will decrease. The 'quick scan' program includes at least five interviews, to be conducted in three days. However, it depends on the amount of insights if this is sufficient or that more interviews are required. The 'extensive scan' allows for conducting more interviews in combination with other methods.

F. *Consider to use specific questioning techniques.* As mentioned under 'questioning techniques'.

G. *Dealing with sensitive questions.* Sensitivity differs per culture, so it might be that the questions you think are sensitive, are not sensitive to the participant. Your own assumptions and feelings towards questions should not be leading. Discuss the questions beforehand with a local partner to identify sensitivities. Start with more general and easy to answer questions, and later in the interview, when rapport has been build, it might be possible to pose sensitive questions and probe broader and deeper. However, be understanding and sensitive towards the feelings of participants and the potential of causing psychological harm for the participant. Try to rephrase a question when the participant is hesitant to answer it, or ignore the question if it leads to an uncomfortable situation. Sensitive questions should not be forcefully asked, just because they are in the ODK. It is not always possible to obtain answers to all questions, but that is also not required. Participants must be free to share what they want and remain comfortable. An unwillingness to answer questions also provides valuable information. It might be wise to let sensitive questions to male participants be posed by male facilitators and translators and to female participants by female facilitators and translators. Sensitivities can be pointed out beforehand by local partners and / or the translator, but the information provided by them should not be leading.

Tips and tricks for behaviour and attitude

These tips and tricks have been derived from: Larsen and Flensborg (2011); Viitanen (2011); IDEO (2008a); Beyer and Holtzblatt (1995); Narayanasamy (2013); Handwerker (2001); Barab et al. (2004); Simanis and Hart (2008); Verdu-Isachsen (2012); Naidoo (2012); Beebe (2014); Chambers (2004); Pelto (2013); Van Boeijen et al. (2013); Kapoor (2012); d.School (2010); Von der Lippe (2012); IDEO

(2008b); Johansson and Messeter (2005); Polak (2008); Ramberg (2012); Sperschneider and Bagger (2003); Martin and Hanington (2012); FrogDesign (2012); Freudenberger (1999); Nesset and Large (2004); Smart and Whiting (2001). The tips and tricks have been adjusted according to insights based on the iterations (chapter 6) and evaluations (chapter 7) presented in this thesis.

The recommendations for designers' behaviour and attitude are:

- *Minimise 'outside' hierarchy.* In order to minimise hierarchical perceptions:
    - Sit at the same height level as the participants;
    - Do not sit together if you are with more than one person;
    - Wear casual clothing with the same status as participants, which does not mean identical clothing
    - Avoid organization-branded clothing.
- *Be aware of 'inside' hierarchy.* To approach certain regions or communities, there might be an 'appropriate' way to do so. Pay attention to local hierarchy and follow the local hierarchical rules).
- *Be aware of 'inside' customs.* There might be some local customs that you should be aware of in order to fit in, e.g., taking your shoes of inside a house, sitting on the floor, not pointing with your feet towards someone. Be aware of them and behave accordingly.
- *Build rapport.* Build relationships and trust with potential users early in the process and make them appreciate the work being done. This stimulates becoming accepted and motivates collaboration, resulting in a better understanding. It takes time to win trust and build rapport and this time should be taken in order to stimulate opening up of potential participants. To fasten the process of building rapport, follow the following tips:
    - Be aware of potential codes of behaviour;
    - Explain who you are;
    - Seek and listen carefully;
    - Demonstrate commitment;
    - Show respect towards the people, their culture, their customs, attitudes, beliefs and their way of life;
    - Do not criticize, correct or judge participants, but try to understand their perceptions and underlying reasons, appreciate how people live their lives;
    - Show humility;
    - Show interest;
    - Be honest and transparent;
    - Be open and clear about intentions and do not make false promises;
    - Develop a collaborative dialogue;
    - Be ready to learn and ask to be taught. Invite and answer questions;
    - Share yourself. By sharing personal experiences an open atmosphere is created that allows for vulnerability and gossip;
    - Share information, ideas and food;
    - Accept and give gifts if appropriate;

- o Limit deliberations in your mother tongue or with the translator in a language unfamiliar to the participant.
- *Demonstrate willingness to learn.* Go into the field with the recognition that indigenous knowledge is essential. Do not act as the expert knowing what is best and do not impose theories and insights on participants, but instead be willing to admit ignorance and threat the participants as the experts who should feel that the designers are open to learn from them, that their knowledge is relevant. Gain appreciation for the people, culture, customs and the way people live their lives and do not correct them.
- *Start with an open mind.* You are an 'outsider' who probably speaks a different language and has different perceptions of meanings due to different life experiences and cultures. Try to understand the insiders' perspective, learn about the categories that local people use to describe situations and inquire about local perceptions of the meaning of important denominators. Learn to think different about the world. To avoid carrying assumptions, it is important to enter the field with an open mind, willing to learn. Put aside what you know and look with fresh eyes, think like a child. Pay attention to detail, question everything, be truly curious, do not judge, look for interesting threads and themes that come up and truly listen. Even if you think you know the answer, pretend you do not know.
- *Listen with genuine interest.* Listen actively and attentively with genuine interest, enthusiasm and curiosity, without thinking about the next question or comment.
- *Encourage answering.* Encourage answering verbally and nonverbally. Say things like 'mmmm', 'uh-huh', 'I see' or 'really?', and use body language, such as head nodding, attentive forward leaning, and smiling.
- *Mind your body language.* While body language can be used to encourage participants to share stories, it can also communicate disinterest or lack of commitment. Be aware and careful about body language and keep an appropriate amount of eye contact.
- *Pay attention to body language.* Decide how to continue an activity based upon non-verbal behaviour of the participant.
- *Stimulate storytelling.* Stories indicate how participants think about the world. Do therefore not try to make participants answer brief and concise, but encourage them to tell stories in their own way - in all its complexity.
- *Encourage sharing of details and context.* Stimulate participants to share details and context to help you to understand which experiences have been significant to them and why they have been significant.
- *Sympathize.* Even if you do not agree, it might be useful to sympathize with the participant in order to make the participant open up more.
- *Limit interruption.* Play an active role in engaging users, but do not interrupt or rush them. Listen first and then talk. Do not be afraid of silence. Give participants the time to reflect, think and respond. However, do not let pauses become awkward.
- *Mind habitual behaviour.* Behave as an apprentice, do not lapse into the role of interviewer, expert or personal friend.

- *Avoid abstract talking.* When participants start to talk in abstract terms, make them talk about actual experiences again. It might be useful to ask participants about concrete examples.
- *Make it relaxed.* The activities need to be conducted within limited time, but this does not mean that they should be rushed. Instead, interactions should be relaxed and conducted with commitment.
- *Learn from failures.* Things will not always go as anticipated. When things go wrong, learn from those failures and start building new plans based on the failed ones.

Tips and tricks for ethical behaviour
- The participant community should be central in the research process, the research should be participatory and conducted with respect for everyone, regardless of ethnicity, culture, religion, gender, class, sexual orientation, disability etc. The first responsibility is towards the participant community: their interests should be central to the study. Do not use your power to the disadvantage of participants, act responsibly.
- Different participants should be included in the research, not only the ones who are easily accessible.
- Permission to conduct research should be obtained, follow formal requirements and procedures. Review obligations of research plans in the designers' home country and in the country under study should be checked.
- Designers should explain who they are, what the nature and goals of the research are and what the programme and purpose of the activity is.
- Objectives, expected outcomes, source of funding, methods to be employed, output usage, risks and benefits should be shared to the community prior to conducting research. Their rights and responsibilities should also be shared. Designers should be open and honest, frank and realistic about research constraints and outcomes, do not make false promises, do not raise unreasonable or unrealistic expectations.
- Informed consent should be obtained. Preferably a written statement in the local language, but if most participants are illiterate, verbal consent is more ethically appropriate. Consent should be obtained for conducting the research activity, recording the activity, and using and sharing the – anonymised – outcomes.
- Designers should be aware of the risks and dangers that the research may pose to local communities and individuals and take appropriate action to eliminate them, in order to protect the weakest in a community. Participants' privacy should be protected. Data should be secured and anonymised in order to protect identities and locations of participants. It should be ensured that the data is protected from misuse and falling into the wrong hands. Designers should be careful to engage with organisations who might use research results against – certain members of – the participant community.
- Designers should conduct research that is sound, well-conducted and results in relevant and useful data, as it is unethical to incompetently invade participant's personal lives resulting in questionable data.

Appendix C

- Designers should recognise and respect people's sensitivities and rights, should not trick them into revealing dark, shameful, personal or sensitive information or feelings, should not be intrusive or too demanding. The designers interests should not be placed ahead of those of the collaborators or the participants. Designers should not mine developing societies for data and should minimise social harm (e.g., intrusion, distress, indignity, physical discomfort, personal embarrassment, psychological harm) and maximize social benefit.

- Designers should be aware of their position, their background and training, power differentials, cultural distance, and the privileged position of power to influence situations through design, as these influence the way they think, the relationships with participants and the reactivity of participants.

- Designers should appreciate varying contexts, cultures, traditions, norms, mores, values, practices, systems and structures and be open to learn without judgement.

- Designers should try to limit inequalities: they should build local partnerships and collaborate on different levels, and try to contribute in a positive way, without making false promises.

- Designers should properly thank participants and local assistants, and provide appropriate compensation for time and effort taken. The research should not result in any material gain or loss for the participants. They should avoid making excessively high rates of payments, but provide appropriate compensation to participants and local assistants. Designers should provide gifts where this is culturally appropriate or expected, but should not end up in bribery or corruption. They should avoid exploitation of local assistants by providing them a fair return. The appropriate compensation can be discussed with local stakeholders.

- Designers should judge responses, but do so carefully. They should limit misinterpretation of outcomes due to preconceptions or misunderstandings, by triangulation, sharing of data, and consult stakeholders, participants and / or participant communities. They should be open about how interpretations are established.

- Designers should critically reflect on:
  - data limitations. E.g., regarding generalizability, errors;
  - method limitations. E.g., regarding the approach and methods used and the selection of participants;
  - designer limitations. E.g., regarding their position, established relationships, way of working, documentation, handling of delegated power, personal errors and mistakes;
  - project limitations. E.g., regarding the roles of participants, distributed power and agency.

- Designers should resist pressure from funding agencies or local authorities to make the outcomes match their needs or expectations: outcomes should be transparent, genuine and honest.

- Designers should make the research outputs available locally, ideally in a language and / or form that the communities can understand and use. This enhances transparency and openness, and facilitates mutual learning. Designers should acknowledge the contribution of everyone involved.

- Designers should provide follow-up / keep the people involved in an accessible and understandable manner, without making false promises.

Tips and tricks for questioning

These tips and tricks have been derived from: Martin and Hanington (2012); Narayanasamy (2013); FrogDesign (2012); IDEO (2008a); d.School (2013); Larsen and Flensborg (2011); Van Boeijen et al. (2013); Handwerker (2001); Chambers (2004); Johansson and Linde (2005); Beyer and Holtzblatt (1995); Freudenberger (1999); IDEO (2008b); Viitanen (2011); Barab et al. (2004). The tips and tricks have been adjusted according to insights based on the iterations (chapter 6) and evaluations (chapter 7) presented in this thesis.

The recommendations for questioning are:

- *Pose questions that are*:
  - Neutral. Avoid steering participants' answers by implying a right or wrong answer, do not lead them towards an expected answer and avoid blaming questions which suggest the participant is wrong or at fault. Such oriented questions introduce bias;
  - Specific. Avoid using the word 'usually', but make questions more specific by asking about a specific instance or occurrence;
  - Naïve. Pretend you do not know to hear how people narrate things themselves. Do not be afraid posing 'dumb' questions, as the answers might be surprising;
  - Open-ended. To stimulate conversation and stories, questions should elicit answers that require more than one word. Open-ended questions often start with 'what?', 'when?', 'where?', 'who?', 'how?', and 'why?'. Why-questions make brings about reasons, intentions, and motivations, but often result in more abstract answering. 'How'-questions stimulate straightforward storytelling.
  - Simple, short and to the point;
- *Avoid questions that are*:
  - Insensitive;
  - Offensive;
  - Ambiguous;
  - Biased. Questions with built-in assumptions are not always corrected by participants, who might answer the question to please you;
  - Leading, blaming, or oriented;
  - Abstract, consider to explain them through a story;
  - Multiple questions in one;
  - Hypothetical;
- *Mind terminology.* Properly word and ask questions:
  - Avoid jargon and tricky language;
  - Avoid vague language that makes no sense to the participants;
  - Avoid terminology with multiple meanings attached to them that might different things to different participants;
  - Use local indicators and terminology;

Appendix C

- *Start with easy questions that are important to them.* Start with themes and questions that the participants find important. For example, if family is important to them, ask them about their family members and how they are doing first, before diving into the other themes.
- *Pose follow-up questions.* Probe into issues before continuing with the next topic. To improve understanding of how the participants view the world, it is useful to ask them why they say or do things;
- *Pose questions that stimulate description, discussion and depth.* Ask participants to tell more about a certain topic, echo answers in a question format, or retell answers or stories in order to stimulate further explanation and to elicit additional information;
- *Mix questions with discussions.*
- *Pose verifying questions.* Pose different types of questions about the same topic to verify participants' answers. Summarize answers to check understanding. Pay attention to and check inconsistencies and discrepancies, as they may hide interesting information. Admit confusion and ask for clarification;
- *Verify interpretations.* To avoid misinterpretation, check your interpretations of answers or observations by sharing them during the interview. Checking interpretations is not only useful for verification, but might also provide participants a starting point for providing additional insight;
- *Do not suggest answers.* Let the participants come up with answers themselves.

Questioning techniques

The following questioning techniques can be considered during interviewing to aid the designer to obtain deeper insight into the behaviour and reasoning of the participant and to provide information about aspirations and desires. These techniques are not obligatory to follow and are therefore not explicitly part of the ODK, but they can be useful to consider. These techniques have been derived from: (Barab et al. 2004; Gielen 2008; IDEO 2008b; Kensing, Simonsen, and Bødker 1998; Martin and Hanington 2012; Nesset and Large 2004; Park 2011).

These questioning techniques are:
- *The 'five why's'.* This technique means asking why five times in a row to probe deeper and detect underlying reasons for behaviour and attitudes.
- *'Directed storytelling'.* This technique means guiding the participant to tell a story about a certain topic with help from additional questions such as 'who?', 'what?', 'when?' 'where?' and 'how?'.
- *'Guided speculation'.* This technique means asking questions about hopes and fears for the future
- *'What-if-scenarios'.* This technique means putting forward scenarios or storylines for the participant to complete.
- *'Sacrificial concepts'.* If a question is abstract it can help to change the question to a concrete scenario with two options. For deeper insight the variables of the options can be changed.
- *'Talking diaries'.* Asking participants to describe important past events in their lives like reading from a diary.

- *'Thinking aloud'*. Asking participants to tell what they are doing and/or thinking when they are performing a specific task. This technique can, for example, be used during the scoring exercise.

Tips and tricks for 'What to pay attention to'

These tips and tricks have been derived from: Polak (2008); Van der Veer (2008); Diggins and Tolmie (2003); Beyer and Holtzblatt (1995); Handwerker (2001); FrogDesign (2012); IDEO (2008a); Narayanasamy (2013); Martin and Hanington (2012); d.School (2013); Beebe (2014); Pelto (2013); Liedtka (2011); Gielen (2008). The tips and tricks have been adjusted according to insights based on the iterations (chapter 6) and evaluations (chapter 7) presented in this thesis.

Basically, learn everything there is to know. Relevant knowledge is not only with the participants, it is also present in the context. Try to understand the details of people's lives and practices and detect patterns and structure. Specific things to pay attention to are:

- Everything that is seen

  Observations during the interviews are useful means to check and interpret answers and helpful to start and continue dialogue. Observe during the touchstone tour, but also observe the participant's behaviour and body language.

  o Things that are physically present

  o Objects participants care about

  o Body language

  o Factual behaviour and things that change behaviour

  o Interactions with the environment

  o Adaptations and work-arounds

- Everything that is heard

  o Language, vocabulary, words and categories

  o Expressions

  o Motivations

  o Perceptions

  o Issues, difficulties or obstacles

  o Interactions

  o Social actors

  o Unarticulated needs

  o Events and circumstances that shape experiences

  o Prior experiences, current experiences and how those are perceived and conceptualized

  o Intonation

- Everything that is felt

  o Emotions, moments or things that participant react upon emotionally

  o Feelings

- Everything that is smelled

- Everything that is tasted

- Anything surprising: that changes assumptions or seems irrational
- Observable and explicit needs, but also tacit needs – which cannot be expressed verbally, and latent needs- which are subconscious. These can be detected by exercises where participants create or perform tasks.

Tips and tricks for selecting and instructing a translator

- Tips and tricks for selecting a translator: The translator should be selected based on his knowledge of the area, of the local language and of English. The translator should have sufficient time, be sufficiently educated or skilled to translate and should not have a stake in the research, but be interested in it. The translator's position and gender should preferably match the gender of the potential participant, it might therefore be wise to select both a male and a female translator. When the translator is familiar to the participants, but does not have a stake in the interview, it is easier for participants to open up. It is best to use one and the same translator for every interview, as this reduces training and interview time, a translator's availability is therefore an important selection criterion. Normally, a translator is paid for his or her services.
- Tips and tricks for instructing a translator: Designers should insist that the translator properly translates the questions and the participants answers, should not be afraid to pose 'naïve' questions, should not rush the interview, should not interpret questions or answers, and should not steer the participant by providing examples or indicating desired answers by tone or body language. The translator should however try to build rapport and show empathy. Designers should stress that a proper introduction and asking for consent are required. It might be wise to have food or a drink with the translator to build rapport with this person.
- Tips and tricks for working with a translator: It is difficult to decide at whom to look. Do not forget that the participant is the one you are interviewing, not the translator! Be aware of the way you pose questions to the translator, especially if the translator directly translates everything you say.

Tips and tricks for contextualizing visualizations

When visualizations are contextualized, the following guidelines should be kept in mind:

- Keep the audience in mind (Hodge 2008)
- Collect and review visualizations (Pettersson 2010)
- Consider the use of words, images and graphic forms (Pettersson 2010)
- Consider the size the visualization will be displayed at (Hodge 2008)
- Consider feedback expressed by participants (Pettersson 2010)
- Use bold and large enough picture elements (Pettersson 2010)
- Use one specific style (Pettersson 2010; Hodge 2008)
- Use a limited amount of perspectives (Hodge 2008)
- Pay attention to colour and contrast (Pettersson 2010)
- Make the lay-out clear and simple (Pettersson 2010; Hodge 2008)
- Avoid unnecessary detail, keep the amount of elements limited (Pettersson 2010)

- Emphasize what is important (Pettersson 2010)
- Make the photograph represent all the topics within the theme (team F2 and G)
- The photograph for one theme should not link to another theme (Team F2)
- Use pictures regarding the aspired yet achievable situation (Team F2)
- Stay "gender neutral, country neutral and age neutral" (team F2)
- Make the photographs recognizable for the participants (Team F2)
- Be aware that visualizations are perceived differently in different regions (Team F2)
- Be aware about local preconceptions to avoid overtone (Team F2)
- Do not use too many photographs (team G)

APPENDIX D

Appendix D

D.   Themes and Questions

Below the themes and questions as derived from literature are presented (appendix D1), and their adjustments as a consequence of the executed iterations (appendix D2- D6). The adjustments to the themes and questions are indicated with an orange colour, new themes and questions are marked green, and questions that shifted from one theme to another are marked purple.

D.1   Themes and questions 0.0

In table 6, the themes and questions of the CDD approach / ODK, as established from literature, are listed.

Table 6: Themes and questions derived from literature

Health

How important do you find your health? (0-7)

How is your health?

1. Until what age do you expect to live? Why (family history, food, lifestyle and health status)?
2. How many brothers and sisters do you have? Are they all still alive?
3. How old are your parents and are they still alive?
4. Does your health in any way limit your daily activities compared with most people of your age?
5. Are you able to have children?
6. Have you recently worried much or felt under strain?
7. Do you ever feel lonely compared to other people of your age?
8. Are you or other family members able to visit the doctor whenever necessary?

Nutrition

How important do you find your food? (0-7)
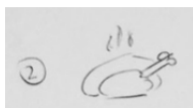
9. How often do you eat and what do you eat during each of those meals?
10. Do you have sufficient food to feed yourself?
11. Do you have sufficient food to feed your family?
12. Do you eat many different types of food?

Accommodation and Surroundings

How important do you find your accommodation? (0-7)

What type of house do you have?
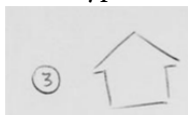
13. Is your current accommodation adequate or inadequate for your current needs?
14. How did you choose and obtain your home?
15. Do you feel you were involved in choosing your home?
16. Are you prevented from moving home for any reason?

Education

How important do you find your education? (0-7)

Have you ever been to school, how many years?

Have you ever attended any courses?

Do you have any diplomas?

17. What is your highest education?
    a. Can you read and/or write?
    b. Can you count?
    c. Do you have a signature?
18. How often do you use your imagination and or reasoning in your day to day life?
19. In which ways do you have access to information? And how often do you use these?

Meaningful Work

How important do you find your meaningful work? (0-7)

20. Have you recently felt that you were playing a useful part in your normal day-to-day activities?
21. To what extent do your day-to-day activities make use of your skills and talents?
22. Do you feel appreciated in your day-to-day activities?

Leisure

How important do you find your recreational activities? (0-7)

What do you do in your spare time?

23. Have you recently been able to enjoy your normal day-to-day activities?
24. Do you feel you have sufficient spare time?
25. Have you recently been enjoying your recreational activities?

Mobility

How important do you find your mobility? (0-7)

26. Do you go out often?
27. Do you ever go far away?
28. What kinds of transportation is available to you/do you use?
29. Do you use vehicles by yourself?

Friends and Community

How important do you find friendships? (0-7)
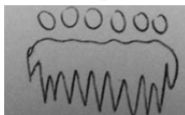
30. Do you feel like having sufficient friends?
31. How difficult do you find it to make friendships?
32. Do you know a lot of people in your community?
33. Do you find it easy or difficult to express feelings of love, grief, longing, gratitude, and anger?
34. Do you feel appreciated by your friends?

Self-determination

How important do you find your beliefs? (0-7)
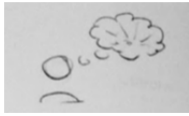
35. Do you evaluate how you lead your life and where you are going in life?
36. Are you happy?
37. Even if you don't need or have never needed any of the following, are you prohibited from using contraception, abortion or infertility treatment for any reason (e.g. religious beliefs, family pressure)?
38. Are you free to express your political views and participate in political activities?
39. Are you free to practice your religion as you want to?

Partner and Family

How important do you find your partnership? (0-7)

40. Do you have a partner? If yes: How did you and your partner get together? Are you happy with your partner? Are you free to leave your partner?
41. Do you have children, parents, parents-in-law?
42. Do you experience sufficient affection from your partner?
43. Who is the decision maker in your family?
44. Do you feel appreciated by your family?

Safety and Security

How important do you find your safety? (0-7)

Are you ever hit/bothered or had any arguments/fights either inside your home or outside on the street?

45. Please indicate how safe you feel inside your home.
46. Please indicate how safe you feel walking alone in the area near your home.
47. Do you ever experience discrimination or are you ever bullied because of your; race, sexual orientation, gender, religion, age?

Products, Animals and Plants

How important do you find your belongings – animals, products, plants? (0-7)

48. Do you have any animals and how attached are you to them?
49. Do you have any products and how attached are you to them?
50. Do you have any plants and how attached are you to them?

D.2 Themes and questions 0.1

The themes and questions of the CDD approach / ODK as adjusted after the first iteration, a micro-evaluation, are listed in table 7.

Table 7: Themes and questions adjusted according to iteration 1

0. Introduction questions

1. What is your name?

2. What is your age?
3. Where are you from?
4. What is your religion?
5. What do you love, what is your passion?
6. What does a normal day in your life look like?

1. Health

7. How is your health?
8. Until what age do you expect to live? Why (family history, food, lifestyle and health status)?
    a. How many brothers and sisters do you have? Are they all still alive?
    b. How old are your parents and are they still alive?
9. Does your health in any way limit your daily activities compared with most people of your age?
10. Are you able to have children? -> Do you want to have children?
11. Have you recently worried much or felt under strain?
12. Do you ever feel lonely compared to other people of your age?
13. Are you or other family members able to visit the doctor whenever necessary?
14. Did anything change in the past years?

2. Nutrition

15. How often do you eat and what do you eat during each of those meals?
16. Do you have sufficient food to feed yourself?
17. De you have sufficient food to feed your family?
18. Do you eat many different types of food?
19. Did anything change in the past years?

3. Accommodation and Surroundings

20. Is your current accommodation adequate or inadequate for your current needs?
21. How did you choose and obtain your home?
22. Do you feel you were involved in choosing your home?
23. Are you prevented from moving home for any reason?
24. Did anything change in the past years?

4. Education

25. What is your highest education?
    a. Can you read and/or write?
    b. Can you count?
    c. Do you have a signature?
26. Do you have any diplomas? Have you ever attended any courses?
27. How often do you use your imagination and or reasoning in your day to day life?
28. In which ways do you have access to information? And how often do you use these?
29. Did anything change in the past years?

5. Meaningful Work

30. What are your day-to-day activities?
31. Do you like what you do?
32. Do you feel you are playing a useful part in your normal day-to-day activities?
33. To what extent do your day-to-day activities make use of your skills and talents?
34. Do you feel appreciated in your day-to-day activities?
35. Did anything change in the past years?

6. Leisure

36. Have you recently been able to enjoy your normal day-to-day activities? -> Do you enjoy your day-to-day activities?
37. What do you do in your spare time?
38. Do you feel you have sufficient spare time? -> Do you need more spare time?
39. Did anything change in the past years?

7. Mobility

40. Do you go out often?
41. Do you ever go far away? -> Where do you go when you go out?
42. What kinds of transportation is available to you/do you use? -> What kinds of transportation is available to you?
43. Do you use vehicles by yourself? -> What kind of transportation do you use and which ones by yourself?
44. Did anything change in the past years?

8. Friends and Community

45. Do you feel like having sufficient friends?
46. How difficult do you find it to make friendships? -> Do you find it difficult to establish friendships?
47. Do you know a lot of people in your community?
48. Do you find it easy or difficult to express feelings of love, grief, longing, gratitude, and anger?
49. Do you feel appreciated by your friends?
50. Did anything change in the past years?

9. Self-determination

51. Do you evaluate how you lead your life and where you are going in life?
52. Are you happy?
53. Even if you don't need or have never needed any of the following, are you prohibited from using contraception, abortion or infertility treatment for any reason (e.g. religious beliefs, family pressure)? -> Do you think people in your community are able to use contraception or infertility treatment?
54. Do you think people in your community consider abortion?
55. Are you free to express your political views and participate in political activities?
56. Are you free to practice your religion as you want to?
57. Did anything change in the past years?

10. Partner and Family

58. Do you have a partner? If yes: How did you and your partner get together?
59. Do you think people in this community can leave their partner if they want to?
60. Do you have children, parents, parents-in-law?
61. Do you experience sufficient affection from your partner? -> Do you feel happy with your partner?
62. Who is the decision maker in your family?
63. Do you feel appreciated by your family?
64. Did anything change in the past years?

11. Safety and Security

65. Please indicate how safe you feel walking alone in the area near your home -> Do you feel safe walking alone in the area near your home?
66. Are you ever hit/bothered or had any arguments/fights either inside your home or outside on the street?
67. Do you ever experience discrimination or are you ever bullied because of your; race, sexual orientation, gender, religion, age? -> Do you ever experience discrimination or are you ever bullied? Why?
68. Please indicate how safe you feel inside your home -> Do you think people in your community feel safe inside their house?
69. Did anything change in the past years?

12. Products, Animals and Plants

70. Do you have any animals and how attached are you to them?
71. Do you have any products and how attached are you to them?
72. Do you have any plants and how attached are you to them?
73. Did anything change in the past years?

D.3 Themes and questions 0.2

In table 8, the themes and questions of the CDD approach / ODK, after the second iteration, are listed.

Table 8: Themes and questions adjusted according to iteration 2

0. Introduction questions

1. What is your name?
2. What is your age?
3. Where are you from?
4. What is your religion?
5. What do you love, what is your passion?
6. What does a normal day in your life look like?

1. Health

Continuously ask: 'and then?', 'why?', 'anything more?'

7. How is your health? Are you ever sick?
8. Until what age do you expect to live? Why (family history, food, lifestyle and health

status)? How many brothers and sisters do you have? Are they all still alive? How old are your parents and are they still alive?

9.   Does your health in any way limit your daily activities?
10.   Do you want to have (more) children?
11.   Have you recently worried much or felt under strain? -> Do you worry much or feel under strain?
12.   Do you ever feel lonely?
13.   Are you or other family members able to visit the doctor whenever necessary?
14.   Is your doctor far away?
15.   Did anything change in the past years?

2. Nutrition

Continuously ask: 'and then?', 'why?', 'anything more?'

16.   How often do you eat?
17.   What do you eat during each of those meals?
18.   How often do you drink? Where do you get potable water?
19.   Do you have a stock of food in the house?
20.   Do you have sufficient food to feed yourself?
21.   De you have sufficient food to feed your family?
22.   Do you feel you can enjoy a meal whenever you need one?
23.   Do you eat many different types of food? -> Are you a vegetarian? If no: Do you feel you can eat sufficient meat, chicken or fish?
24.   Do you feel you can eat sufficient vegetables?
25.   Did anything change in the past years?

3. Accommodation and Surroundings

Continuously ask: 'and then?', 'why?', 'anything more?'

26.   What type of house do you live in?
27.   How many rooms do you have? What type of roof?
28.   Do you have light, electricity and/or gas?
29.   Is your current accommodation adequate or inadequate for your current needs?
30.   How did you choose and obtain your home?
31.   Do you feel you were involved in choosing your home?
32.   Are you prevented from moving home for any reason?
33.   Did anything change in the past years?

4. Education

Continuously ask: 'and then?', 'why?', 'anything more?'

34.   What is your highest education? Can you read and/or write? Can you count? Do you have a signature?
35.   Would you have wanted to go longer back then? Do you still want this?
36.   Do you have any diplomas? Have you ever attended any courses?
37.   Where did you learn to do your work?
38.   In which ways do you have access to information? And how often do you use these?
39.   In your day-to-day life, do you face problems you cannot solve yourself? What kind of problems and how do you solve them?
40.   Did anything change in the past years?
        How often do you use your imagination and or reasoning in your day to day life? ->

better fits in 'meaningful work'

5. Meaningful Work

Continuously ask: 'and then?', 'why?', 'anything more?'

41.	What are your day-to-day activities? Do you like what you do?
42.	Which days and at what times do you work?
43.	Do you work together with other people?
44.	Do you feel you are playing a useful part in your normal day-to-day activities?
45.	To what extent do your day-to-day activities make use of your skills and talents?
46.	How often do you use your imagination and or reasoning in your day to day life?
47.	Do you feel appreciated in your day-to-day activities?
48.	Did anything change in the past years?

6. Leisure

Continuously ask: 'and then?', 'why?', 'anything more?'

49.	Do you enjoy your day-to-day activities?
50.	What do you do when you don't work?
51.	Do you have free time, when you don't have to do anything?
52.	Do you need more free time?
53.	What do you do in your free time?
54.	Do you enjoy your free time?
55.	Are there any more activities you would like to do?
56.	Did anything change in the past years?

7. Mobility

Continuously ask: 'and then?', 'why?', 'anything more?'

57.	Do you go out often?
58.	Where do you go when you go out?
59.	What kinds of transportation is available to you?
60.	What is your favourite type of transportation?
61.	What kind of transportation do you use and which ones by yourself?
62.	Do you feel prohibited from using or personally operating any kinds of transportation (which you would like to use or operate)?
63.	Did anything change in the past years?

8. Friends and Community

Continuously ask: 'and then?', 'why?', 'anything more?'

64.	Do you feel like having sufficient friends? -> Do you have friends ?
65.	When do you meet your friends?
66.	Do you find it difficult to establish friendships?
67.	Do you know a lot of people in your community?
68.	When do you meet the people in your community?
69.	What kind of things do you talk about with your friends?
70.	Do you find it easy or difficult to express feelings of love, grief, longing, gratitude, and anger?
71.	Do you feel appreciated by your friends?
72.	Did anything change in the past years?

9. Self-determination

Continuously ask: 'and then?', 'why?', 'anything more?'

73.	Do you evaluate how you lead your life and where you are going in life?
74.	Are you happy?
75.	Do you feel like having control over your own life?
76.	Do you make your own decisions?
77.	Do you think people in your community are able to use contraception or infertility treatment?
78.	Do you think people in your community consider abortion?
79.	Are you satisfied about the way you are leading your life?
80.	Did anything change in the past years?

10. Cultural and Spiritual Life

Continuously ask: 'and then?', 'why?', 'anything more?'

81.	Are you free to express your political views and participate in political activities?
82.	Do you vote?
83.	Which party do you support?
84.	What is your religion?
85.	Are you free to practice your religion as you want to?
86.	What do you do when you practice your religion?
87.	What are your daily rituals (e.g., eating, cooking, sleeping)?
88.	Did anything change in the past years?

11. Partner and Family

Continuously ask: 'and then?', 'why?', 'anything more?'

89.	Do you have a partner? If yes: How did you and your partner get together?
90.	Do you have children, parents, parents-in-law, siblings?
91.	When do you spend time together with your partner / children / parents / siblings? What do you do together?
92.	Who is the decision maker in your family?
93.	Do you feel appreciated by your family?
94.	Do you feel sufficiently involved in decision making in the family decision making?
95.	From who do you receive love, care and/or support?
96.	Who do you go to first if you feel lonely or sad?
97.	Do you feel happy with your partner?
98.	Do you think people in this community can leave their partner if they want to?
99.	Did anything change in the past years?

12. Safety and Security

Continuously ask: 'and then?', 'why?', 'anything more?'

100.	Are you ever hit/bothered or had any arguments/fights either inside your home or outside on the street? / Do you think people in your community feel safe inside their house? -> Are there quarrels / arguments / fights / shouting either inside your home or outside on the street?
101.	Do you feel safe walking alone in the area near your home?
102.	Do you ever experience discrimination or are you ever bullied? Why?
103.	Do you dare to go out during the day? And during the night?
104.	Do you think people are discriminated in the area you live in?
105.	Did anything change in the past years?

13. Products, Animals and Plants

Continuously ask: 'and then?', 'why?', 'anything more?'

106.	Do you have any products. If yes: How attached are you to them?
107.	Do you want to have more products? Which products?
108.	Do you have any animals? If yes: How attached are you to them?
109.	Do you want more animals? What kind of animals?
110.	Do you have any plants. If yes: How attached are you to them?
111.	Do you want to have more plants? What kind of plants?
112.	Did anything change in the past years?

D.4 Themes and questions 0.3

In table 9, the themes and questions of the CDD approach / ODK, after the third iteration, are listed.

Table 9: Themes and questions adjusted according to iteration 3

0. Introduction questions

74.	What is your name?
75.	What is your age?
76.	Where are you from?
77.	What is your religion?
78.	What do you love, what is your passion?
79.	What does a normal day in your life look like?

1. Health

Do you feel your life expectation is sufficiently long?

Are you or other family members able to visit the doctor whenever necessary?

Do you feel your health limitations obstruct you in your day-to-day activities?

Do you feel you are able to fulfil your wish for children?

Do you worry much or feel under strain?

Do you feel lonely?

80.	Do you have a toilet? Where do you go when nature calls?
81.	How old are your parents and are they still alive? Are all your brothers and sisters still alive?
82.	How old do you think you will become? Do you want to live longer?
83.	Are you ever sick? Do you have any health limitations?
84.	Can you and your family visit the doctor when you are ill?
85.	Is your doctor far away?
86.	Do you want to have (more) children?
87.	Do you worry much or feel stressed? Do you sleep well?
88.	Do you ever feel lonely?

➔ *Continuously ask: and then? Why? Anymore? Changes?*

2. Nutrition

Do you feel you have sufficient food to feed yourself?
Do you feel you have sufficient food to feed your family?
Do you feel you can enjoy a meal whenever you need one?
Do you feel you can eat sufficient meat, chicken or fish?
Do you feel you can eat sufficient vegetables?

89. What is your diet? When do you eat?
90. What do you drink? Where do you get potable water?
91. Do you have a stock of food in your house?
92. Do you feel you have sufficient food to feed yourself?
93. Do you feel you have sufficient food to feed your family?
94. Do you feel you can enjoy a meal whenever you need one?
95. Are you a vegetarian?
96. Do you like to eat fresh meat, chicken or fish?
97. Do you feel you can eat sufficient meat, chicken or fish?
98. Do you like to eat fresh vegetables?
99. Do you feel you can eat sufficient vegetables?

➔ *Continuously ask: and then? Why? Anymore? Changes?*

3. Accommodation

Do you feel you were involved enough in choosing your home?
Do you feel your home is your own property?
Do you feel prevented from moving to another home for any reason?
Do you feel your current accommodation is adequate for your current needs?

1. What type of house do you have?
2. With whom? Rooms? Roof? Light, electricity, gas?
3. When did you move here? Why?
4. Did you build this house yourself?
5. Did you make any changes to this home?
6. How did you pay for this home?
7. Are there other houses/places that you would really like to live?
8. Do you think you will live here the rest of your life?
9. Do you want to change something in your house?

➔ *Continuously ask: and then? Why? Anymore? Changes?*

4. Education

Do you feel you are properly educated? Do you feel you have sufficient knowledge? Do you feel you have sufficient access to information?

10. Have you ever been to school, how many years?
11. Would you have wanted to go longer back then? Do you still want this?
12. Where did you learn to do your work?
13. Did you follow any courses?

14.	Do you have any other diplomas?
15.	Can you read and write? Can you count? Do you have a signature?
16.	Do you want or need any of these?
17.	In your day-to-day life, do you often face problems you cannot solve by yourself?
18.	What kind of problems? Then what do you do?
19.	Do you always find an answer?

➔ *Continuously ask: and then? Why? Anymore? Changes?*

5. Meaningful Work

Do you feel you can enjoy your normal day-to-day activities?

Do you feel you can use your imagination and or reasoning in your day-to-day activities?

Do you feel you are playing a useful part in your normal day-to-day activities?

Do you feel you make enough use of your skills and talents in your day-to-day activities?

Do you feel you are appreciated in your normal day-to-day activities?

20.	What kind of work do you do during the day?
21.	When do you work (time/day)?
22.	Do you work together with other people?
23.	What kind of activities do you have to do?
24.	What are the things you are good at in your work?
25.	Why do you do this?
26.	Do you like what you do?

➔ *Continuously ask: and then? Why? Anymore? Changes?*

6. Leisure

Do you feel you have sufficient spare time, in which you can decide what to do?

Do you feel you can enjoy your recreational activities?

27.	Do you have free time, when you don't have to do anything?
28.	What do you do in your free time?
29.	What do you do when you don't work?
30.	Do you enjoy this?
31.	Do you need more free time?
32.	Are there other activities you would like to do?

➔ *Continuously ask: and then? Why? Anymore? Changes?*

Do you enjoy your day-to-day activities? -> moved to meaningful work

7. Mobility

Do you feel you can go out of the house whenever you want to?

Do you feel you can go wherever you want to go?

Do you feel prohibited from using any kinds of transportation (which you would like to use)?

Do you feel prohibited from personally operating any kinds of transportation (which you would like to operate)?

33.	Do you go out often?
34.	Which places do you visit in your village?
35.	Do you ever go out of the village?
36.	Which types of transportation do you use?
37.	What is your favourite type of transportation?
38.	Do you own any transportation devices?
39.	Do you want to own transportation devices?
40.	Which other places do you want to visit?

➜ *Continuously ask: and then? Why? Anymore? Changes?*

8. Friends

Do you feel accepted within your community / by your friends?

Do you feel appreciated within your community / by your friends?

Do you find it difficult to make friendships?

Do you find it difficult to express feelings of love, grief, longing, gratitude, and anger?

41.	Do you know a lot of people in your community?
42.	When do you see the people in your community?
43.	Do you have friends?
44.	When do you see your friends?
45.	What kind of things do you talk about with your friends?
46.	Do you feel like you can tell your friends everything?

>> Social status <<

➜ *Continuously ask: and then? Why? Anymore? Changes?*

9. Self-determination

Do you feel you can evaluate how you lead your life and where you are going in life?

Do you feel you live your life satisfactorily?

Do you feel prohibited from using contraception, abortion or infertility treatment?

47. Are you happy?
48. Do you have a dream of a different life?
49. If you could change anything in your life, what would you want to change?
50. Do you have a plan of what you want to do or be in life?
51. What do you want to achieve in your life?
52. Do you make your own decisions?
53. Do you ever consider using contraception? / Do you think people here want to use contraception?
54. Do you ever consider abortion? / Do you think people here want an abortion?

➜ *Continuously ask: and then? Why? Anymore? Changes?*

10. Cultural Life

Do you feel free to practice your religion as you want to?

Do you feel free to express your political views and participate in political activities?

Do you feel prohibited from performing your cultural habits?

55. What is your religion?
56. Has this always been your religion?
57. What about your parents?
58. How do you practice it?
59. Do you vote in government elections?
60. Which party do you support?
61. Do you fit in your community?
62. What are your daily rituals?
    - e.g. what is your eating ritual (where, when, how, with what)?
    - e.g. what is your cooking ritual (where, when, how, with what)?
    - e.g. what is your sleeping ritual (where, when, how, with what)?

➔ *Continuously ask: and then? Why? Anymore? Changes?*

11. Family

Do you experience sufficient affection from your partner?

Do you feel happy with your partner?

Do you feel you are sufficiently involved in the family decision making?

Do you feel prohibited from leaving your partner if you would want to?

Do you feel appreciated by your family?

63. Do you have a partner/children?
64. How did you and your partner get together?
65. When do you and your partner/children spend time together?
66. Who is the decision maker in your family?
67. When do you see your parents? When do you see your brothers and sisters? And other family?
68. What do you like most about your partner? Are you happy with your partner? What do you do together?
69. Who can you count on most?
70. From whom do you receive love/care/support?
71. Who do you go to first if you feel lonely/sad?

➔ *Continuously ask: and then? Why? Anymore? Changes?*

12. Safety

Do you feel safe inside your home?

Do you feel safe walking alone in the area near your home?

Do you feel discriminated or bullied?

72. Are there quarrels/arguments/fights/shouting either inside your home or outside on the street?
73. Do you feel secure in the area you live in?
74. Do you dare to go out during the day?
75. Do you dare to go out at night?
76. Do you think people are discriminated in the area you live in?

➔ *Continuously ask: and then? Why? Anymore? Changes?*

13. Belongings

Do you feel sufficiently attached to products?
Do you feel sufficiently attached to plants?
Do you feel sufficiently attached to animals?

77. Which objects do you love to use?
78. Are there certain objects you need to have?
79. Are there certain objects you want to have?

80. Are there any plants/trees in or near your house?
81. Do you like them? Do you care for them?
82. Do you want more plants?
83. Do you grow plants yourself or do you want to?

84. Do you own domestic animals?
85. What is your favourite animal?
86. Do you want (more) animals?
87. Do you like animals? Do you respect animals?

➔ *Continuously ask: and then? Why? Anymore? Changes?*

D.5 Themes and questions 1.0

In table 10, the themes and questions of the CDD approach / ODK, after the fourth and final iteration, are listed.

Table 10: Themes and questions adjusted according to iteration 4

0. Introduction questions

What is your social status?

100. Gender
101. What is your name?
102. What is your age?
103. Where are you from?
104. What is your religion?
105. What work do you do?
106. Do you belong to a specific social group?

0. Timeline – Daily rituals, habits, customs

Do you feel prohibited from performing your cultural habits?

107. What are your daily rituals?

108. Can you describe your normal day to day activities?
         (Getting up, eating, working, leisure, sleeping, other)
109. Is it different on specific days?
110. Which habits/customs do you have?
111. Do you enjoy the things you do in a day?
112. Do you have sufficient time to do all the things you want in a day?
113. Do you take rest?
114. Is there anything you would like to change?

1. Healthcare - Doctor, hospital, dentist

Are you or other family members able to visit the doctor whenever necessary?

115. Where does your doctor live? How far away is that?
116. What type of doctor do you have? (quack, homeopathic, allopathic, family doctor, other)
117. How often do you visit the doctor? When do you visit?
118. Can you and your family visit the doctor when required?
119. How far is the hospital?
120. How often do you visit the hospital/clinic? When do you visit?
121. Can you and your family visit the hospital/clinic when required?
122. How far is the dentist?
123. How often do you visit the dentist?
124. Can you and your family visit the dentist when required?
125. Where do you get your medicine? And medical devices?
126. Is there anything that you require concerning healthcare?

➜ *Continuously ask: And then? Why? Anymore?*

2. Health I - Physical condition

Do you feel your life expectation is sufficiently long?
Do you feel your health limitations obstruct you in your day to day activities?
Do you feel you are able to fulfil your wish for children?
Do you feel prohibited from using contraception, abortion or infertility treatment?

127. Do you or your family members have any health problems?
128. If there are health problems; do they obstruct you/your family members in your/their daily activities?
129. Do you or your family members need to take any medicine?
130. Do you want to have children/more children?
131. Do you have a bathroom and/or a toilet?
132. Where do you go when nature calls?
133. Did anything change in physical health recently?
134. How old do you want to become?
135. What do you do to prevent illnesses?
136. Is there anything that you require concerning your health?

If applicable:

137. Are you somehow obstructed to do your daily activities when you are menstruating?
138. Do you have a place to change when you are menstruating?

➜ *Continuously ask: and then? Why? Anymore?*

2. Health II - Feelings and emotional support

Do you worry much or feel under strain?
Do you feel lonely?
Do you find it difficult to express feelings of love, grief, longing, gratitude, and anger?

139. Do you worry much? Do you ever feel stressed?
140. Do you sleep well?
141. Do you ever feel sad or lonely?
142. Do you ever feel happy?
143. How do you see yourself?
144. Which characteristics of yourself are you proud of?
145. Who do you go to when you feel sad or lonely?
146. Who do you go to when you feel happy?
147. Who can you count on most for love, care and support?
148. Do you find it difficult to express your feelings?
149. Do you feel like you can tell your partner/family everything?
150. Do you feel like you can tell your friends everything?
151. Did anything change regarding your feelings and sharing them?
152. Is there anything that you would like to change regarding your feelings and sharing them?

➜ *Continuously ask: and then? Why? Anymore?*

3. Nutrition – Food and Drinks

Do you feel you have sufficient food to feed yourself?
Do you feel you have sufficient food to feed your family?
Do you feel you can enjoy a meal whenever you need one?
Do you feel you can eat sufficient meat, chicken or fish?
Do you feel you can eat sufficient vegetables?

153. Do you have a special diet (vegetarian or other)?
154. What do you generally eat? Do you like what you generally eat?
155. What else would you like to eat?
156. How many times a day do you eat? When?
157. Do you feel you can eat whenever you want to?
158. Do you ever feel hungry?
159. Do you feel you have sufficient food for you and your family?
160. Where do you get your food?
161. Do you keep a stock of food in your house?
162. Do you have a refrigerator?
163. Who cooks?
164. Do you like to eat meat, chicken or fish?
165. Do you feel you can eat sufficient meat, chicken or fish?

166. Do you like to eat vegetables?
167. Do you feel you can eat sufficient vegetables?
168. Do you feel you can eat varied enough?
169. What do you generally drink?
170. Do you feel you have sufficient healthy drinks for you and your family?
171. Do you feel you can drink whatever you would want to?
172. Any changes in food and drinking habits recently?
173. What would you like to change in your food and drinking routine?

➔ *Continuously ask: and then? Why? Anymore?*

4. Accommodation – Type / size / rooms, choice / ownership

Do you feel you were involved enough in choosing your home?
Do you feel your home is your own property?
Do you feel your current accommodation is adequate for your current needs?
Do you feel prevented from moving to another home for any reason?

174. What type of house do you have (roof, walls)?
175. How many rooms does your house have?
176. When did you start living here?
177. Why did you choose to live here?
178. How did you acquire the house (rented, bought, build)?
179. How did you pay for this home?
180. Do you feel that this is your own house?
181. What have you changed in the house since you started living here?
182. Is there anything that you would like to change in your current house?
183. Do you think you will live here the rest of your life?
184. Are there any other houses/places that you would like to live?

➔ *Continuously ask: and then? Why? Anymore?*

5. Land – Property, fertility

Do you feel you were involved enough in choosing your land?
Do you feel your land is your own property?
Do you feel your current land is adequate for your current needs?

185. Do you own any land? How much? Where is the land?
186. When did you get this land?
187. What type of land do you have?
188. How did you pay for this land?
189. Do you feel that this is your own land?
190. Did your possession of land change recently?
191. Do you want to have (more) land?

➔ *Continuously ask: and then? Why? Anymore?*

6. Education and Information I – Formal education, literacy, training

Do you feel you are properly educated?

Do you feel you can use your imagination and or reasoning in your day-to-day activities?

192. Have you ever been to school, how many years?
193. Would you have wanted to go longer to school back then?
194. Where is the school? What type of school is this? How do you get admitted there? What do you think of the teachers?
195. Has your partner been to school, how many years?
196. Can you read and write? Can you count? Do you have a signature? Do you want or need any of these?
197. Which languages do you speak?
198. Do you ever imagine or fantasize in your daily activities?
199. Do you ever use reasoning in your daily activities?
200. Did you follow any courses / trainings? Do you have any other diplomas?
201. Would you like to learn more right now (trainings, courses)?

➔ *Continuously ask: and then? Why? Anymore?*

6. Education and Information II – Knowledge, skills, information

Do you feel you have sufficient knowledge?

Do you feel you make enough use of your skills and talents in your day-to-day activities?

Do you feel you have sufficient access to information?

202. In your day-to-day life, do you ever face problems you cannot solve by yourself?
203. What kind of problems? Then what do you do?
204. Would you like to use more of your knowledge in your daily activities?
205. Would you like to use more of your skills in your daily activities?
206. What are the things you are good at in you daily activities?
207. Do your skills and talents fit your current activities?
208. Do you feel you have sufficient access to information?
209. If you have a question or need information, what do you do?
     Questions can be related to: health(care), transportation, education, nutrition, products, animals, politics, religion, other themes
210. Do you have devices that can help you to find information?
211. Do you feel that the information you obtain is useful?
212. Do you always find an answer?
213. Is there a need for you to find more information?
214. Are there any more ways for you to gather information that would be convenient?

➔ *Continuously ask: and then? Why? Anymore?*

7. Meaningful Work – Type of work, colleagues

Do you feel you can enjoy your normal day-to-day activities?

Do you feel you are playing a useful part in your normal day-to-day activities?

Do you feel you are appreciated in your normal day-to-day activities?

215. What kind of work do you do during the day?
216. What kind of work do your family members do?
217. Who does the household work?
218. When do you work (time/day)?
219. What kind of activities do you do? Why?
220. How did you choose your work?
221. Where did you learn how to do this work?
222. What do you like best about your daily activities?
223. What do you dislike about your daily activities?
224. What are the things you are good at in your work?
225. Do you feel appreciated in your daily activities?
226. Did anything change recently in your job of the jobs or your family members?
227. Do you like the activities that you do in a day?
228. Is there anything that you would like to change?
229. Is there anything else that you would like to do?

If applicable:
230. Do you have a boss/co-workers/employees?
231. Do you have a good contact with them?
232. How long do you know them?
233. Do you meet your colleagues also outside working hours?
234. Do you feel accepted at work?

➡ *Continuously ask: and then? Why? Anymore?*

8. Income – Economic security, expenses

Do you feel your current income is adequate for your current needs?

235. How much money does your family earn?
236. Is this amount sufficient for your family?
237. What do you spend money on?
238. Do you find it difficult to choose between options to spend your money on?
239. Are you able to save money?
240. Do you feel you can buy everything you want?
241. With which amount of earnings would you be satisfied?
242. Did anything recently change in the amount of family earnings?

➡ *Continuously ask: and then? Why? Anymore?*

9. Leisure – Time, activities

Do you feel you have sufficient spare time, in which you can decide what to do?
Do you feel you can enjoy your recreational activities?

243. Do you have free time, when you don't have to do anything?
244. Do you feel free to do nothing?
245. How much time is free in a week?

246. What do you do in your free time?
247. With whom do you enjoy time together (family / friends / community members / colleagues / other)?
248. What do you do when you meet them in your free time?
249. Do you enjoy this?
250. Do you feel you need more free time?
251. Are there other activities you would like to do?

➡ *Continuously ask: and then? Why? Anymore?*

10. Mobility – Places, modes of transportation

Do you feel you can go out of the house whenever you want to?
Do you feel you can go wherever you want to go?
Do you feel prohibited from using any kinds of transportation (which you would like to use)?
Do you feel prohibited from personally operating any kinds of transportation (which you would like to operate)?

252. Do you go out often?
253. Which places do you go when you leave your house?
254. What is your favourite place to go?
255. Do you ever go out of the village?
256. What is the furthest place you ever went?
257. Are you able to go wherever you want to go? Whenever you want to go?
258. Is it safe to go everywhere you want to go?
259. Which types of transportation do you use?
     To go to work/market/leisure activities/holiday?
260. Have you used any other types of transportation in the past?
261. Which places would you like to visit (more often)?
262. What is your favourite type of transportation?
263. Would you like to use any other types of transportation?

➡ *Continuously ask: and then? Why? Anymore?*

11. Significant Relationships – Friends, community

Do you find it difficult to make friendships?
Do you feel accepted within your community / by your friends?
Do you feel appreciated within your community / by your friends?

264. Do you have any friends?
265. How did you get to know these friends (family, neighbours, work, other)?
266. How long do you have those friends?
267. When do you meet your friends?
268. What do you do when you meet your friends?
269. What kind of things do you talk about with your friends?
270. Do you feel like you can tell your friends everything?
271. Do you like to meet your friends? Would you like to meet them more often?
272. Do you know a lot of neighbours/ people in your community?

273. Do you feel accepted in your community/neighbourhood?
274. When do you meet the people in your community?
275. Do you fit in your community? Are there people who do not fit in the community?
276. How does your community perceive outsiders?
277. Did anything change in relation to your friends recently?
278. Is there anything that you would like to change in your current friendships?

➔ *Continuously ask: and then? Why? Anymore?*

12. Dreams and Plans

Do you feel you can evaluate how you lead your life and where you are going in life?
Do you feel you live your life satisfactorily?

279. Do you have a plan of what you want to do or be in life?
280. What do you want to achieve in your life?
281. Do you feel you are in charge of your own life?
282. Can you decide yourself what you want to do or be in life?
283. Are you satisfied with your life as it currently is?
284. Do you have a passion?
285. Who do you go to for advice about your life?
286. If you could change anything in your life, what would you want to change?
287. Do you have a dream of a different life?

➔ *Continuously ask: and then? Why? Anymore?*

13. Spirituality

Do you feel free to practice your religion as you want to?

288. Does your family have the same religion as you have?
289. How much time do you spend on religion/spirituality?
290. What do you do when you spend time on religion/spirituality?
291. Which spiritual rules do you find most important?
292. Have you ever changed your religion or did you consider other religions?
293. What do you think about other religions?
294. Would you like to spend more time on religion/spirituality?
295. How do you find inner harmony and piece?

➔ *Continuously ask: and then? Why? Anymore?*

14. Politics – Political support, involvement

Do you feel free to express your political views and participate in political activities?

296. Do you vote?
297. Are you involved in politics? Do you feel free to participate in politics?
298. Do you feel free to express your political views?
299. Does the government provide sufficient support?
300. Do you ever meet public officials?

301. Did anything change recently concerning the political situation?
302. Would you like to participate (more) in politics?

➔ *Continuously ask: and then? Why? Anymore?*

15. Nuclear Family – Partner, children

Do you experience sufficient affection from your partner?
Do you feel happy with your partner?
Do you feel you are sufficiently involved in the family decision making?
Do you feel prohibited from leaving your partner if you would want to?
Do you feel appreciated by your family?

303. With whom do you live together?
304. Do you have a partner / children?
305. How did you and your partner get together?
306. What do you like most about your partner?
307. Are you happy with your family?
308. How much time do you spend with your family?
309. What do you do together? What do you talk about together?
310. Did anything change in your nuclear family or family relations recently?
311. Is there anything that you would like to change in your relationship with your partner or children?
312. Do you feel appreciated by your family?

➔ *Continuously ask: and then? Why? Anymore?*

16. Kindred Family – Parents, siblings, in-laws

Do you feel accepted by your family?
Do you feel appreciated by your family?

313. Do you still have parents and how old are they?
314. Where do your parents live?
315. Do you have any brothers and sisters?
316. How often do you meet your family (parents/siblings)?
317. Are you happy with your family (parents/siblings)?
318. Do you experience any family pressure?
319. Did anything change in your family or family relations recently?
320. Is there anything that you would like to change in your current family relationships?
321. Do you feel appreciated by your family?

If applicable:
322. Do you feel accepted by your in-laws?
323. Are your partner's parents still alive and where do they live?
324. Does your partner have any brothers and sisters?
325. How often do you meet your in-laws?
326. Are you happy with your in-laws?

→ *Continuously ask: and then? Why? Anymore?*

17. Safety and Security – in the area, fright

Do you feel safe inside your home?
Do you feel safe walking alone in the area near your home?
Do you feel discriminated or bullied?

327. Do you feel safe and secure in the area you live in?
328. Do you feel safe to go outside in the daytime? And your family?
329. Do you feel safe to go outside in the night? And your family?
330. Are there any quarrels/fights /crime in your surroundings?
331. How often are there quarrels/fights?
332. Are there any conflicts in the surroundings?
333. Who solves the conflicts in your surroundings?
334. Do you think people are discriminated or bullied in the area you live in?
335. Do you ever feel discriminated or bullied?
336. Are you ever afraid of anything?
337. Do you ever feel insecure or unsafe?
338. Has your feeling of safety and security changed recently?
339. Is there anything you would like to change to make you feel more safe/secure?

→ *Continuously ask: and then? Why? Anymore?*

18. Products and Services – Household, transportation, other

Do you feel attached to products?

340. Do you have light, electricity, gas?
341. How do you cook?
342. What kind of household products do you have?
343. Which household product/service do you like most? Why?
344. What kind of communication products do you have?
345. Which communication product/service do you like most?
346. What kind of transportation products do you own?
347. What kind of transportation services are available in your surroundings (private and public transportation)?
348. Are there any other products or services that you have or use?
349. What is your favourite product?
350. Did anything change recently in products/services that you had or have?
351. Do you feel you can buy everything you want?
352. Are there any products or services that you would like to have? Why?

→ *Continuously ask: and then? Why? Anymore?*

19. Animals

Do you feel attached to animals?

353. Do you like animals?

354. Do you own any animals?
355. When did you get these animals?
356. Do you have sufficient food for your animals?
357. What is your favourite animal?
358. Do you want to own (more) animals?

➜ *Continuously ask: and then? Why? Anymore?*

20. Nature – Plants, trees, pollution, climate

Do you feel attached to plants?

359. Do you like plants and trees?
360. Do you own any plants or trees?
361. Do you have any plants or trees in your surroundings?
362. When did you get these plants or trees?
363. Do you want to own (more) plants or trees?
364. Is the area you live in clean or polluted?
365. Where do you dispose waste?
366. How is the climate / weather in your surroundings?

➜ *Continuously ask: and then? Why? Anymore?*

21. Speaking up – Decision making, speaking freely

Do you feel you are sufficiently involved in family decision making?
Do you feel you are sufficiently able to speak up freely?

367. Who makes the decisions in your family?
368. Do you make your own decisions?
     Decisions can be related to: accommodation, household, family, products, nutrition, healthcare, other?
369. Would you like to be more involved in decision making?
370. Are you confident?
371. Did anything change in decision making recently?
372. Are you able to speak up freely?
373. Are you able to express emotions?
374. Are you able to express aspirations?
375. Would you like to speak up more?

➜ *Continuously ask: and then? Why? Anymore?*

Product questions – Acquiring, Usage, Satisfaction, Changes

1. How did you find out about the product?
2. When did you acquire the product?
3. How did you acquire the product?

4. Why did you acquire the product?
5. Can you describe how you use the product?
6. Are there any functions you don't use?
7. Do you like to use the product?
8. Who else besides you uses the product?
9. Which additional products do you need when using this product
10. Where do you get these?
11. Did you make any changes to the product to your own preferences?
12. Do you consider the product to be your own property?
13. What do you like about the product?
14. What do you dislike about the product?
15. What would you like to change or add to the product?
16. How did you perform the function of the product before?
17. Comparing the situation before and after acquiring the product, what has changed for you personally?
18. Do you feel like you have more or less possibilities?
19. Does the product contribute to your happiness?
20. Where there any changes due to the product that we did not mention yet?

D.6   Themes and questions 2.0

In table 11, the themes and questions of the CDD approach / ODK, after the evaluation, are listed.

Table 11: Themes and questions adjusted according to the evaluation

Introduction

Social status, daily rituals, habits, customs

Basic information

Note down: Gender and race of participant, interview setting, audience present, translator details
1. What is your name?
2. What is your age?
3. Where are you from?
4. What is your religion?
5. What work do you do?

Timeline

6. Can you describe your normal day to day activities?
   (Getting up, eating, working, leisure, sleeping, other)
7. Do you have sufficient time to do all the things you want in a day?
8. When do you take rest?
9. Which days are different?

10. Do you enjoy the things you do in a day?
11. Is there anything you would like to change?

Person

Self-Reflection & Dreams

Self –reflection, identity, plans for the future, self-improvement, goals, habits, expectations, barriers, confidence, life satisfaction

1. Do you have a passion?
2. Are you satisfied with your life as it currently is?
3. What are the things you are proud of?
4. Do you have a plan of what you want to do or be in life?
5. Who do you go to for advice about your life? Who's opinion matters to you most?
6. What do you want to achieve in your life? / What do you dream about? *(can be both short-term and long-term)*
7. Can you decide yourself what you want to do or be in life?
8. Are you confident?
9. Do you feel you can make your own decisions in life? *(Decisions can be related to: accommodation, healthcare, household, family, products, nutrition, other?)* Would you like to be more involved in decision making?
10. If you could change anything in your life, what would you want to change?

➔ *"How / why / what / who / where / when ……………………?"*

Spirituality

Religion, beliefs, rituals, functionings. Involvement of others, time spend, way of practicing, body energy, inner peace, intentions

11. What does spirituality mean to you? Is it important to you?
12. How much time do you spend on spiritual practices? Would you like to spend more time?
13. What do you do when you spend time on spirituality?
14. Which spiritual rules do you follow? Why?
15. Which religion do you follow? And your family?
16. What do you think about other religions? Have you ever considered other religions?
17. How do you find inner harmony and peace?
18. Which things in life give you energy?
19. Do you believe in guilt and punishment?

➔ *"How / why / what / who / where / when ……………………?"*

Knowledge & Skills

Formal / informal education, sufficiency of knowledge and skills, capacities, training, imagination, reasoning, reading, writing, languages, work, activities, talents, availability of education, critique

20.   Have you ever been to school, how many years? And your partner? And your children?
21.   Would you have wanted to go longer to school back then? If yes: why didn't you?
22.   How do you improve upon your knowledge and skills?
23.   Did you follow any courses / trainings? Do you have any other diplomas?
24.   Would you like to learn more right now (trainings, courses)? What would you like to learn?
25.   Do your children go to school? Where is the school? What type of school is this? How do you get admitted there? What do you think of the teachers?
26.   Which languages do you speak? Can you read and write? Can you count? Do you have a signature? Do you want or need any of these?
27.   What are the things you are good at in you daily activities?
28.   Do you use your skills and talents in your daily activities? Would you like to use them more?
29.   Do you use your knowledge in your daily activities? Would you like to use it more?
30.   Do you ever face problems you cannot solve by yourself? What kind of problems? Then what do you do?

➔   *"How / why / what / who / where / when ……………………?"*

Body & Appearance

Appearance, care, hygiene

31.   How much time per day do you spend on personal care (washing, brushing teeth, clothing, styling)? What kind of products do you use?
32.   Do you find personal hygiene important?
33.   When and how often do you wash your hands?
34.   How often do you purchase new clothing? Do you like your clothing? Do you think you have sufficient clothing?
35.   How often do you go to a barber?
36.   Do you work out or exercise for a better appearance?
37.   How confident are you about your appearance?

If applicable:
38.   Are you somehow obstructed to do your daily activities when you are menstruating?
39.   Do you have a place to change when you are menstruating?

➔   *"How / why / what / who / where / when ……………………?"*

Health

Health

Physical condition, life expectation, health limitations, medicine, mortality, body energy, ability to

perform activities

1. How is your physical condition?
2. Do you have any health problems? And your family members? Do these limitations obstruct you/your family members in your/their daily activities?
3. Do you or your family members take any medicine?
4. Where do you get your medicine? And medical devices?
5. Did anything change regarding your health recently?
6. How long do you want to live?
7. How do you try to prevent illnesses?
8. How do you think about death?
9. Is there anything that you require concerning your health?

➔ *"How / why / what / who / where / when …………………?"*

Healthcare

Doctor, nurse, hospital, dentist. Formal / informal. Trust, familiarity, affordability, accessibility, connectivity, subsidies, attitude, stigma's superstition, beliefs

10. Do you have a doctor / hospital / clinic / dentist / other medical treatment facilities?
11. How did you choose your doctor / hospital / clinic / dentist / other medical treatment facilities?
12. How far away is your doctor / hospital / clinic / dentist? Are they easy to reach?
13. How often do you visit the doctor / hospital / clinic / dentist? When do you visit?
14. How familiar are you to your doctor / hospital / clinic / dentist?
15. Can you and your family visit the doctor / hospital / clinic / dentist when required? Are they expensive? How do you pay for them?
16. Do you trust your doctor / hospital / clinic / dentist?
17. What type of doctor do you have (quack, homeopathic, allopathic, family doctor, other) ? Why?
18. Is there anything that you require regarding healthcare?

➔ *"How / why / what / who / where / when …………………?"*

Happiness & Worries

Happiness, bless, worries, stress, strain, love, care, support, loneliness, expression of feelings, vulnerability, uncertainty about future

19. Are you happy? Are you hopeful? Why?
20. Who do you go to when you feel happy?
21. Who can you count on most for love, care and support?
22. What do you feel blessed about?
23. Do you find it difficult to express your feelings?
24. Do you worry much? Do you ever feel stressed? Do you sleep well? Why?
25. Do you ever feel sad or lonely? Why?

26. Who do you go to when you feel sad or lonely?
27. Who are you able to tell everything?
28. Have you ever felt differently about life?
29. What would you like to change regarding your feelings and sharing them?

➔ *"How / why / what / who / where / when …………………?"*

Food & Drinks

Habits, intake, nutritional value, availability, affordability, variety, quality, cooking

30. What do you generally eat and drink? Do you have a special diet (vegetarian or other)?
31. Do you like what you generally eat? What else would you like to eat?
32. How many times a day do you eat? When?
33. Do you keep a stock of food in your house? Do you have a refrigerator?
34. Do you like to eat meat, chicken or fish? And vegetables?
35. Where do you get your food and drinks?
36. Do you feel you can eat varied enough?
37. Do you ever feel hungry? Do you feel you can eat and drink whenever you want to?
38. Do you feel you have sufficient food and drinks for you and your family?
39. Do you feel you can eat sufficient meat, chicken or fish? And vegetables?
40. Have your food and drinking habits changed in the last years?
41. What would you like to change in your food and drinking routine?

➔ *"How / why / what / who / where / when …………………?"*

Relationships

Family

Partner, children, parents, siblings, in-laws. Ties, care, attachment, love, romance, children (contraception, abortion, infertility treatment), activities, decision making, speaking up / having voice, support, acceptance, appreciation, competition, cooperation, pressure, hierarchy, tradition, sharing, knowledge transfer

1. With whom do you live together in your house?
2. How much time do you spend with the family members with whom you live together?
3. What do you do together? What do you talk about together?
4. If applicable: How did you and your partner get together? What do you like most about your partner? When do you spend time together with your partner?
5. If applicable: Do you have children? Do you want to have children / more children? What do you find most important to offer your children? What do you like them to become?
6. Do you still have parents? Where do they live?
7. Do you have any brothers and sisters? Where do they live?
8. Do you have in-laws? Where do they live?

9. How often do you meet your parents / siblings / in-laws? What do you do together?
10. Are you happy with your family?
11. Do you have specific family traditions and / or celebrations?
12. Do you feel appreciated / accepted by your family?
13. In which ways do you support your family? Do you feel like you can count on your family for support?
14. Who makes the decisions in your family? Why?
15. Are you able to speak up freely in your family?
16. Are you able to express emotions and aspirations within your family?
17. Do you feel you can make your own choices in life? Do you experience any family pressure?
18. Did anything change in your family or family relations recently?
19. Is there anything you would like to change in your family?

➔ *"How / why / what / who / where / when ……………………?"*

Community

Friendships, ties, activities, attachment, stigmatisation, class differences, acceptance, appreciation, competition, cooperation, pressure, tradition, sharing, support, social status

20. Do you know a lot of neighbours / people in your community?
21. Do you feel accepted in your neighbourhood / community?
22. When do you meet the people in your neighbourhood / community?
23. Do you feel you fit in your community? Are there people who do not fit in the community?
24. Do you belong to a specific social group?
25. How does your community treat outsiders?
26. Are you able to speak up freely within your community?
27. Are you able to express emotions towards your community?
28. Did anything change in your community in the past years?
29. Is there anything that you would like to change in your community?

➔ *"How / why / what / who / where / when ……………………?"*

Social Life

Friends and acquaintances. Strong and weak ties, informal relations, networks / digital, attachment, acceptance, appreciation, competition, cooperation, pressure, tradition, sharing, support

30. Do you have friends? How and where did you get to know them? When did you get to know them?
31. Do you like to meet your friends? Would you like to meet them more often?
32. When do you meet your friends? How do you meet your friends?
33. What kind of things do you talk about with your friends? Do you feel like you can tell your friends everything?
34. What activities do you do when you meet your friends?
35. Do you feel like you can share your emotions and aspirations with your friends?

36. Did anything change in relation to your friends in the past years?
37. Is there anything that you would like to change in your current friendships?

➔ *"How / why / what / who / where / when ....?"*

Colleagues
Friends, ties, activities, attachment, acceptance, appreciation, competition, cooperation, pressure, support

38. Do you have a boss / co-workers / employees?
39. Do you have a good contact with them?
40. How long do you know them?
41. Do you meet your colleagues also outside working hours?
42. Do you feel accepted and appreciated at work?
43. Are you able to speak up freely at work?
44. Are you able to express emotions and aspirations at work?
45. Did anything change in relation to your colleagues in the past years?
46. Is there anything that you would like to change in your relationships with your colleagues?

➔ *"How / why / what / who / where / when ....?"*

Activities

Work & Spare Time
Paid / unpaid activities (household, care), leisure, hobby, Time usage / perception, activity type, where, with whom, working area, enjoyment, usefulness, power, learning / training, decision making, celebrations, relaxing

1. What kind of activities do you do during the day? And your family members?
2. Where do you work? And your family members?
3. Who does the household work? Who cooks?
4. Why did you choose this work / activities? Are you happy with this choice?
5. Where did you learn how to do this work? Which training did you have? How do newcomers learn to do their work?
6. What are the things you are good at in your work? Do you feel appreciated / useful?
7. Are there other work activities you would like to do?
8. How many hours do you work? Do you feel you need more work time?
9. How much time is free in a week? Are you able to relax in this time?
10. Is there time when you feel free to do nothing?
11. What do you do when you do not work?
12. With whom do you enjoy spare time together?
13. What do you do when you meet them in your free time? Do you enjoy this?
14. Which festivities / parties / events do you celebrate in a year? Why? When?

15. How many spare hours do you have in a week? Do you feel you need more free time?
16. What do you like best about your daily activities? And what do you dislike?
17. Is there anything else that you would like to do? Or like to change?
18. Did anything change in your job / activities in the past years?

➔ *"How / why / what / who / where / when ……………………?"*

Movements
Places to go, freedom to go out, safety to go out

19. Do you go out often? Where do you go? Why do you go out?
20. Do you often go out of your community? Why?
21. Where do you travel to? *(e.g. for family, work, spare time, friends, healthcare, shopping, political participation)*
22. What is the furthest place you ever went? Why did you go there?
23. Which places do you go when you leave your house? What is your favourite place to go?
24. Are you able to go wherever you want to go? Whenever you want to go?
25. Is it safe to go everywhere you want to go?
26. Which places would you like to visit (more often)?

➔ *"How / why / what / who / where / when ……………………?"*

Participation & Organisation
Communal, regional, national. Social activities, involvement, participation, speaking up in public / express opinion, critique, power and control, view, politics, voting procedure, misuse / misbehaviour, forgery, corruption, justice, rules and regulations, political support

27. Do you vote? How do you vote? Why do you vote?
28. Are you involved in politics? Would you like to participate (more) in political activities?
29. Are you involved in social activities on a communal / regional / national level?
30. Do you feel the government provides sufficient support?
31. Have you ever met public officials?
32. Do you feel there is any corruption or misbehaviour in your community / region / country?
33. Are there many rules & regulations that you have to stick to?
34. How is the political situation in your community / region / country? Did anything change in the past years?
35. What would you like to change regarding the current political situation in your community / region / country?
36. Do you feel free to participate in political activities? Do you feel free to express your views and opinions in public? Also when they express critique?

➔ *"How / why / what / who / where / when ……………………?"*

Communication & Information

Phone, internet, relationships, solving problems, information distribution, correctness of information

37. How do you communicate with other people? Do you have a mobile phone / internet access / television?
38. Are you on social media? Does your phone have internet access?
39. How much money do you spend on mobile phone usage / internet / communication?
40. Are there other forms of communication which you would like to use?
41. What kind of communication device do you like most?
42. How do you search for information? Do you always find an answer?
    (Questions / information quest can be related to: health(care), transportation, education, nutrition, products, animals, politics, religion, other themes)
43. Do you feel you have sufficient access to information? Is the obtained information usable?
44. Is there a need for you to find more or different information?
45. Are there more ways for you to gather information that would be convenient?
46. What has changed in the past years regarding communication and information?

➔ *"How / why / what / who / where / when ……………………?"*

Living

Housing

Type, ownership, size, choice, facilities, attachment, migration, own space, comfort, envy / judging, affordability

1. What type of house do you have (roof, walls)?
2. How many rooms does your house have?
3. How do you clean your house? And how often?
4. When did you start living here? Why did you choose to live here?
5. How did you acquire the house (rented, bought, build)? How did / do you pay for this home?
6. Do you feel that your house is your own space? Do you feel comfortable in your house?
7. Do you like to invite guests to your house? Why?
8. What have you changed in the house since you started living here?
9. Do you feel your current accommodation is adequate for your current needs?
10. Do you have a bathroom and / or a toilet? Where do you go when nature calls?
11. Is there anything that you would like to change in your current house?
12. Do you feel you were involved in choosing your house?
13. Do you think you will live here the rest of your life? Why? Are you free to move?
14. Are there any other houses/places that you would like to live? Why?

➔ *"How / why / what / who / where / when ……………………?"*

Safety & Security

In- and outside the house and area, day and night. Bullying, discrimination, physical security, emotional security, cyber security, fright

15. Do you feel safe and secure in the area you live in? And outside that area?
16. Do you feel safe to go outside in day-time and night-time? And your family?
17. Are there any quarrels / fights / crime / conflicts in your surroundings? How often?
18. Who solves the conflicts in your surroundings?
19. Do you think people are discriminated or bullied in the area you live in?
20. Do you ever feel discriminated or bullied?
21. Do you ever feel scared? What are you afraid of?
22. Do you ever feel insecure or unsafe?
23. Has your feeling of safety and security changed in the past years?
24. Is there anything you would like to change to feel more safe/secure?

➔ *"How / why / what / who / where / when ……………………?"*

Facilities

Energy, energy access, water, infrastructure. Accessibility, affordability, reliability

25. Do you have light, electricity, gas?
26. What type of energy sources do you use? And what for do you use them?
27. How much money do you spend on energy?
28. Would you like to use other energy sources? Which ones?
29. How do you cook?
30. Where do you get potable / drinking water?
31. Where do you get water for cooking / cleaning?
32. Which modes of transportation do you have access to (private / public)? Which ones do you use / have you used?
33. Would you like to use any other types of transportation?
34. What is your favourite type of transportation?
35. Are there any other services / facilities that you have or use?
36. Did anything change in the past years regarding your access to energy, water or infrastructure?
37. Are there any services that you would like to have? Why?

➔ *"How / why / what / who / where / when ……………………?"*

Environment

Nature, environmental conditions, climate, wildlife, eco-system, emotional attachment, access, rules and regulations, consciousness, relaxing

38. How important is your natural environment to you?
39. Do you ever visit public spaces? What do you do there? How often do you go?
40. Are there any rules and regulations regarding the use of environment that you are aware of?
41. Which resources does your environment provide you with?

42. Where do you dispose waste?
43. How is the climate / weather in your surroundings?
44. Are there any dangers from nature in your surroundings? Is there wildlife around?
45. Is the area you live in clean or polluted?

➔ *"How / why / what / who / where / when ……………………?"*

Possessions

Products
Household, personal, mobility, communication. Characteristics, cultural value, product security, ownership, attachment, usage, fashion/ trends

1. What kind of personal / household / transportation / work related products do you have? Are there any other products that you have or use?
2. Where do you use them for?
3. Which product(s) do you like most? Why?
4. Which product(s) do you like least? Why?
5. Who makes the buying decisions?
6. Do you follow product trends? How do you stay up to date?
7. Do you feel you can buy everything you want?
8. Did anything change recently in products that you had or have?
9. Are there any products that you would like to have? Why?

➔ *"How / why / what / who / where / when ……………………?"*

Financial Situation
Savings, income, expenditure, possibilities, behaviour, affordability, accessibility / control, taxes / policies, financial security

10. How much money do you earn in a day / week / year?
11. Is this amount sufficient for your family?
12. Are you able to save money? What are you saving for?
13. Do you have loans? Why did you take a loan?
14. What do you spend money on? Who is responsible for the expenses?
15. Do you find it difficult to choose between options to spend your money on?
16. Do you feel your current income is adequate for your current needs? How much money would be enough for you and your family?
17. Which things would you like / want / need to buy?
18. Did anything recently change in your financial situation?

➔ *"How / why / what / who / where / when ……………………?"*

Natural Property

Land, plants, trees: attachment, happiness, relaxing, care, size, price, availability, usability, rules and regulations, abuse, privacy

19. Do you own any land? How much? Where is the land?
20. What type of land do you have? What do you use it for? Which benefits do you get from your land?
21. When did you get this land? How? How did you pay for this land?
22. Do you feel your current land is adequate for your current needs?
23. Do you like plants and trees?
24. Do you own any plants or trees? How much? Where are they? Where do you use them for?
25. Do you have any plants or trees in your surroundings?
26. When did you get these plants or trees?
27. Do you want to own (more) land, plants or trees?
28. Did your possession of land / plants / trees change in the past years?

➔ *"How / why / what / who / where / when ……………………?"*

Animals

Pets, cattle for work, protection or food/drinks. Acceptance, attachment, beliefs

29. Do you like animals?
30. Do you own any animals? Where do you use them for (pets, cattle, protection, food & drinks)?
31. When did you get these animals? How did you pay for them?
32. Where are your animals living? Do you have sufficient food for your animals?
33. What is your favourite animal?
34. Do you want to own (more) animals?
35. Did your possession of animals change in the past years?

➔ *"How / why / what / who / where / when ……………………?"*

APPENDIX E

Appendix E

E.   Results Iterations

E.1   Iteration 1: Micro-evaluation with five Dutch participants

Below, the full results of iteration 1 are described. Iteration 1 comprised a micro-evaluation by the research team who conducted 5 interviews in the Netherlands.

Results

In total five participants have been interviewed, of which one couple. Some details of the interviews are presented in table 12.

Table 12: Interview characteristics of micro-evaluation

Characteristics of interviews					
Interview no.	1	2	3	4 & 5	
People present	participant, 1 researcher	participant, 1 researcher	participant, partner, 1researcher	Participant 4&5, 1 researcher	
Duration (minutes)	Approx. 150	Approx. 120	Approx. 100	Approx. 170	
Facilitator & note taker	Researcher 1	Lead Researcher	Researcher 1	Lead Researcher	
Characteristics of participants					
Age	25	30	32	63	62
Gender	Female	Male	Female	Male	Female
Family	Single	Partner	Partner	Married, 2 sons, 1 daughter	
Rural/Urban	Urban (city)	Urban (city)	Urban (city)	Rural	
State	South-Holland	South-Holland	Utrecht	North-Holland	
Household income (EUR) per month	Not asked	Not asked	Not asked	Not asked	
Occupation	Student / Teacher	Engineer	PhD candidate	Service engineer	Housewife (recently retired)
CDD/ODK specifics					
Drawing and/or visualizations	Person, house	Person, house, family, context	None	Person	Person
Writing	By participant	By facilitator	By participant	By participant	By participant
Scoring each theme	yes	yes	yes	yes	yes
Amount of themes discussed	13	13	13	13	13

Efficiency and effectiveness

The average duration of the interviews was 2 hours and 15 minutes. All participants did not consider the duration a problem. The designers noticed that the longer participants had the time to reflect on

themes and think about them, the more information was obtained. During the interviews, a good insight into the lives of the participants could be obtained. Three participants indicated that the interview gave them an interesting view on their own lives, and by looking at their lives in this way they gained insights in things they were satisfied and dissatisfied about, leading to willingness to change some of these (participant 1, 4 and 5).

Steps

All steps have been followed without any issues.

Guidelines

The designers noted that the duration of the interviews was different than anticipated. Conducting the full interview and completing all the forms turned out to be a time-consuming activity, and the interviews therefore lasted between 1.5 and 3 hours, longer than the anticipated 1.5 hours. All participants indicated that they were fine with the amount of time the interviews took.

Themes

The designers noticed that:

- Some themes were more time-consuming to discuss than others. For example, one participant had a lot of travel experience, which resulted in an elaborate answer. More generally, the theme 'Products, Plants and Animals' resulted in elaborate answering, mainly about products.

Questions

The participants indicated that:

- They felt free to answer all questions (participant 1, 2, 3, 4 and 5). All questions that were posed to the participants were answered.
- By being questioned about two fixed points in time, the changes in their lives were not always properly reflected (participant 1 and 4). Some themes underwent a lot of change in between, and this information is not detected by posing questions about two points in time only.
- They honestly answered questions about their ability to use contraception, abortion and infertility treatment, their ability to leave their partner, and their feeling of safety inside the house, but that those questions might be too personal and potentially inappropriate when asking them to people who you are not very familiar with (participant 1, 3, 4 and 5).

The designers noticed that:

- Some questions already concerned participants' history, which made it irrelevant to ask about the situation three years earlier. For example: "*Do you ever go far away?*" or "*Do you feel you were involved in choosing your home?*"
- Some questions were about factual aspects, such as "*Do you participate in political activities?*" or "*Are you able to have children?*", while other questions were more focused towards opinions or perceptions, such as "*Do you feel you have sufficient spare time?*" or "*Do you feel appreciated by your family?*".

- Some questions pre-define participants' aspirations. From some questions, for example, it might be perceived that engaging in political activities, having children, spare time and appreciation from family members is desirable. This might influence participants' answering.
- The formulation of some questions caused confusion. Some questions focused on comparison towards other people *"Do you ever feel lonely compared to other people of your age?"*, which were difficult questions for participants to answer and also do not provide information about what the participants themselves feel or find important.

Techniques

The participants indicated that:

- They felt encouraged to share information while they were drawing and mapping answers to the questions posed (all participants). The one participant, who did not draw or note answers himself, did indicate that the overview of information encouraged additional answering, by also providing time to think about the answers.
- They felt insecure about what they had to draw (participant 1, 2, 4 and 5). All participants felt more comfortable when writing rather than drawing (see figure 1). The personal details sheet did encourage participants to draw, as it provided some guidance (see figure 2).
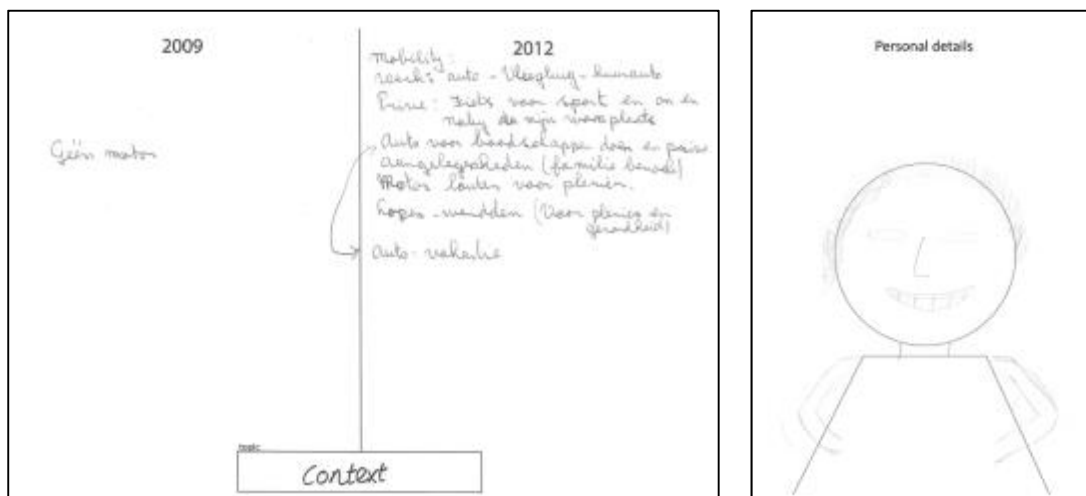
Figure 1: Participant writing instead of mapping and describing the situation in 2009 by noting down the changes only
Figure 2: Participant having drawn his own person on the personal details sheet

- Scoring the themes was a challenging task (all participants). Participants found all themes important and were ambiguous about what to score: their aspirations towards the theme, or the importance of the theme in their lives at the moment of the interview.
- They found the order of the themes and questions to be random and incoherent (participant 2 and 3). These participants explained that they did not know what to expect next, and how much to expect.

The designers noted that:

- They were sometimes lost when keeping an overview of the themes that had been discussed and the questions asked.
- Most participants drew and/or mapped themselves (only participant 2 did not).
- The participants continued to add more elements during drawing and noting things down, leading to more dialogue and insight.
- Two participants ranked the answer sheets to compare them to one another, in order to help them to score the themes. This can be seen in figure 3.

Figure 3: Ranking the answer sheets (picture by Researcher 1)

Tools

The designers noted that:

- The timeline was time-consuming.
- If situations had not changed, the participants did not want to draw or write everything down again, they preferred to describe their current situation and then indicate the differences for the situation three years earlier (see figure 1).
- The answer sheets occupied a great deal of space. The sheets covered the tables of the participants while the activity was conducted (see figure 3). If the sheets were piled up to make space, it was more difficult for the designers to keep an overview.

Conclusions

At the end of the interview, the designers, as well as the participants, obtained a broad insight into the lives of the participants. In general de interview flow was good. However, some questions need improvement, the scoring exercise appeared to be difficult to conduct and the amount of answering sheets was somewhat overwhelming. It was for both the researchers and the participants sometimes difficult to keep an overview of the interview. These aspects needed to be addressed.

Changes to the Opportunity Detection Kit

According to the obtained feedback from the participants and the insights from the designers, several changes have been made to the guidelines, questions, techniques and tools. Based on this evaluation no changes have been made to the steps and themes. An overview of the changes can be seen in figure 7.

Guidelines

When a translator is required, the expectation is that the interview will take more time. Therefore, the techniques and tools have been looked at critically and have been made more efficient (see below). Participants need to be properly informed before the interview how much time the activity will approximately take. For now, this time will be set on 2 hours.

Questions

The questions that changed after the micro-evaluation can be found in Appendix D2. In total 25 questions were added and 13 questions were adjusted.

- Instead of questioning people about two fixed points in time, it was decided to question people about their current situation and then ask for any changes over the past years. In this way, the changes in their full extent can be understood and not just for two specific points in time, and for questions where this additional question about change is not relevant, this question will not be posed.

- The questions that make comparisons are adjusted, as the interview is about the individual feelings of the specific participant and not how their feelings relate to others. Comparisons were only detected in the theme 'Health' and these questions have been adjusted towards questioning the participants about their individual experience.

- As the interview is focused on people's perceptions, ideas and behaviour, factual questions are of less interest. Still they are important to obtain general information from the participant. It must, however, not beforehand be defined what is aspirational. It is important to get a feel of what the participant thinks is aspirations. The questions have been checked towards 'bias' and have been adjusted accordingly. It concerns questions regarding 'Health', 'Meaningful Work', 'Leisure', 'Friends and Community'.

- To obtain insight into sensitive topics questions regarding 'Partner and Family', Self-determination', 'Mobility' and 'Safety and Security' have been reconsidered. Most questions that were indicated to be sensitive have been transformed to a more general perspective: "*Do you think people in this community are able to use contraception?*", "*Do you think people in this community can leave their partner if they want to?*" and "*Do you think people in your community feel safe inside their house?*".

- For the theme 'Cultural and Spiritual Life' more questions have been formed in order to obtain deeper insight in participants' cultural and spiritual life.

Techniques and tools

- Instead of multiple answer sheets, one big answer sheet was developed, as can be seen in figure 4. On this sheet all themes are represented with a pictograph and participants can draw and write

their answers on the sheet. This sheet is developed to help visualize the interview structure for the participants and also to provide guidance to the designer, without taking a lot of space and consuming a lot of time.

- Question cards have been developed for each theme with pictographs on the front side and questions on the backside. These cards intend to aid the designer to keep track of the themes discussed. It might also help in giving the participants an idea of how far the interview has progressed. The question cards do not offer a rigid interview procedure, the cards can be questioned about in random order and mainly offer an overview of the topics and the questions that can be used to start a conversation. The pictographs and an example of a question card can be seen in figure 5 and figure 6.
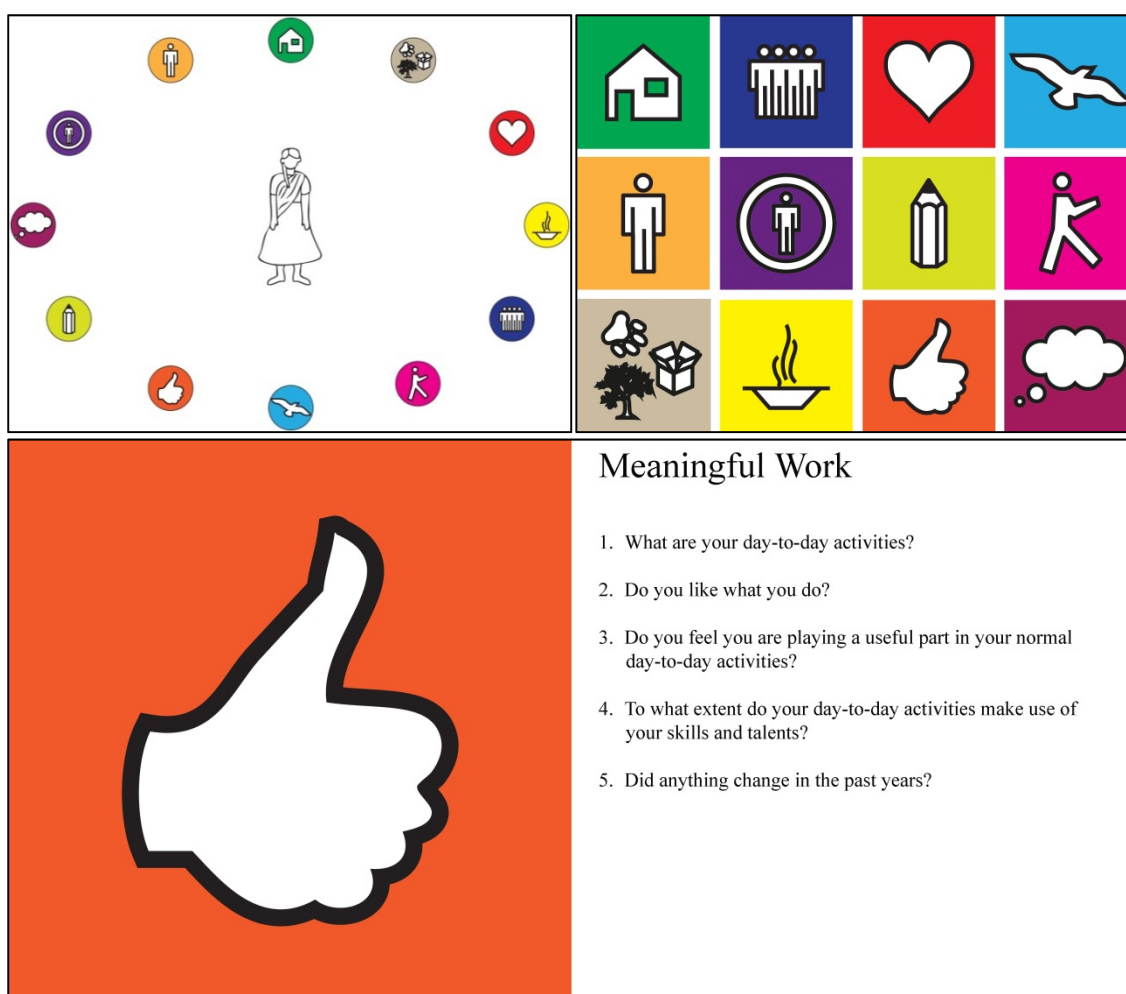
Figure 4: One big drawing sheet for all themes. The pictographs represent the following themes (starting at the top and going clockwise): 'Accommodation and surroundings', 'Products, Animals and Plants', 'Partner and Family', 'Nutrition', 'Friends and Community', 'Mobility', 'Leisure', 'Meaningful Work', 'Education', 'Self-Determination', 'Safety and Security', and 'Health'.
Figure 5: Question cards for all themes (developed by Lead Researcher and Researcher 1)
Figure 6: Question card for meaningful work with front side and backside (developed by Lead Researcher and Researcher 1)

- The timeline has been discarded, but a 'question card' with introduction questions has been added. This introduction card has been developed to warm up the participant for the actual questions and to obtain a view of the participant's social status.

- The answering scales have been removed, as the interview is about the individual feelings of the specific participant and not how their feelings relate to a pre-defined scale.

- For design purposes it is important to get to know people's aspirations and desires. However, the scoring exercise is meant to get a feel of the person's situation at that moment. As scoring turned out to be difficult for the participants and two participants themselves started ranking the themes towards each other, 'Ranking' of the themes will be further investigated instead of 'Scoring'.
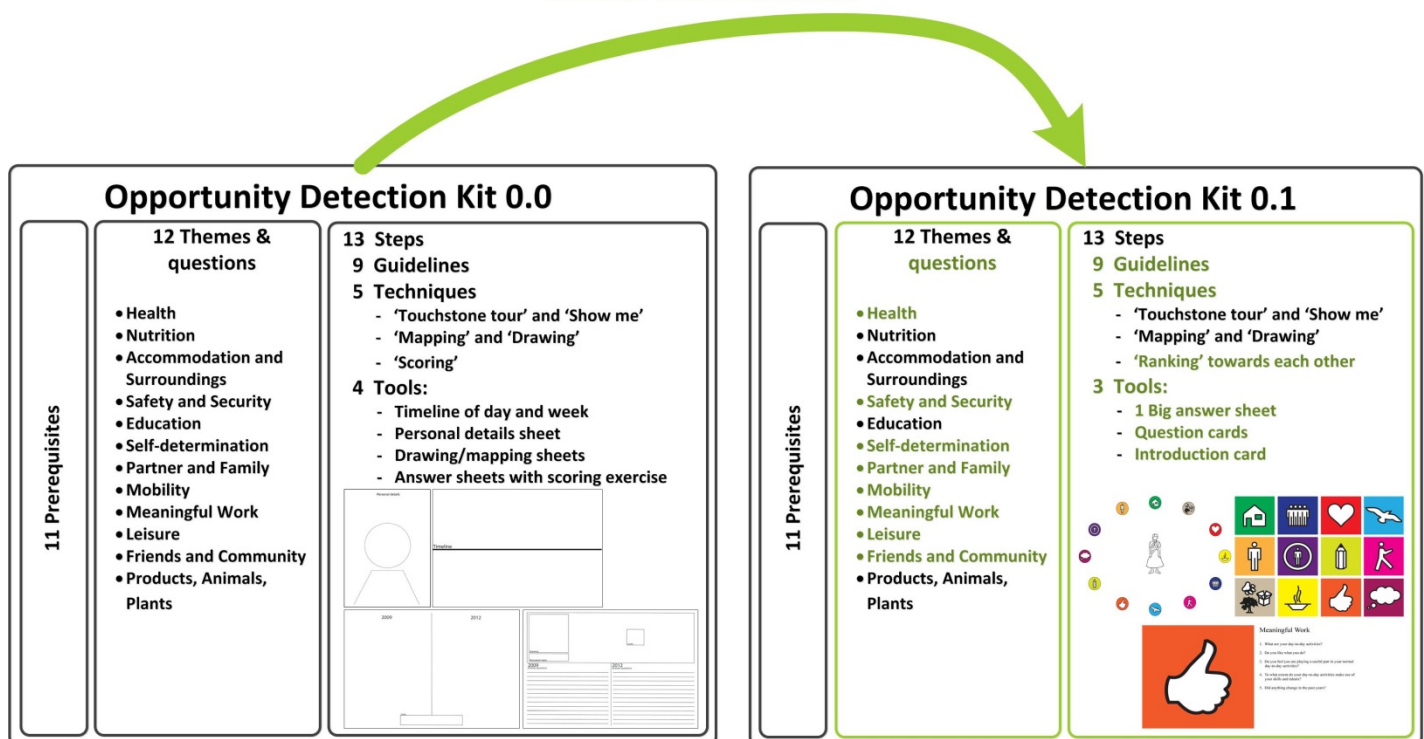
Figure 7: An overview of the changes to the ODK after micro-evaluation (changes indicated in green)

E.2   Iteration 2: Micro-try-out in India

Below, the full results of iteration 2 are described. Iteration 2 comprised a micro-try-out by the research team who conducted 5 in-context interviews in India.

Results

Below the results regarding the ODK procedure are presented: the issues noticed by the designers or indicated by the participants are described. Five issues regarding the steps, one regarding the guidelines, six regarding the techniques and three regarding the tools. Although a variety of participants was selected, no female amputees were present in the waiting room of the JFO, so only

interviews with male participants have been executed. In total five people have been interviewed. The details of the interviews are presented in table 13.

Table 13: Interview characteristics of micro-try-out

Characteristics of interviews					
Interview no.	1	2	3	4	5
People present	participant, translator, 2 researchers	participant, translator, 2 researchers	participant, translator, 2 researchers	participant, translator, 2 researchers	participant, translator, 2 researchers
Duration (minutes)	102	92	82	45	60
Facilitator	Researcher 1	Researcher 1	Lead Researcher	Lead Researcher	Lead Researcher
Note taker	Lead Researcher	Lead Researcher	Researcher 1	Researcher 1	Researcher 1
Translator	Male employee JFO	Male employee JFO	Male employee JFO	Male employee JFO	Male employee JFO
Characteristics of participants					
Age	39	45	68	26	38
Gender	Male	Male	Male	Male	Male
Family	Married, 2 daughters	Married, 3 sons, 1 daughter	Married, 3 sons, 3 daughters	Married (6 months)	Unmarried
*Rural/Urban**	Urban (district headquarter)	Rural	Rural	Urban (city)	Rural
State	Uttar Pradesh	Uttar Pradesh	Uttar Pradesh	Punjab	Madhya Pradesh
Household income (INR) per month	Not asked	5.000 - 10.000	3.000 - 4.000	72000	300 - 400
*Household income ($) per day PPP***	Not asked	10 - 21	6 - 8	149	0,60 - 0,80
Occupation	Tea stall owner	Agricultural farmer, animal caretaker	Reseller of food items	Truck driver	Agricultural farmer with labourers
Product specifics					
Time of usage	5 years	11 years	7 years	5 years	7 years
Cost	Free	Free	Free	Free	Free
CDD/ODK specifics					
Drawing and/or visualizations	by participant	by facilitator	by note taker	by note taker	by note taker
Ranking themes towards each other	yes	yes	yes	yes	yes
Amount of themes discussed	12 (out of 12)	13 (out of 13)	12 (out of 13)	12 (out of 13)	12 (out of 13)

* *District headquarters or higher level is labelled 'urban'*

** *PPP Conversion factor 2012 = 15,9, Source: http://wdi.worldbank.org/table/4.16*

Effectiveness

Then, the participants, translator indicated and the designers noticed that:

- It was confusing and tiring to discuss the themes per situation. The first set-up resulted in a messy, overwhelming and tiring exercise. The second set-up led to shorter interviews that were easier to follow (although this is also partly because the translator and designers have become more experienced in using the ODK).

- One participant was shy and after some time asked if he could leave. He did not open up very much and shared limited information. Underlying reasons were not always uncovered. Three participants seemed to enjoy the interview and two of them expressed that they really liked meeting 'people from abroad': "*I'm so glad to meet you, he say*". These three participants opened up more by expressing their inner emotions and thoughts. More underlying reasons could be uncovered.

Efficiency

Table 14 presents the time taken for each step of the interview process. As can be seen, most time was spent discussing the themes. On average, the discussion of themes took around 1 hour per interview.

Table 14: Time consumed by different parts of the micro-try-out

Opportunity Detection Kit steps	Average time discussed (minutes)	Time discussed (% of total)	No. of times discussed
Introduction	0:04:56	6,5%	5
Explanation interview	0:02:42	3,2%	5
Product questions	0:06:17	8,5%	5
Question cards	0:58:18	76,6%	5
Ranking	0:02:36	3,3%	5
Round up	0:01:24	1,9%	5
	Total	1:16:13	100,0%

The designers noticed that:

- Starting the interview with product questions is a logic start of the conversation, as the participants are in Jaipur for receiving their second prosthesis. It also provided some insight about the prosthesis. However, the participants all indicated the prosthesis to be fine. During the interview and when posing the product questions at the end of the interview again, more details were shared and some problems were indicated. For example that participants do not continuously wear the prosthesis during the day: "*In daytime. After 3 or 4 hours he put of the prosthesis, and he feels some relax. And in night, all night.*"

- During the first interview the interview flow was not yet established and a lot of discussion between the two designers took place. The participant became impatient and lost interest in the interview.

Steps

The designers noticed that:

- The first interview took longer and was messy. This was due to the first set-up, but also because the designers still had to get familiar with the flow of the ODK and with working with a translator.

Figure 8: Researcher 1 and translator after conducting the interview (picture by Lead Researcher)
Figure 9: Participant 5 showing his prosthesis (picture by Researcher 1)
Figure 10: Participant 2 before the interview (picture by Researcher 1)

- The participants truly appreciated the designers' introduction in Hindi. They reacted enthusiastic, resulting in a more comfortable atmosphere.
- The interview setting might have influenced the participants' answers (see figure 8, 9 and 10). While the interview setting was private, only a glass door separated the office where the interviews were conducted from the waiting room where other beneficiaries were seated. Other beneficiaries were curious about what was going on, JFO employees sometimes came in with questions and the office was an unfamiliar place for the participants. They were not in their own surroundings. This all may have affected the participants' answering.
- The ceramic clogs were received well as a gift. Three participants showed their gift to other beneficiaries at JFO with enthusiasm.
- One participant was hoping to receive money. Although the translator did indicate that no compensation would be offered in return for the interview, this participant kept on explaining to be very poor and really in need for money.

Guidelines
During this micro-try-out a translator was required to translate the questions to and answers from the participants. The translator was instructed before the first interview, but the designers noticed that the translator:

- Refused to fully translate the introduction, even after persuasion from the designers. This resulted in confusion on the participants' side about the interview purpose and what was expected from them. It also caused uncertainty on the participants' side about the time the interview would last.
- Did not want to ask the participants for consent, as he argued they would give it anyway. After stressing this to be done, he did ask the participants for consent and all agreed. This led to the translator's reaction of: "*I told you so, we did not have to ask for it*".

- Was impatient and rushed the interview. This probably caused participants to share fewer stories.
- Was not neutral in his reactions. He sometimes expressed surprise, agitation or irritation. He did, however, also showed empathy and comforted participants. His reactions will have influenced the participants' answers.
- Provided examples to the participant to clarify questions and sometimes answered questions without asking the participant or provided a very brief answer where the participant had given an elaborate answer.

For the designer it is impossible to fully assess the influence of the translator. The designers found it a difficult task to work with a translator as no direct line of communication is there with the participant, which also decreases the amount of rapport that can be build.

Themes

The amount of time spent per theme was analysed (see boxplot figure 11). No statistical relevance could be assigned to the number of interviews conducted, but the boxplot provides a good overview of the average interview time spent on each theme and on the dispersion of the time. As can be seen, some themes were more time-consuming than others:

- The discussion of 'Partner and Family', 'Accommodation and Surroundings' and 'Meaningful Work' seem to consume most time, while the discussion of 'Safety', 'Cultural and Spiritual Life', and 'Leisure' seem to consume little time. The boxplot therefore indicates that some themes might comprise too many topics and some too little.
- The discussion time of the themes 'Products, Animals and Plants', and 'Friends and Community' seem to differ a lot per participant. 'Self-determination' was only questioned about specifically in 2 interviews, so not much can be said about that. These themes need further investigation to say something about their adequateness.

The designers furthermore noticed that:

- 'Accommodation and Surroundings' seems to be a good starting theme. When a house is drawn, from there onwards the surroundings, products, family and movements can be added easily. 'Accommodation' does not seem to contain sensitive questions and participants were willing to elaborately discuss this theme. The themes 'Partner and Family ', 'Friends and Community' and 'Health' contained some questions that the translator found difficult to pose, indicating sensitivity. These themes can therefore better be discussed somewhat later in the interview.
- The topics 'Products', 'Plants' and 'Animals' are different topics all belonging to one theme, just as the topics 'Religion' and 'Politics' in 'Cultural and Spiritual Life'. For the theme questions this was not perceived to be a problem, but for ranking the participants were confused about what to rank.

Appendix E

Time
(% of total interview time spend on discussing the themes)

Discussion time per theme
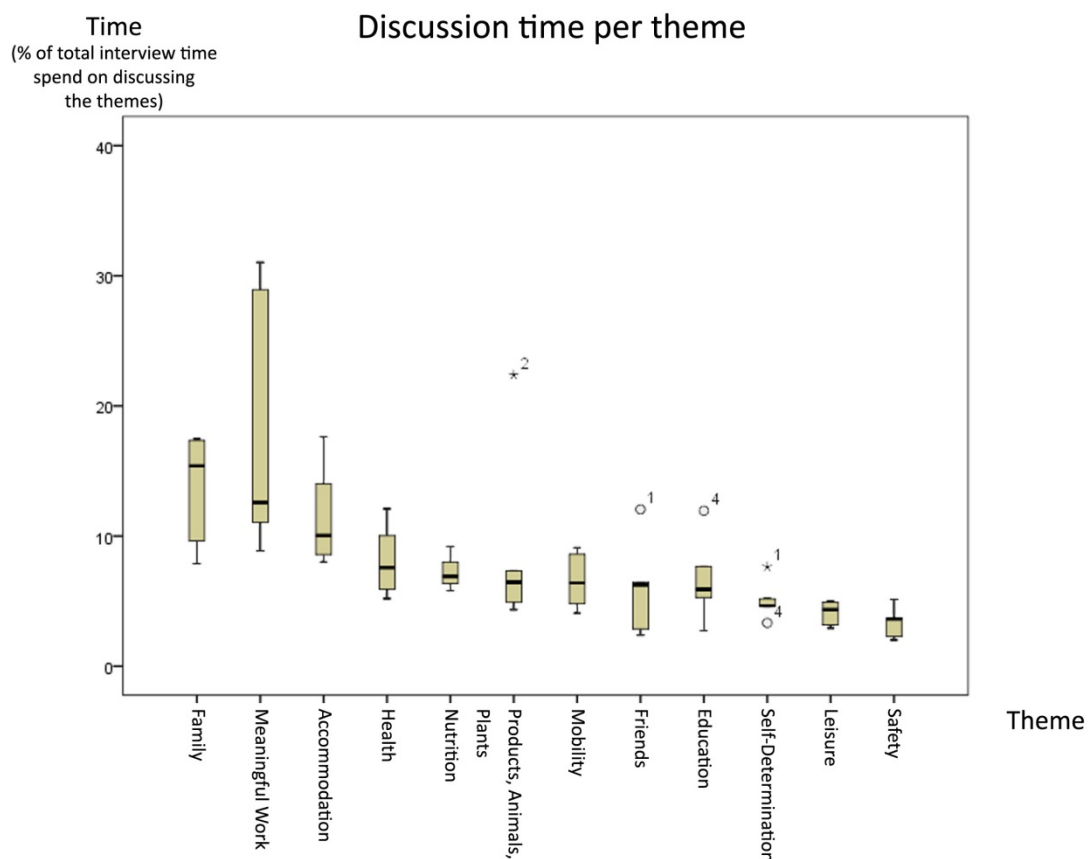
Theme

Figure 11: Overview of discussion time per theme in percentage of total amount of time spend on the question cards

Questions
The translator indicated that:

- He sometimes had difficulty to understand the questions. Especially the wording used for questions regarding 'Leisure' (spare time, free time) and 'Self-determination' (evaluate life, control over life) were difficult for him to understand or to explain to the participants. These themes have therefore become little exposed, resulting in limited insight.

- He felt uncomfortable asking broad questions and therefore provided the participants examples. He found the questions too vague or too personal and wanted questions to be more concrete and to the point. He asked for examples regarding questions related to information and decision making. The translator kept on asking: "*Information about what?*" and "*Decisions about what?*". Participants also indicated that their answer would differ depending on the type of information or decision. For the question "*Do you feel your health limitations obstruct you in your day to day activities?*" the translator provided four to five examples of health limitations he thought of himself (e.g., tuberculosis, nausea, and cough). The participants tended to answer for the examples mentioned only, and were therefore guided in their answers.

- For 'Nutrition' not only food, but also drinks and especially the availability of potable water is important. He also indicated that by asking about a stock of food in the house or about the ability

to enjoy a meal whenever desired, more information can be obtained about the sufficiency of food.

The designers noticed that:

- The amount of questions seemed to overwhelm the participant. During two interviews the participants became impatient and less interested. This might also be because the interview flow was not yet fully established during the first interview.

- They sometimes had difficulty to keep track of the themes discussed, as topics kept on changing during the interview. However, the freedom to change the order and content of the questions during the interview kept the dialogues pleasant.

- Questions about 'Safety and Security' related only to feeling safe and secure inside and outside the house, but not to feeling safe during day and night. This seemed to be a relevant distinction for one participant as can be derived from the following dialogue:
    - Lead Researcher (checking the answer): "*Before [amputation], he went out?*"
    - Translator (after the participant): "*Yes, at night.*"
    - Lead Researcher (checking the answer): "But now he doesn't, after amputation?"
    - Translator (after the participant): "*No.*"

- For 'Accommodation and Surroundings' there is a question about the adequateness of the current accommodation, but no question about the type of accommodation. Because the interviews have been conducted at JFO and not at participants' homes, this question was required.

- For 'Health' there was a question about being able to visit the doctor when required, but not how far away the doctor is. Asking about the reachability of the doctor might open up more dialogue.

- 'Education' is not linked to other themes and the questions result in short answers only, not opening up dialogue.

- Questions about 'Products, Animals and Plants' opened up more dialogue when discussing participant's desires.

- No question about vegetarianism is part of 'Nutrition', while many Indian people are vegetarians.

- No questions about the working hours and days and about colleagues is part of 'Meaningful Work'.

- When discussing 'Mobility' participants shared some of their movements and transportation devices, but others came up during other themes. For example during discussion of 'Meaningful Work': "*He has tea stall in other town. Four kilometre away from. This town*". This indicates that the questions in the theme mobility do not stimulate to discuss all movements.

- There are no questions about when participants meet their family and friends and what they do when they spend time together.

- No specific information regarding social status and cultural life was obtained. This information can be indirectly derived from the answers, but more attention should be paid towards these aspects.

- They themselves felt hesitant to ask questions about contraception, infertility and abortion.

Techniques and tools

Appendix E

Two types of answer sheets have been used during the interviews: during the first interview answer sheets containing all pictographs were used (see figure 12), during the other four interviews the answer sheet showing the participant in three different life situations was used (see figure 13). The designers noticed that:

- The answer sheet that was used during the first interview caused confusion instead of providing support. The participants did not understand the pictographs.The three sheets representing the participant in three different situations were easier to understand. They also helped the designer to keep the overview. However, shifting between the three sheets also caused some confusing at the translator's and participant's side.

- The participants were reluctant to draw. Only the first participant drew a blueprint of his house and surroundings. In order to help the participant, Researcher 1 drew the answers on the answer sheet if participants did not feel comfortable drawing themselves. In this way the collaborative process of creation was lost and Researcher 1 had less time to take notes and to observe, but the drawings still aided in creating a more lively interview, because:
  - The participants looked at the drawings and corrected mistakes. In this way it was a direct form of communication with the participant and an extra answer check.
  - The drawings seemed to encourage participants to elaborate on their stories. While the note taker was drawing, the participants often added information.
  - The drawings provided a point of reference for the facilitator.

Figure 12: Answer sheet used during the first interview
Figure 13: Answer sheet used during the last four interviews

- During the ranking exercise the designers noticed that the participants had difficulty to recall the themes being discussed. The question cards were used to illustrate the different themes, but the participant could not relate to the pictographs. Each question card was therefore one by one explained, but the participants still had difficulty to place them in an order. Therefore, they were asked which one they found most important, and which one next to that. In this way the participants selected the most important ones only (see figure 14).

Figure 14: Ranking the themes in practice: the participant choose the two themes he found most important

Conclusions

During this micro-try-out, the interviews took 1 hour and 15 minutes on average. This was below the anticipated two hours. By not using a timeline and letting participants rank instead of score, less time was consumed than during the micro-evaluation, but the interviews were also less effective in generating deep and broad insight. No prior rapport had been build and due to working with a translator less rapport could be built during the interview, resulting in less openness. The translator had a big influence on the interview results. When working through a translator it is important to select someone who translates more than interprets, who understands the research activity and who is able to build rapport with the participants.

The drawings did help to communicate directly with the participants, and the participants did open up more during the interview, also resulting in more elaborate answers towards the product questions posed after the interview, but these interviews had not been very effective in obtaining deep insight. Still, some surprising insights and possible product improvements were detected. For more information about the detected design opportunities per product, see BOX I.

The first interview pointed out that the flow and structure of the ODK needed improvement. The adjustments resulted in better outcomes. Although the three life situations – before amputation, before the prosthesis and after the prosthesis – still caused some confusion. The drawing activity was beneficial. The answer sheets did not encourage the participants to draw and thus 'create' themselves, as was intended, but visualizing the answers made the interview interactive and enjoyable for the participants, the translator and for the designers. When one of the designers drew the answers, this activity did not demand much from the participant. The drawings inspired the participants and functioned as a mnemonic for the facilitator. Thereby, they stimulated additional answering and correcting of mistakes by the participants. The ranking exercise was difficult to understand and execute for the participants.

Changes to the Opportunity Detection Kit

Appendix E

According to the obtained feedback from the translator and the insights from the designers, several issues regarding the flow, appeal and clarity of the ODK had been pointed out. Therefore, changes have been made to the prerequisite (1 adjustment), steps (5 adjustments), guidelines (2 additions), themes (1 split into 2 themes), questions (39 questions added, 4 adjusted), techniques (1 addition, 1 adjustment) and tools (3 additions and 1 adjustment). An overview of the changes can be seen in figure 21.

Prerequisites

The following adjustment will be made regarding the prerequisite:

- It is important for the designers to really know the interview flow, the themes and the questions before starting the interviews, this causes less confusion during the interview and makes the interview easier and quicker to conduct. Therefore, prerequisite K will change from 'Keeping the themes in mind' to 'Learn the themes and questions by heart'.

Steps

The following adjustments will be made regarding the steps:

- In step 2 it will be stressed more that the translator should be carefully selected and properly instructed. Step 2 will change to: *Properly select and instruct the translator.* The translator should be thoroughly informed about the task at hand and his or her role. Go through all the themes and questions before the first interview to get the translator acquainted with the interview flow and structure, the themes and key questions. Share the goals of the research and explain the rules.
- During step 6 'introduce' it should be very thoroughly explained that the participants are free to participate and leave and that they will not receive any money for participating. If people start to ask for money, it is better to stop the interview.
- To step 6 'introduce' it was added that giving an introduction in the local language helps to build rapport and to make the atmosphere relaxed.
- To step 10 'build dialogue' it was added that when questioning the participant about the themes, the facilitator should start with the current situation for one theme or topic and immediately ask about changes in the past and aspirations for the future, before continuing to the next theme or topic.
- To step 11 'thank the participant' it was added that providing a *tangible* gift at the end of the interview is received well by the participants, as it allows them to show the gift to other people.

Guidelines

The following guidelines will be added:

- Guideline J will be added with tips and tricks for selecting and instructing a translator:
  - Tips and tricks for selecting a translator: The translator should be selected based on his knowledge of the area, of the local language and of English. He should not have a stake in

the research, but be interested in it. The translator's gender should preferably match the gender of the potential participant. Often, a translator must be paid for his or her services.

    o Tips and tricks for instructing a translator: Designers should insist that the translator properly translates the questions and the participants answers, that he or she should not rush the interview, should not interpret questions or answers, and should not steer the participant by providing examples or indicating desired answers by tone or body language. The translator should however try to build rapport and show empathy. Designers should stress that a proper introduction and asking for consent are required.

- A guideline K will be added about the sensitivity of questions. Questions the designers felt hesitant to ask about are kept in the ODK. Sensitivity differs per culture, so it might be that the questions are not sensitive for participants. The guideline entails that designers should try to phrase a question in a different way when they feel hesitant to pose a question, or leave the question out if they feel really uncomfortable.

Themes

After the first interview, the theme 'Self-determination' was split into 'Self-determination' and 'Cultural and Spiritual Life'. No more changes have been made to the themes, as the amount of themes was already overwhelming to the participants and the designers.

Questions

The questions that changed after the micro-try-out can be found in Appendix XX.

- To stimulate participants to open up and to detect more underlying reasons, the designers must be focused on asking follow-up questions. Therefore the sentence: "*Continuously ask: 'and then?', 'why?', 'anything more?'*" has been be added to each question card.

- The questions within the themes of 'Self-determination' and 'Leisure' have been adjusted to better depict what the themes are about.

- Questions about feeling safe during day and night were added to the theme 'Safety and Security'.

- Questions about health limitations, information and decision making have been deliberately kept open. The translator guided the participants by providing examples of things were they would try to get information about or make decisions about, but participants should themselves indicate where the differences for them are and not being directed in a certain way. However, some questions have been added to stimulate answering.

- To make the meaning of 'Leisure' and 'Self-determination' more clear, wording has been changed and questions have been added to these themes.

- The question "*What type of house do you live in*", "*How many rooms do you have? What type of roof?*" and "*Do you have light, electricity and/or gas?*" have been added to 'Accommodation', as it is not only relevant when the interview is not conducted in a participant's own house, but also to learn more about a participant's house when being there, as not everything can be observed. It might moreover be useful to hear in which way a participant describes his or her own house.

Appendix E

- To obtain more insight into cultural life, questions about habits and behaviour have been added to the theme 'Cultural and spiritual life'.
- The theme 'Education' is linked to meaningful work by adding the question "*Where did you learn to do your work?*" and to open up the dialogue about education, the following questions have been added: "*Would you have wanted to go longer back then?*" and "*Do you still want this?*"
- To 'Nutrition' questions about vegetarianism, stock in the house, ability to enjoy a meal when desired, and questions about drinks have been added to open up the conversation and obtain deeper insight.
- To 'Health' questions have been added about the reachability of the doctor.
- To 'Products, Animals and Plants' questions about participants' desires have been added.
- To 'Meaningful Work' questions about working hours and days and about colleagues have been added.
- To 'Mobility' questions have been added to open up the dialogue.
- To 'Partner and Family' and 'Friends and Community' questions about when participants meet them and what they do together are added.

Techniques
- As ranking the themes towards each other turned out be difficult for the participants is was decided to change the technique to a sorting technique where the participants have to sort the different themes into four different categories. Purposively there is no 'middle' category, obligating participants to make a choice instead of providing the option of an 'average category'.
- To lessen the amount of time that is spend on drawing the answers, visualization has been added as a technique. Pre-made cards represent possible answers which the participants can place on the answer sheet to map their lives. The participants can also still draw on this sheet. Visualizing is added to stimulate participants' answering and to form a direct line of communication between the facilitator and the participant. The visualizations and drawings also aim to guide the facilitator to keep an overview of the topics discussed and to show the interview progress to the participant and translator. If the participant does not want to map or draw, the note taker can do so.

Tools
- The question cards have been adjusted. After the first interview some pictographs and colours changed. Again some colours changed, because the colours of certain themes looked very much alike. In figure 15 the new colours are shown.

Figure 15: The new question cards with the new colours.

- Visualization cards have been created to help the participants visualize their answers (see figure 16). The visualization cards have been made to stimulate participants to create their own mappings and drawings.

Figure 16: A selection of the visualization cards for the themes 'Partner and Family', 'Mobility', 'Friends and Community', 'Health', Nutrition' and 'Products'.

Figure 17: Visualization card for house is four times bigger than other visualization cards.

- As 'Accommodation' turned out to be an easy conversation starter, different visualizations of houses were made four times the size of the other visualization cards (see figure 17). The most representative visualization of 'Accommodation' for the context of investigation can then serve as a starting point for that interview.

- An 'importance sheet' has been added as a tool. This sheet contains the four possible categories in which participants can sort the themes: three exclamation marks for 'very important', two exclamation marks for 'important', one exclamation mark for 'less important' and a dot for 'not important' (see figure 18).

Figure 18: Importance sheet comprising four categories, from top to bottom: not important, less important, important and very important.

Figure 19: Sorting cards with importance sheet.

- For the sorting exercise small cards have been made, containing the pictographs of the themes (see figure 19). For the topics of 'Products', 'Animals', 'Plants', separate ranking cards have been made.
- The timeline of a day in the participant's life was added again (see figure 20). It consumes time, but it allows for building rapport during the interview by starting with simple questions and showing interest in people's day-to-day life. It also provides the designer starting points for further conversation. The themes that come up during the discussion of the timeline can be drawn on during the interview. The timeline is visualized by a line and by the sun and moon coming up and going down, in order to indicate the passing of time. The visualization cards can also be used on the timeline, and the timeline is covered with plastic, so it can be drawn on with erasable markers.
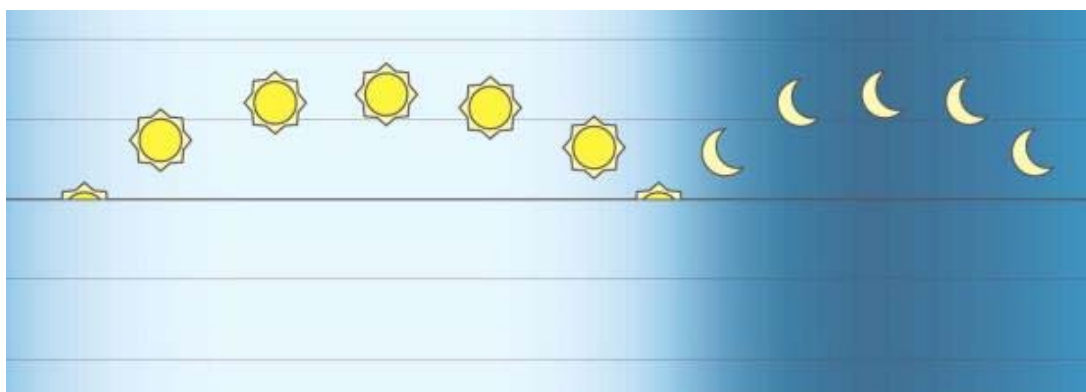
Figure 20: Timeline representing one day in a participant's life.

- An empty drawing sheet (A3 size sheet) will be used to visualize the answers of participants. This sheet can be drawn on with marker and visualization cards can be placed on it.
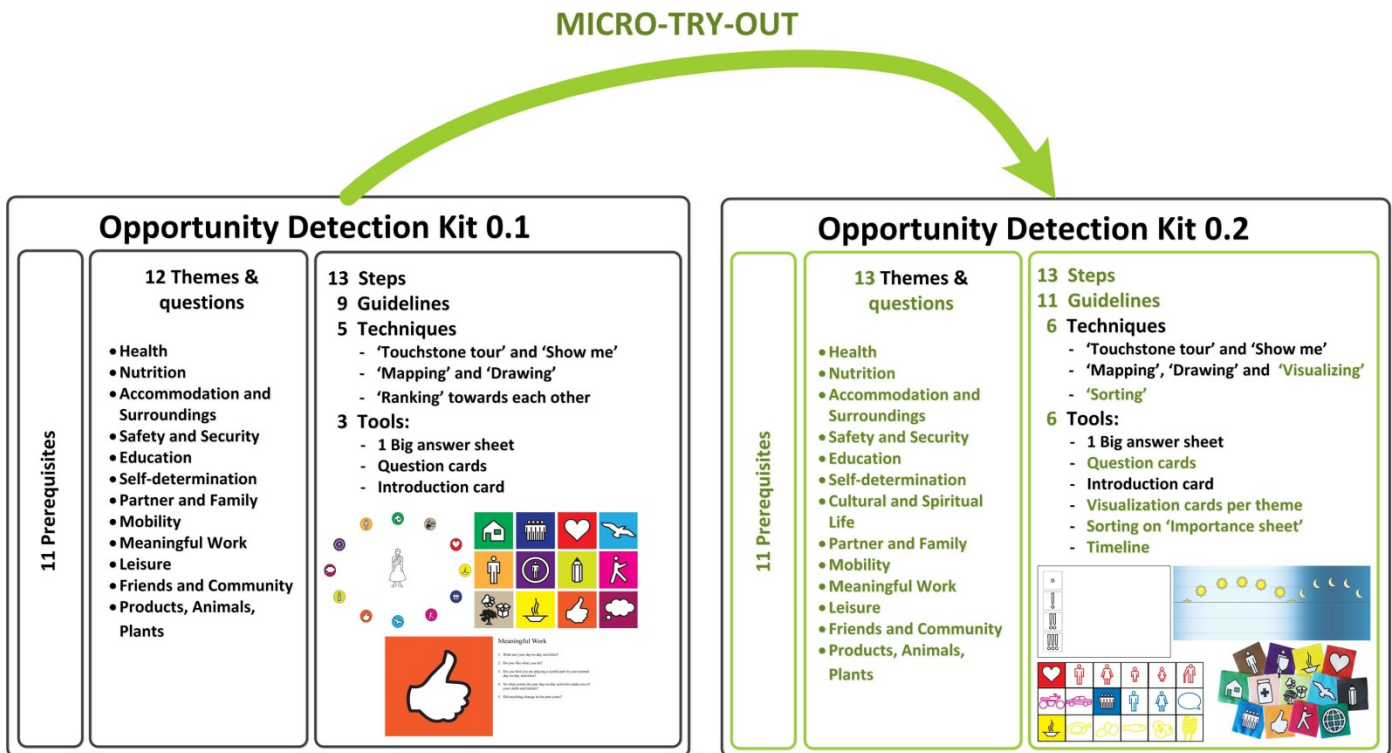
Figure 21: An overview of the changes to the ODK after micro-try-out (changes indicated in green)

E.3 Iteration 3: Screening the content

Below, the full results of iteration 3 are described. Iteration 3 comprised a screening evaluation by two members of the research team.

Results

Below the effects of the screening on the themes, questions and tools are presented, leading to adjustments of the ODK (see figure 23).

Steps and Guidelines

- Both researcher 2 and 3 stressed that participants might not always be able to relate to the pictograph. If designers sufficient time in the field, the pictographs can be replaced by local visualizations, to which the participant can relate, but which do not steer the participant into a certain direction. If there is limited time in the field the facilitator should properly explain what the card is about, before asking questions concerning a specific question card.

- Researcher 3 stressed that the facilitator can be more guided in his task to build dialogue by explaining how the different tools should be used.

- Guideline G and H concerning the time per interview and the number of interviews were commented upon. Researcher 2 and 3 both indicated that in the field interviews can take a long time and that it might be difficult to keep a proper focus when going very broad. They also indicated that broad insight and building rapport requires quite some time. Moreover, they

argued that five interviews should not be mentioned as a fixed number, as it depends on the context and the way the interviews go how much interviews should be conducted.

Themes

The main comments on the themes were:

- The theme names should be short and understandable for the designer.
- It must be tried out if some themes are too long or comprise too many topics. The themes 'Accommodation and Surroundings', 'Health' and 'Friends and Community' were pointed out to be themes comprising a lot of topics.

Questions

- Additional questions came up and some questions were adjusted. The main remarks concerned the way sensitive questions are asked: they have been made less direct. Some questions were also perceived as being too general and were made more specific.
- As some questions coming from literature might be able to be difficult to understand for designers, participants and translators, Researcher 2 recommended to separate the questions coming from literature and the actual 'conversation starters'.
- Researcher 2 indicated that more insight about the participants social status should be generated.
- Researcher 2 and 3 indicated the following changes to the questions:
  - Regarding 'Health': questions about sanitation are lacking and a questions about how well participants sleep can indicate worries and stress, possibly resulting in more insight.
  - Regarding 'Accommodation': questions regarding payment and obtaining the current house and preferences regarding changes to the house might open up more dialogue.
  - Regarding 'Education': it might be easier to ask about the amount of years of education than about the highest education obtained.
  - Regarding 'Meaningful Work': it might be useful to ask what participants think they are good in in their work and why they do the work they do, this might open up dialogue.
  - Regarding 'Mobility': questions about aspirations might result in more opening up.
  - Regarding 'Friends': to open up conversation it might be useful to ask "*Do you feel like you can tell your friends everything?*" instead of "*Do you find it easy or difficult to express feelings of love, grief, longing, gratitude, and anger?*".
  - Regarding 'Self-determination': Questions about what participants would like to change in their life might open up dialogue.
  - Regarding 'Cultural Life': Questioning participants about how they feel they fit in the community might open up dialogue about social status.
  - Regarding 'Belongings' (Products, Animals and Plants): attachment towards belongings can be indicated by asking about participants' favourite product, animal and plant.

Techniques and Tools

Researcher 2 and 3 had no comments regarding the techniques and tools, although they expressed some doubts regarding the visualization cards, as they might pre-define participants answers.

Conclusions

After screening, the research team members mainly commented regarding the questions. As during the micro-try-out it was noticed that the participants did not fully open up, the questions have been critically looked upon by the researchers to stimulate dialogue. The only topic that was indicated to deserve more attention is 'social status'. Moreover, the researcher expressed some doubts about the time consumption of the interview and the number of interviews to be conducted. This resulted in changes being made to the ODK, as presented below.

Changes to the Opportunity Detection Kit

According to the obtained feedback from the evaluators, several changes have been made to the ODK elements. The improved guidelines, steps and questions can be found in Appendix D3.

Steps

The following steps have been adjusted:

- Not as a separate step, but in addition to step 1 it is stressed that, if time permits, the pictographs can be replaced by local visualizations, to which the participant can relate, but which do not steer the participant into a certain direction.

- Not as a separate step, but in addition to step 10 it is stressed that before asking questions concerning a specific question card, the facilitator should explain what the card is about. Sub-steps are added to step 10:

  a) *Start with the timeline.* Ask what the participants do during a day. The timeline can be combined with the visualization cards and erasable markers to create an overview of their day. Try to let participants create, if they are unwilling let the note taker create.

  b) *Continue with the question cards.* Use the drawing sheet, the visualization cards and the erasable markers to visualize the answers. Again, try to let participants create, if they are unwilling let the note taker create. There is no indicated order for discussing the themes, although 'Accommodation' is an easy theme to start with. The questions for each theme are mere options for starting conversations than exact questions that need to be asked. However, the questions should be kept general enough to stimulate conversation, and focused enough to reveal the desired information. Questions can be left out and for each theme it is also important to ask questions in different ways, to pose questions about topics and experiences that come up during the conversation.

  c) *Conclude the conversation with the sorting exercise.* Use the sorting cards and let participants place these cards on the ranking sheet, based on their importance: not important (.), less important (!), important (!!) or very important (!!!). The ranking exercise works as a

confirmation of the things being told during the interview and provides insight in what and how participants value.

Guidelines

The following guidelines have been adjusted:

- In Guideline G it is mentioned that the ODK interview is scheduled to last between 1.5 and 3 hours.
- In Guideline H it is mentioned that the number of interviews that need to be conducted depend on the context, the results and the variety of participants that can be included.

Themes

- The theme names were slightly adjusted to: 'Health', 'Nutrition', 'Accommodation', 'Safety', 'Education', 'Self-determination', 'Cultural Life', 'Family', 'Mobility', 'Meaningful Work', 'Leisure', 'Friends', and 'Belongings'.

Questions

The renewed question cards for each theme can be found in Appendix D4.

- The suggested changes for the questions of the themes 'Health', 'Accommodation', 'Education', 'Meaningful Work', 'Mobility', 'Friends', 'Self-determination', 'Cultural Life' and 'Belongings' (Products, Animals and Plants) have been agreed to and changed.
- To provide the designer additional guidance to keep track of the interview and questions a set of 'ideal questions' and 'pragmatic questions' have been established. The ideal questions represent the questions that come from literature. They are more abstract, and are aimed to be answered but not to be posed directly. They are intended to guide the designer. The pragmatic questions represent conversation starters that trigger dialogue and aid the designer to find answers to the ideal questions. The exact framing of the questions is up to the designer. The ideal questions are made bold (see figure 22).

Figure 22: Question card for meaningful work with ideal questions (bold) and pragmatic conversation starters

Techniques and Tools

No changes have been made regarding the techniques and tools. Only the question cards have been improved showing the 'ideal questions', the 'conversation starters' / 'pragmatic questions' and some questions on the right bottom to stimulate the designer to ask follow-up questions (see figure 22).
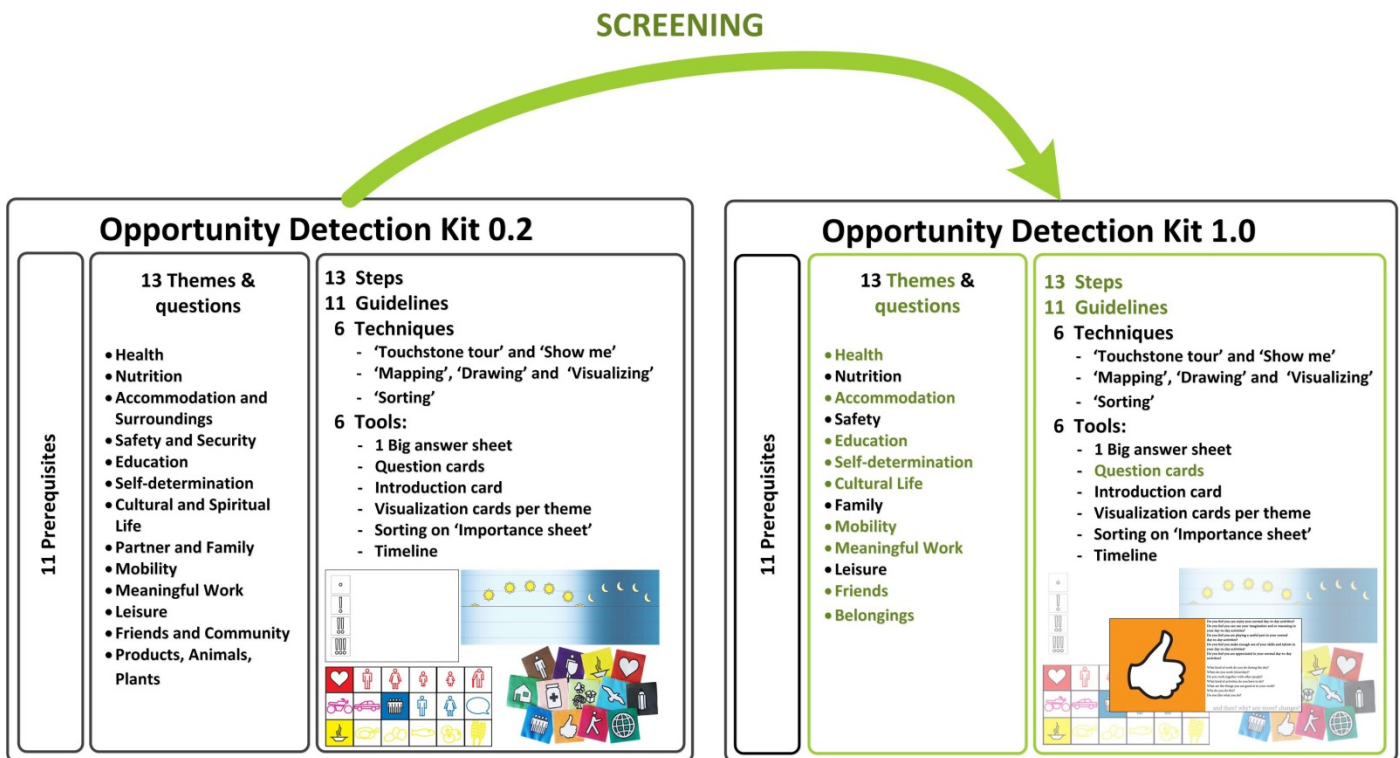
Figure 23: An overview of the changes to the ODK after screening (changes indicated in green)

E.4   Iteration 4: Micro-try-out, walkthrough and expert consultation

Below, the full results of iteration 4 are described. Iteration 4 comprised a micro-try-out by the research team who conducted 42 in-context interviews in India, a walkthrough by 10 design students from the United States and an expert consultation by 12 experts from the United States.

Results micro-try-out

Table 15 shows some of the interview characteristics. Per type of study some additional explanation is given below.

Table 15: Interview characteristics of micro-try-out

	STUDY 1			STUDY 2
	Mitticool Refrigerator - Mitticool	Chotukool Refrigerator - Godrej	Anna Tasar Reeling Machine -PRADAN	Chulha - Philips
Interview characteristics				
No. of interviews	5	2	4	31

Duration (minutes)	35 to 142	32 to 55	72 to 170	16 to 54
Average duration (minutes)	102	43	129	33
Place of interview	4x home, 1x office	2x home	2x reeling centre, 2x organization's office	31x home
Facilitator	1 female	1 female	1 female	1 male
Translator	3x male employee Mitticool, 2x none	Male employee Godrej	2x male employee, 2x female employee PRADAN	Male student from local university

Characteristics of participants

Participant(s)	2x female individual, 1x male individual, 2x family	1x family, 1x couple	1x female individual, 3x female & others	6x female individual, 20x female & audience, 3x male & audience, 2x couple
Age	32, 35, 35, 38, 42	?, 32	?, ?, 25, 35, 35	16 - 75
*Rural/Urban**	3x urban, 2x rural	2x urban	4x rural	31x rural
State	3x Gujarat, 2x Maharashtra	2x Maharashtra	4x Jharkhand	31x Karnataka
Household income (INR) per month	10 000 – 375 000	8 500 – 12 000	750 – 7 500	unknown
*Household income ($) per day PPP***	21 to 775	18 to 25	1.55 to 16	unknown
Income group	1x lower-middle, 1x middle, 3x high	1x lower-middle, 1x middle	4x low	unknown
Occupation	2x sewer / household, 2x household, 1x Microsoft employee	1x construction, 1x fuel attendant / money collector	3x reeler / household / care for livestock / aid in agriculture, 1x reeler, trainer/ household	14x farmer, 6x household, 7x land-owners, 2x care for livestock, 1x student, 1x cook

Product specifics

Time of usage	1x 1 year, 3x 2 years, 1x 4 years	1x 1,5 year, 1x 4 years	2x 1 year, 2x 2 years	17x 1-2 months, 14x1-2 years
Cost	1x gifted, 4x full price	2x full price	3x gifted, 1x full price	16x gifted, 4x full price, 11x unknown

Techniques deployed

House tour	4x	2x	0x	31x
Timeline	3x	0x	0x	31x
Mapping, drawing, visualizing	2x by designer, 1x by participant	0x	4x by designer	27x by designer, 2x by children
Sorting	5x	2x	4x	31x

*   *District headquarters or higher level is labelled 'urban'*
**   *PPP Conversion factor 2012 = 15,9, Source: http://wdi.worldbank.org/table/4.16*

*** *Distinction between income groups is based on a paper from the World Bank Development Research Group (Ravallion, 2010) who define the 'middle income group' as ranging from an income of $2 up to $13 a day per person PPP. For this research the middle income group was subdivided into lower-middle, middle and upper-middle income group.*

Study 1: Mitticool refrigerator, Chotukool refrigerator and Anna Tasar Reeling Machine

The Lead Researcher visited several places in 5 weeks' time to conduct 11 interviews. For most interviews an employee of the company or organization was selected to translate. They were selected for their knowledge of English and the local language, familiarity with the participants and interest in the ODK. The translators were instructed and specifically informed to share that no wrong answers can be given and that participants could be open about their opinion towards the product. Present at each interview were the designer, the translator and the participant. Some details for the different interviews are provided below:

1. *Mitticool interviews.*
    1. One week in Wankaner (3 interviews). The first two interviews have been conducted in a rural area in Gujarat with families belonging to the middle income group, the third in a city in Gujarat with a high income group family. These interviews have been translated by a male employee of Mitticool. One interview lasted 56 minutes. This participant indicated that she is not used to speak a lot and so she did not. The other two interviews ended up in long conversations with a lot of chitchat.
    2. One week in Bangalore to (2 interviews). The participants belonged to the high income group. While the refrigerator is specifically developed for low-income families, it turned out that the product is much aspired by high-income families, being an ecological, hygienic refrigerator, not emitting 'harmful gasses'. A male PhD student from the Indian Institute of Science was selected as a translator, but his services were not required as both participants spoke English fluently. The visualizations and drawings were not used. One interview, in a participant's office lasted only 35 minutes. No translation was required and the participant answered short and quick. The other interview ended up in a long conversation with a lot of chitchat.

2. *Chotukool interviews.* One week in Mumbai with Godrej (2 interviews). These interviews had to be conducted in limited time due to time and accessibility constraints of the participants. Therefore the visualization exercise was not used. Both interviews have been interpreted by a male employee of Chotukool. All topics could be discussed during these interviews, but due to the rush not all topics were scored.

3. *Anna Tasar Reeling Machine interviews.* One week in Deoghar with PRADAN (4 interviews). There was limited time to build rapport with participants, but the users of the ATRM were already familiar with the Lead Researcher, who worked in this area for 1.5 years. The translators were both employed by PRADAN. All topics could elaborately be discussed during all interviews. During these interviews both the visualization and ranking exercises have been used.

Study 2: Philips Chulha

Appendix E

After the initial adjustments to the ODK, in total 31 interviews were conducted with Chulha users from four different villages. Researcher 1 stayed in the area of Bandipur for four weeks, enabling him to discuss the ODK contents with local people, and to build rapport with and observe the Chulha users. An Indian PhD student from Mysore, Karnataka, who executed an impact study on the Chulha one year before, was selected as the translator. Present at the interview were the designer, the translator and the participant. In each village, one of the installers first had to give an introduction to encourage people to participate, as the conflict with the government and a recent local prophecy that predicted a close relative would suddenly die when a stranger passed the doorstep, made people suspicious and unwilling to participate.

Comparing study 1 and 2

In table 16 the different components of the interview are specified according to the time they have been discussed, when being discussed. As can be seen, the extra interview time of study 1 was mainly used to longer discuss the different themes (question cards) and to score the themes. This additional time for the question cards turned out to be important for deep insight. In study 2, on average only 16 minutes were spend to discuss all themes – except for accommodation and politics, leaving very limited time to discuss the remaining themes. During study 1 however, the interviews were less focused. While the average time to conduct the interview has been a little more than 1.5 hours, this is not the time spend with the participants. These interviews were more often disturbed: during seven interviews telephones were ringing, during two interviews people came by with questions, often curious family members or community members stopped by or interfered during the interviews, four interviews were interrupted by breaks to eat snacks and to chat, and during one interview a meeting of the translator came in between. These circumstances surely disturbed the interview flow and made the time spend with participants during three interviews go up to three hours.

Table 16: Duration of different parts of the ODK interview per study. For study 1 a distinction has been made between the interviews with and without translator, as no translation time reduces the discussion time.

	Study 1				Study 2		
	Total Mitticool with translator + ATRM + ChotuKool		Total Mitticool + ATRM + ChotuKool		Chulha		
Interview components	Average time discussed (minutes)	No. of times discussed	Time discussed (% of total)	No. of times discussed	Time discussed (minutes)	Time discussed (% of total)	No. of times discussed
Introduction	0:02:08	9	2,4%	11	0:02:25	7,5%	31
Explanation interview	0:01:29	9	2,8%	11	0:01:26	4,7%	31
Product questions	0:11:05	9	11,5%	11	0:08:25	26,3%	31
Question cards	1:11:30	9	72,0%	11	0:16:03	47,7%	31
Daily rituals	0:01:11	4	1,3%	5	0:01:30	4,8%	31
Scoring	0:06:08	9	6,4%	11	0:01:48	5,7%	31
Round up	0:03:58	9	4,3%	11	0:01:01	3,3%	31
Total duration	**1:36:50**		**100,7%**		**0:32:39**	**100,0%**	

Interruptions / chitchat	0:26:41	6	4,4%	7	-	-	-

Steps and guidelines

Data analysis indicates that:

- Based on location (rural or urban), gender, income and occupation of participants their interpretation and scoring of the themes and questions differed. For example, ownership of land turned out to be important especially for rural participants, and concerning 'Animals' the rural participants mainly spoke about cattle, while most urban participants referred to pets. Female participants spoke more about 'Family' and 'Plants', and less about 'Friends' and 'Animals' than the male participants who spoke longer about their worries and stress in life. Lastly, low income group participants spoke more about their 'Work & Income', 'Worries & Stress', middle income group participants more about 'Mobility' and high income group participants more about 'Education', 'Dreams and Plans', and 'Physical health'. This indicates the importance to include a variety of participants.

- More attention can be paid to the concept of choice, especially to the existence and sense of choice and choice making behaviour. Lack of choice could be easily detected, but all opportunities available to a person and which options a person prefers over another are more difficult to detect.

- Identification of adapted preferences and how they influence people's use of choice proved to be difficult. There were instances of men going out in the evening to meet their friends, while their wives did not consider doing that. However, these women also did not indicate any urge for it. From the designer's perspective this can be indicated as an adapted preference, especially as translators sometimes added information, such as: "*Generally, generally lady or girl don't go outside after 10 in India. They don't*".

- The data gathered from these individual interviews mainly provided individual micro data; deep insight into people's lives within their social setting. However, information about collective capabilities, and social and environmental conversion factors was mainly obtained from translators, the involved companies and organizations, and local stakeholders. Thereby, underlying reasons for lacking services, political influences and socially accepted behaviour was not revealed. The interviews did reveal for example:
  - information about relationships (e.g., the importance of being able to offer guests good food and cold drinks)
  - the effects of societal and political structures (e.g., the importance of the Mukhiya (village head), land purchase and division arrangements, social schemes to support the poor, the option for sterilization in rural villages, rules for women - who should not ride a bicycle or go out at night),
  - the influence of environmental conversion factors (e.g., electricity supply and availability, and the availability of public transport).

  However, information about the educational and voting system was explained by a translator, another translator provided information about water supply, a local doctor provided health

statistics, power relations and sensitivities were identified during conversations with a local partner.

- The differences in prior India experience between the designers have influenced the interviews. The Lead Researcher was more familiar to terminologies, nutrition, habits and organizational structures than Researcher 1. On the other side, this knowledge can also lead to biases and/or assumptions. It can thus be a benefit as well as a disadvantage.

Furthermore, the designers noticed that:

- It is useful to match the terminology with the local language for improved understanding of the interview content by the translator and participants.

- Participants' body language and tone during the interview also revealed information and sometimes triggered follow-up questioning. As no direct line of communication was possible, based on body language and intonation it could be detected if participants wanted to share more information or did not want to talk about specific topics.

- The interviewing tasks were too much for one designer. The designer has to guide the interview, guide the translator, map and draw the answers and switch between several discussion topics. Conducting the interview individually led to not always asking follow-up questions when contradictory answers were given, or unintentionally skipping of certain topics. Therefore, during the interviews with English participants, the drawing was left out, as a direct line of communication was possible.

- Conducting interviews individually does not allow for discussing interpretations of the interview afterwards.

- Forcefully posing sensitive questions does not serve the goal of entering into dialogue. However, it is difficult to decide which topics might be sensitive. Most participants openly spoke about their income, sterilization, or inability to conceive children, while the designers thought these questions would be sensitive. And 'Accommodation', a theme considered to be an 'easy' conversation starter turned out to be a sensitive topic for the Chulha users.

- Next to the data from the interviews, observations made during the interviews were valuable to support the interview. When family or community members were present during the interview, more was learned about social structures and relationships. Observations about how people use their product, what their house looks like, or where they work offer insights and starting points for discussion. During the Chulha interviews for example it was noticed that in one house the chimney was broken, while the participant did indicate to have less health problems since the installation of the stove. In many cases participants had difficulty to come up with products they owned, in which case walking through the house supported them to answer this question.

- It is not always feasible to conduct the interview at participant's homes. Most participants seem to feel comfortable at the office or reeling centre. Only one participant, being interviewed at his office, was suspicious and did not want to answer questions about income and future plans concerning work.

- The influence of participant's characteristics and behaviour on the interview is not easy to indicate. The designers experienced time shortage, suspicion, unwillingness to answer certain questions, feelings of discomfort, talkative participants, and silent participants. Especially during the Chulha interviews motivation, suspicion and availability of time played a role. A gatekeeper therefore introduced the designer to take away suspicion, but not all suspicion could be taken away for each interview. The influence of cultural background and socially desirable answering was even more difficult to detect, but contradictions in answers could be noticed, such as participants who first indicated to be happy with their family or with their product, but later on mentioned problems. This might indicate politeness or socially desirable answering.

- The differences between the designers and their participants and translators did not have a notable influence on opening up. In most cases participants were curious to the designers or honoured by their visit. However, the influence of differences in age, gender, background and/or race, amongst others, was difficult to detect.

- The translators influenced the interviews. Due to difference in social status, gender, cultural background, skills, knowledge, and interest, and due to their interest, familiarity with the participants, and their social skills. Four translators were employees of the different organizations / companies, only the translator present during the interviews of the Chulha was not. Three translators were well-known to the participants and their culture, the other two less or not. Four translators were very interested in the interview and its purpose - although one of them was often distracted and had a moderate command of the English language, one was told by his superiors to translate. Three translators were very sociable and established a good relationship with the participants and asked the questions with sincere interest. One of them talked a lot, making the interviews last up to three hours. Two translators the translators' were steering participants and speaking in their name. All these aspects influenced the rapport being built, the length of the interviews and the openness of the participants.

- Due to time constraints, the instructions of almost all translators lasted 5 to 10 minutes and were given just prior to conducting the first interview. This was not sufficient to get them properly acquainted to the interview flow.

- Directly noting down key insights, observed characteristics and behaviour during or after the interview helped a lot in interpreting the data and detecting design opportunities.

- The local pilot conducted before study 2 proved to be very useful. Both the designer and the translator better got to know the interview flow, the themes and questions and learned working together. It was also useful to become familiar with the area and the people, and with local terminology, leading to adaptation of the ODK to local circumstances.

- It is important to establish relationships with participants beforehand. During the Mitticool and ChotuKool interviews the designer did not get to know the participants beforehand, but solely visited them for the purpose of interviewing. This was different for the case of the ATRM and Chulha. During these interviews the designers were or got familiar to the local people leading to more information being shared, and more dialogue. Especially for the Chulha interviews this familiarity was important in order to take away – most of the – suspicion.

Appendix E

- It is important to build rapport during the interview. Bringing pictures of life in the Netherlands generated interest and helped in establishing a relaxed conversation. During multiple interviews participants also started to ask questions to the designer, stimulating dialogue.
- The more interviews were executed, the easier it became to conduct them, as the themes and questions are more familiar making switching between topics easier.

Themes

An analysis of the amount of time spend per theme was made. In figure 24 a boxplot shows the average percentage of the time each theme is discussed for all interviews. No statistical relevance can be assigned to the number of interviews conducted, but the boxplot provides a good overview of not only the average interview time spend on each theme, but also on the dispersion of time spend on each theme in the different interviews.
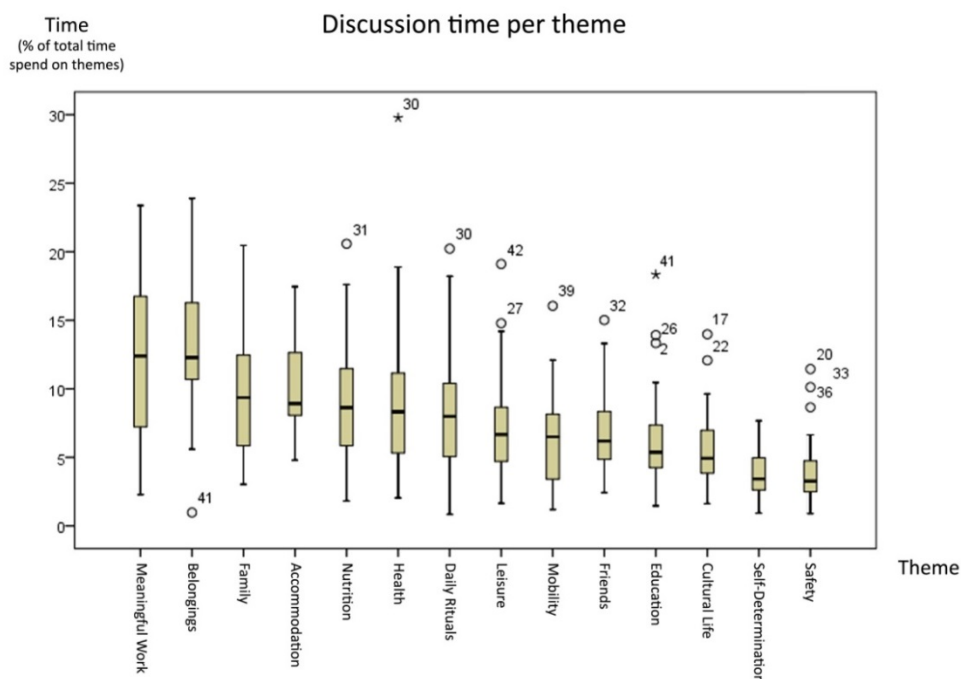
Figure 24: Overview of discussion time per theme in percentage of total amount of time spend on the question cards for all 42 ODK interviews

Concluding from this overview:

- Similar to the first micro-try-out at JFO, the themes 'Meaningful Work', 'Products, Animals and Plants', 'Family' and 'Accommodation' consume most time to discuss.
- Similar to the first micro-try-out at JFO, the themes 'Safety', 'Self-determination' and 'Cultural Life' consume the least time to discuss.
- No large deviations from the average discussion time of the themes per participant are indicated, except for 'Health' (participant 30) and for 'Education' (participant 41).
- Some themes took up an average of over 10% of the interview time, while some others took less than 1%.

The boxplots in figure 25 and 26 show the average percentage of the time each theme is discussed for study 1 and study 2 separately. From these two plots and table 17, it can be seen that:

- 'Education', 'Meaningful Work', 'Family' and 'Mobility' are more extensively discussed during study 1. That is mainly because the Lead Researcher posed more questions regarding 'Education' and 'Mobility' to the participants.

- 'Nutrition', 'Health', 'Daily Rituals' and 'Religion' are more extensively discussed during study 2. This is because the Philips Chulha is a cooking stove ('Nutrition') which aims to reduce indoor-air-pollution ('Health'), because during study 1 the designer paid less attention to the timeline and daily rituals than the designer in study 2, and because the Chulha users find 'Religion' very important (as could be derived from the scoring exercise).

- 'Accommodation' was not discussed during study 2 and 'Cultural Life' was only about 'Religion', as both 'Accommodation' and 'Politics' were sensitive topics in the area.

- Based on the product the focus has been on, the discussion time of the themes varied. During the Chulha interviews for example, a lot of time was spend on 'Nutrition' and 'Health', while during the discussion of the ATRM most time was spend on discussion of 'Meaningful Work' and during the Mitticool and ChotuKool interviews most time was spend on discussing 'Products'.
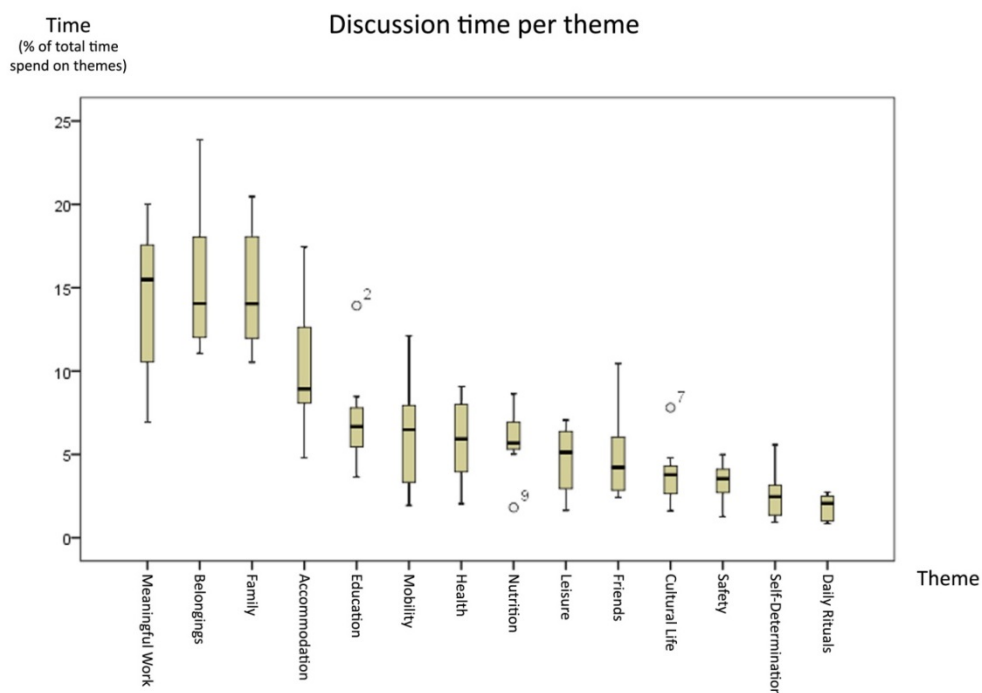
Figure 25: Overview of discussion time per theme in percentage of total amount of time spend on the question cards for study 1 (11 interviews)
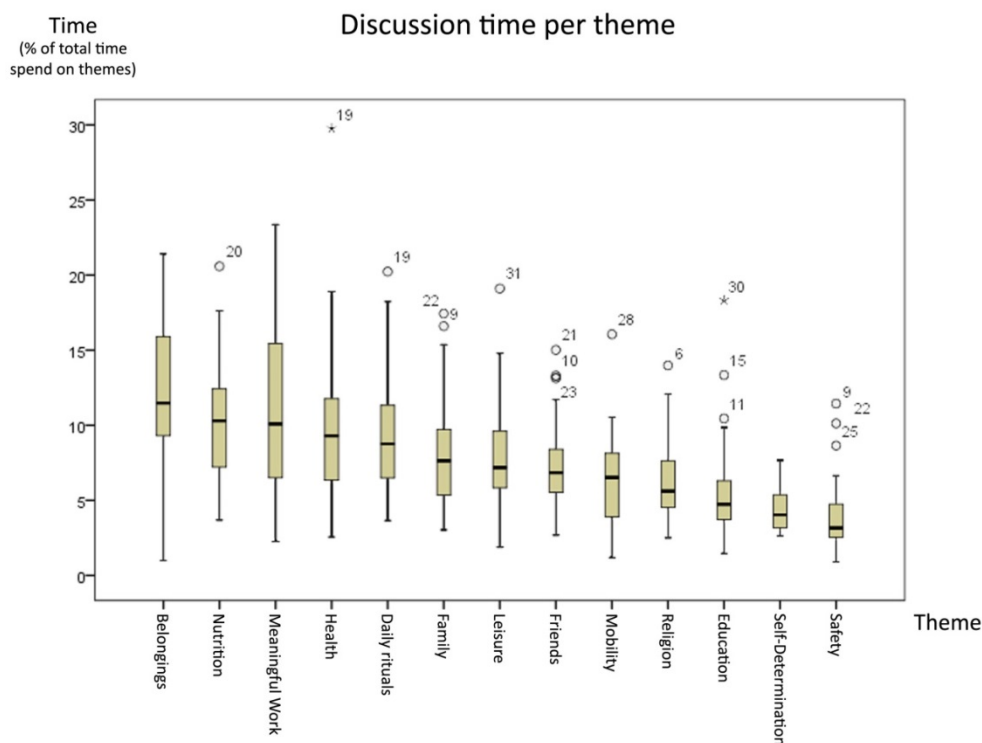
Figure
26: Overview of discussion time per theme in percentage of total amount of time spend on the question cards for study 2 (31 interviews)

In table 17, the themes have been split into different topics. It can be seen that not all topics have been discussed during each interview and that splitting the themes into different topics leads to a more even distribution of discussion time per topic.

Table 17: Duration of different themes of the ODK interview per study

Study 1			Study 2			Both studies		
Topic	No. of times discussed	Time discussed (%)	Topic	No. of times discussed	Time discussed (%)	Topic	No. of times discussed	Time discussed (%)
Family	11	13,1%	Nutrition	31	10,4%	Accommodation	11	11,8%
Products	11	10,1%	Meaningful Work	29	9,5%	Nutrition	42	9,2%
Accommodation	11	9,5%	Daily Rituals	31	9,4%	Meaningful Work	40	9,2%
Meaningful Work	11	8,1%	Leisure Time	31	8,0%	Family	42	8,6%
Income	11	6,3%	Friends	31	7,5%	Daily Rituals	36	8,3%
Nutrition	11	6,0%	Family	31	7,0%	Leisure Time	42	7,1%
Mobility	11	5,9%	Religion	26	6,4%	Friends	42	6,8%
Friends	11	4,8%	Physical Health	30	6,2%	Products	38	6,5%
Leisure Time	11	4,6%	Mobility	30	6,2%	Mobility	41	6,1%
Education	11	4,3%	Education	29	5,6%	Income	24	5,3%
Plants	11	3,4%	Products	27	5,0%	Education	40	5,3%
Safety	11	3,4%	Dreams & Plans	17	4,3%	Physical Health	41	5,2%
Information	10	2,9%	Animals	29	4,2%	Religion	37	5,0%
Dreams & Plans	11	2,7%	Plants	28	4,1%	Plants	39	3,9%

Physical Health	11	2,7%	Safety	29	4,0%	Safety	40	3,8%
Land	4	2,4%	Income	13	3,8%	Dreams & Plans	28	3,7%
Decision Making	9	2,3%	Information	1	3,3%	Animals	40	3,7%
Religion	11	2,3%	Healthcare	28	3,1%	Information	11	2,9%
Animals	11	2,1%	Mental Health	12	2,7%	Healthcare	39	2,6%
Mental Health	10	2,0%	Decision Making	16	2,1%	Mental Health	22	2,4%
Daily Rituals	5	1,8%	Land	17	1,2%	Decision Making	25	2,2%
Healthcare	11	1,5%	Accommodation	0	0,0%	Land	21	1,4%
Politics	11	1,2%	Politics	0	0,0%	Politics	11	1,2%
Cultural Life	1	1,2%	Cultural Life	0	0,0%	Cultural Life	1	1,2%

The designers furthermore noticed that:
- 'Products', 'Animals' and 'Nature' are all about people's possessions, but they do not have close connections. 'Nature' was mainly discussed in relation to 'Accommodation', 'Products' were often discussed during the tour through the house and 'Animals' often came up during discussion of 'Meaningful Work'. They might therefore better be separated to stimulate the flow of the interview and aid the designer to be flexible in switching between the question cards.
- The themes that took longer to discuss were often the starting themes ('Accommodation', 'Belongings' and 'Work'). The participants could see the pile of question cards, which sometimes made them impatient: some of them asked how much more time the interview would take, referring to the pile of question cards still remaining.
- During the interviews some terminology changed. This was mainly because the names of the themes were not always well understood or did not correspond to the translators' and/or participants' expectations. 'Self-determination' was often explained as "*dreams and plans in life*", and 'leisure' was posed as "*time to relax or do nothing*". The titles of the different themes therefore need a closer look to better suit their content.
- 'Land' came up as a new topic in 'Accommodation', which is particularly important in rural areas. It comprises ownership of land and the type of land people possess: upland or lowland.
- Within the theme family a lot of time is spend on discussing partner and children, but not much attention is paid to parents, siblings and in-laws.

Questions

During some interviews, beforehand questions were discarded by the translator or by other stakeholders, due to local straits, cultural taboos, or class differences. Still, most questions could be posed and on the basis of these interviews some points of attention concerning the questions have been identified by the designers:
- Some themes and questions might not be clear to the translator and/or the participant. Information about one theme was sometimes revealed in a later discussed theme. For example, when being asked about 'Family' a participant explained "*he is doing two jobs*", which was not revealed before when 'Meaningful Work' was being discussed. Moreover, answers did not always relate to the question posed. For example, when asking a female participant how she got together

with her husband, the answer given was "*In the evening they sit together*". This unclarity mainly concerned questions about 'Information / Questions in life', 'Leisure', 'Safety' and 'Self-determination'. The contents and questions of these themes and topics need to be critically looked at.

- The topic of 'Cultural Life' was difficult to question participants about, and not much cultural related information came out from this theme. It therefore deserves further attention during ODK optimization.

- 'Income' is a topic that deserves special attention. Participants did not always directly share their daily, weekly, monthly or yearly income, but were often willing to tell about their expenses and savings.

- Within 'Accommodation' no questions were there regarding 'Sanitation'.

- Within 'Health' no questions were there regarding tooth care and hospitals.

- Just as with the first Try-Out at JFO, questions regarding 'Products', 'Information / Questions' and 'Decision Making' did not open up conversation. They were perceived as being too open and broad. To prevent translators from providing examples the questions should be made some more specific.

- On the other hand, questions regarding 'Cultural Life' and 'Education' turned out to be too closed to open up a good conversation and need reconsideration as well.

- The amount of questions caused impatience during several interviews, especially the interviews of study 2 where people had limited time or were suspicious. Thereby, the different themes comprise a different amount of questions, which also influenced the expectations of the interview time of the translators and participants. Therefore, there was not always sufficient time to ask follow-up questions as "*why?*", "*how?*" and "*what else?*"

- Some questions belong to different themes. 'Decision Making' for example, is a topic under 'Family', but also came up when discussing 'Friends' or 'Cultural Life'. Information about 'Products' came up, not only under 'Products', but also when discussing 'Accommodation', 'Mobility' and 'Education'.

Techniques and Tools

The designers noticed that:

- The visualization cards attracted the participants, who were often curious to see what was 'in the box'. However, the amount of cards turned out to be overwhelming. The participants do not know which 'answers' are visualized on the cards and it takes too much time to let them search for their answer.

- The timeline, mainly used during the Chulha interviews, turned out to serve as a good conversation starter, especially when not much prior rapport could be build. It made the conversation relaxed and participants were interested in the timeline and the visualization cards.

- The mapping and drawing exercise stimulated discussion and story sharing and also took the rush out of the interviews. It formed a direct line of communication between the designer and the participant when a translator was used, it offered the designer a way to check with the participant

if the answer was correctly understood, and it provided an overview of the discussed items. However, while the designers did encourage the participants to map and draw themselves, during most interviews the designer had to place the visualization cards or do the drawing.

- The pictographs used for the question cards and the scoring exercise have been kept general and as neutral as possible in order to not direct participants into a certain direction, and to be able to apply the ODK to different contexts. However, during this study it became apparent that the participants found the pictographs often difficult to relate to, which resulted in additional explanation time. Incidentally, they also led to misinterpretation. Therefore, the neutrality and appropriateness of the pictographs might need an additional critical view.

- The pictographs used for the scoring exercise needed explanation, but all participants could quickly categorize the different themes when they were reminded what the pictograph represented. While there were only four importance categories, the exercise gave a good view of people's priorities. Often it supported their answers, but it also led to additional questioning and dialogue when it did not.

Results of walkthrough with D-Lab students

Eight D-Lab students took part in the walkthrough evaluation. Students who were at the time of the research taking classes at D-Lab were asked to participate. The requirements were that they must have had executed a Design for Development (DfD) project and went into the field during this project. To stimulate participation the students were offered a voucher. There were twelve applicants of which eight had been selected to participate, based on the diversity of projects that they had worked on. For the characteristics of the evaluators and their projects see table 18 and 19.

Appendix E

Table 18: Characteristics of evaluators and their projects of focus group session 1

Evaluators and projects focus group session 1				
Evaluator no.	1	5	6	8
Age	21	22	20	27
Gender	Male	Female	Female	Female
Background	Chemical Engineering student	BA in Economics, employed at D-Lab	Mechanical Engineering student	BSc in Mechanical Engineering, employed at D-Lab
Project	Improving a bicycle powered ice shaver for young people	Improving charcoal production from waste materials for slum youth	Developing a water level meter for storage tanks and a solar water heater	Developing a rope pump for well water and a windmill to power the pump
Project focus	Simulation	Synthesis, Simulation and Evaluation	Full cycle	Synthesis, Simulation and Evaluation
Project area	Santa Ana, El Salvador	Nairobi, Kenya	São Paulo, Brazil	Honduras
Project team	4 members	5 members	3 members at D-Lab, 2 at Brazil	2 members
Duration of project	4 months	4 months	4 months	4 months
Time in the field	1 week, at the end of the project	Full project	2 months in the beginning of the project	At the end of the project
More DfD experience	No	No	No	D-Lab trips in Ghana and India

Table 19: Characteristics of evaluators and their projects of focus group session 2

Evaluators and projects of focus group session 2				
Evaluator no.	2	3	4	7
Age	23	21	21	21
Gender	Female	Female	Female	Female
Background	Mechanical Engineering student	Chemical – Biological Engineering student	Mechanical Engineering student	BSc in Aerospace Engineering, Entrepreneur
Project	Developing a filtration system for waste vegetable oil for waste picking cooperatives	Improving a pedal-powered ice-cream churner for a youth collective	Improving a solar drier for fruits and crops for rural farmers	Developing a device that removes the shell of Moringa seeds for smallholder farmers
Project focus	Full cycle	Full cycle	Analysis, Synthesis, Materialization	Full cycle
Project area	São Paulo, Brazil	Santa Ana, El Salvador	Berinag, India	Kumasi, Ghana
Project team	In 3 teams with 6, 3 and 5 members	2 members	Individual	Different engineers and economists
Duration of project	39 months and still Continuing	4 months	2 times 4 months	15 months and still continuing
Time in the field	4 trips during multiple phases, for 3 weeks, 2 weeks, 1 week, 3 weeks	During Materialization and Evaluation	1 month during Materialization, started all over again, again 3 months during '2nd' Materialization	1 month during analysis, 2 months during Materialization and 2 months during Evaluation
More DfD experience	D-Lab trips in El Salvador and Nicaragua	No	D-Lab trip	D-Lab trips to Ghana and Nicaragua

Results

The sensitizing packages (see figure 27 and 28) were mainly to get the evaluators acquainted to the themes and their contents, but also insight about their perception towards the themes and topics was obtained.

Figure 27: Filled in sensitizing package
Figure 28: Filled in sensitizing cards

The focus groups (see figure 29 and 30) resulted in the evaluators' perceptions regarding required prerequisites, steps, guidelines for user context research and the evaluators opinions regarding the themes and topics and the effectiveness of using them in the design process.

Figure 29: Individual exercise during focus group session 1
Figure 30: Discussion during focus group session 2

Prerequisites

- In both focus groups the importance of having a community partner was stressed. One evaluator who worked without a community partner explained: "*I didn't have like a community partner, which makes it, I think, a lot more difficult*", and "*I felt that that was one of the biggest things missing for our entire like project.*" E6 explained that her team did not know where to start, what the actual problem was and that they were not accepted by the community as professionals and could not select an unbiased sample of participants, while Evaluator 1 explained that the strong community partner his team had was very helpful in figuring out what to do, in interpreting, and in getting access to participants. A respected community partner with a good relationship with the people in the area can aid in: providing information on the problem and project (Evaluator 4 and 8), providing access to local people (Evaluator 4 and 6), making an unbiased selection of people (Evaluator 6), getting access to participants and being properly introduced as professional designers (Evaluator 5, 6, 8), providing interviewing assistance (Evaluator 4). However, Evaluator 4 warned not to rely only on what the community partner says, as "*the organization I was working*

with, like the project that I was supposed to be involved in with them and my understanding of it, was a complete 180 like the second I got there."

- In both focus groups the evaluators agreed that it is important to go into the field, preferably throughout the full project (Evaluator 1, 2, 7 and 8) to better understand the problem (Evaluator 1, 2, 3, 4, 5, 7 and 8), connect to the local people (Evaluator 6), build relationships and get comfortable with each other (Evaluator 8), learn about habits, decision making early on in the project (Evaluator 7), becoming familiar to the area and the people (Evaluator 4 and 7) and to be able to work together with the people (Evaluator 1 and 8). However, time in the field is often limited. As Evaluator 8 explains: "*In my opinion it would be good to be in the country for every stage, but that is not always possible*". More participants indicated that there is not always time within the project as the schedule is rushed (Evaluator 3, 4, 5 and 7) and it is hard to fit a field visit in the curriculum (Evaluator 2 and 8). Therefore, often one point in time is chosen to go into the field. What the right time is to go into the field depends on the goals of the project (Evaluator 1), on the type of project (Evaluator 3 and 6) and on the kind of product (Evaluator 6), but ideally in the beginning, before a problem is defined (Evaluator 4, 5, 7 and 8) and/or during the Materialization phase to build in-country and obtain feedback (Evaluator 3 and 7).

Steps

All evaluators agreed that gathering information in the beginning is important and they indicated several ways to go about this:

- Internet and literature search on state of the art technologies (Evaluator 1, 2, 3, 4 and 7), although it can be "*hard to find the specific information you are looking for*" (Evaluator 3) or to find hard data (Evaluator 7).
- Consulting experts (Evaluator 1, 2 and 4)
- Learning from former projects by reading reports, consulting the 'D-Lab Wiki' and talking to people who worked on these projects (Evaluator 1, 4, 5 and 8). Although it was also indicated that the information in that case is "*subject to the interpretation of whoever wrote the report*" (Evaluator 8) and "*I was basing a lot on what other people sort of said, but I couldn't tell if it was relevant, I couldn't actually interact with the people who really are important, that would actually use it*" (Evaluator 4).
- Learning from people who are familiar to the area (Evaluator 1 and 8)
- Communicating with local people by phone and/or e-mail (Evaluator 4, 5 and 8) although it was also indicated that this can be difficult due to time differences, language barriers (Evaluator 8) and internet access barriers (Evaluator 3). Thereby, Evaluator 4 indicated that you do not always get the information you need and Evaluator 2 and Evaluator 3 found it hard to have an electronic conversation and to keep in touch.
- Partnering with a local university: "*we were able to easily communicate with the students. […] The students could go visit and get the information back to us.*" (Evaluator 2)
- Walking around in the community and talk to people (Evaluator 1 and 6), informally with questions in mind or through interviews (Evaluator 1, 2, 4, 5, 6, 7 and 8)

Appendix E

Guidelines

- In both focus groups the language barrier was mention as a difficult and frustrating issue (Evaluator 2, 4, 5, 6, 8). It limits actual understanding (Evaluator 2 and 4) and makes it hard to pose the right questions and "*get anything out of them, even if I have a translator*" (Evaluator 4).
- Wording was mentioned as being very important to pay attention to in focus group session 1:
  - Words might be perceived differently: "*A lot of times when you word something in English, the direct translation is kind of like harsh in like another language*" (Evaluator 6), "*The people we were speaking to spoke English, but a different English than we did*" (Evaluator 8) and: "*Even though English is the national language there […] we definitely find communication problems, because, they just speak more freely*" (Evaluator 5).
  - Difference in accent, words and expressions (Evaluator 8) in dialect and pronunciations (Evaluator 6) affect people's answers: "*You have to be like really careful how you phrase things and pay attention to the understanding that the person has*" (Evaluator 8), as, for example: "*My use of the word community might mean something different*" (Evaluator 8).
- The evaluators in both focus groups indicated that working with a translator is difficult: There are good ones and bad ones (Evaluator 2), ones that understand the project and try to get actual information and ones that merely translate (Evaluator 6), and it forms a disconnect with the participant (Evaluator 1, 4 and 6), as "*you are like talking to another person who is talking to another person*" (Evaluator 6). You do not know if things are getting through (Evaluator 4) and "*you are never really sure where to look and the other person just talks to the translator*" (Evaluator 6).
- Political obstacles for working with the people were also mentioned: Evaluator 1 stressed that it can be dangerous to randomly talk to people at the street, Evaluator 2 indicated "*conflicts between some of the cooperatives and the overlying union*" and Evaluator 7 shared that "*a group of farmers that we were working with [..] were challenged by another group of farmers*"
- Planning obstacles were mentioned in focus group 2: time schedules changed because of difference in punctuality (Evaluator 2, 3, 4 and 7), unavailability of materials (Evaluator 3, 7), limited internet access (Evaluator 3 and 6), unavailability of electricity (Evaluator 7), religious breaks (Evaluator 3), weather conditions (Evaluator 4 and 7) and available infrastructure (Evaluator 7), limited access to stakeholders (Evaluator 2, 4), time pressure (Evaluator 2), things go slow due to dependency on other people (Evaluator 4)
- The evaluators in focus group 1 indicated that designers have to be aware of their position:
  - "*We had something […] like an 'American privilege' [..] Like, oh, it is so cool to be friends with Americans*" (Evaluator 1)
  - Gender and age influence people's perception: Evaluator 6 and 8 indicated that it was easier to talk to participants with the same gender as themselves and the translator, Evaluator 5 indicated that male experts do not want to work together with a 20 year old 'girl'. The three female evaluators of focus group 1 (Evaluator 5, 6 and 8) stressed that they wanted to be seen

as professional, credible and competent, while they were often seen as young and cute and unable to help, as well as marriage material.

- o Clothing influences people's perception: dressing formally might help to make people listen (Evaluator 1), but that is not always desired, as you don't want to be the person telling them what to do (Evaluator 5). Evaluator 6 indicated that people are more willing to talk to you when dress informally, as government people make a lot of empty promises to the people and you do not want to perceived like that. Evaluator 6 also indicated that you can become a target of crime when being dressed up, and Evaluator 5 and 6 argued that the way you dress depends on your goal: when selling something you can dress formally, but when trying to gain access to a community you should not look like an authority.
- Evaluator 6 argued that *"A lot of things become everyday life making me unaware of stuff"*.
- Evaluator 2 pointed out that *"people must be appropriately compensated for their time"*

Themes

The new topics that have been mentioned by the evaluators in the sensitizing exercise are listed below:

- Health
  - o Healthcare: cost of care (Evaluator 1, 5, 8), insurance (Evaluator 3, 4, 5, 6), dentist (Evaluator 6), facilities (Evaluator 6), cultural values (Evaluator 8), waiting time (Evaluator 3, 7), herbal treatments (Evaluator 7), medicine accessibility (Evaluator 7)
  - o Mental Health: Risk avoidance (Evaluator 6, 7), confidence (Evaluator 4), resilience (Evaluator 7)
  - o Physical health: knowledge / comprehension of diseases (Evaluator 4, 8), cultural values / acceptance of death (Evaluator 8), cleanliness (Evaluator 2), teenage pregnancies (Evaluator 6)
- Nutrition: hungriness (Evaluator 5, 7), government programs (Evaluator 6), fridge (Evaluator 6), stove (Evaluator 6), time limitations (Evaluator 8), food origin (Evaluator 7, 8)
- Education
  - o Education: cost of education / affordability (Evaluator 2, 3, 5, 8), state of building (Evaluator 5), student-teacher ratio (Evaluator 5), school capacity (Evaluator 6), public versus private (Evaluator 6, 7), admittance rules (Evaluator 2, 6), laws and rules (Evaluator 4), scholarships (Evaluator 7), loans (Evaluator 7), perception – privilege or luxury (Evaluator 7)
  - o Information: internet access (Evaluator 2, 4, 6), TV (Evaluator 4, 6), radio (Evaluator 7), mobile phone (Evaluator 7)
- Safety: rape / violence / crime (Evaluator 5), robberies (Evaluator 6), , difference in urban and rural areas (Evaluator 8), stigma (Evaluator 2), response time (Evaluator 7), presence of police (Evaluator 7)
- Mobility: safety to travel (Evaluator 3, 4, 5), cost of travel (Evaluator 6, 8), access to other people's transportation (Evaluator 8), available infrastructure / reachability (Evaluator 2, 3), difference in day and night (Evaluator 7)
- Accommodation

- o House: sanitation / bathroom (Evaluator 1, 5), inability to move due to time, money and family commitments (Evaluator 8), illegalness (Evaluator 2)
- o Land: location / distance (Evaluator 1), legality of land / laws / regulations (Evaluator 2, 6, 7), ownership (Evaluator 7), fertility (Evaluator 7)
- Friends: dependency on friends (Evaluator 1), colleagues (Evaluator 5, 7), sense of community (Evaluator 6), being part of a community with similar values (Evaluator 8),
- Family: dependency on family (Evaluator 1), communication with family (Evaluator 1), family support (Evaluator 5), family pressure on finding partner (Evaluator 7, 8), family pressure to do certain things (Evaluator 3, 7), pressure against separation (Evaluator 7) family responsibility / commitment (Evaluator 4, 8)
- Belongings:
  - o Products: perception of worth (Evaluator 5), ownership (Evaluator 2), emotional value (Evaluator 2), preference of materials (Evaluator 4), communication devices (Evaluator 3, 7)
  - o Animals: food for animals (Evaluator 5), different roles of animals – protector / income / pets (Evaluator 7)
  - o Plants:
- Meaningful Work:
  - o Work: male vs female jobs (Evaluator 5), passion versus survival / necessity (Evaluator 5, 7), productivity (Evaluator 3, 4, 6), commuting time (Evaluator 6), initiative (Evaluator 3), repetition (Evaluator 4), family / child labour (Evaluator 7)
- Leisure: acceptance of doing nothing (Evaluator 7), pressure by others (Evaluator 7)
- Cultural Life
  - o Society: homogeneity of society (Evaluator 5), opinion towards outsiders / trust and suspicion towards other people (Evaluator 3, 6, 8)
  - o Politics: corruption (Evaluator 1, 3, 5), co-operation (Evaluator 2), solidarity (Evaluator 2), bureaucracy (Evaluator 2), network (Evaluator 3), community leader (Evaluator 4), community / tribal pressure (Evaluator 7)
  - o Religion: views towards other religions (Evaluator 3), religious days (Evaluator 4), family / community pressure (Evaluator 4)
- Self-Determination: influence of family support (Evaluator 1), passion (Evaluator 5), fate (Evaluator 5), choice / options (Evaluator 5), parental pressure (Evaluator 3), community pressure (Evaluator 7)
- Environment: pollution (Evaluator 2)
- Finances: income (Evaluator 3), investments (Evaluator 5), collective savings (Evaluator 5), taxes (Evaluator 2), money at hand (Evaluator 3, 4, 7), making choices between valuable options – e.g., food versus medicine (Evaluator 3)

Effectiveness

Seven evaluators (one had to leave early) had been asked to reflect on their projects from the viewpoint of the developed themes. For six of them, looking at their own projects with hindsight with the themes in mind shed a new light on their projects (see table 20):

o Evaluator 2 explained that her team did not focus on 'Health', 'Nutrition' and 'Leisure' during the project, which turned out to be relevant themes to consider during the project.

o Evaluator 3 stated: "*Ehm, but, now, you know, thinking about it, there is like more things that this also affects.*" And: "*And so, yeah, ehm, a kind of, I am not really sure exactly how it ties into the project, but the way you spend your time, definitely matters and if this project is something you can make money off and spend your time doing, and maybe it keeps you out of gang activity, or gives you a more positive outlet for your time, that can be very valuable. And that was not really something that we had thought of before.*"

o "*I wasn't focused on like the impact that it might have on their health, or you know, nutrition [...] I was more focused on the like, parameters of the technology.*" (Evaluator 4)

o "*I think there are more things to take into account than we actually did. Like, yeah, eh, accommodation, leisure and education*" (Evaluator 5).

o "*I still put the pots and plants early, and nutrition comes up early, but then other things like, education, mobility, health, came up that were just not a party for us in the design process. Ehm, that I now see are important, as I would say impacts of all*" (Evaluator 7).

o "*I think there were only two of these cards that really came out in like my active thought process during the project, and what I think is important to consider during the project, it is like nine cards*" (Evaluator 8).

For 1 Evaluator it was not that obvious:

o "*I think a lot of things weren't really relevant, mobility etcetera, like nutrition. And I feel like most about them about the same*" (Evaluator 6). Although this evaluator did add: "*We didn't actually end up taking into account like, the land, as such that much as we were actually doing it.*"

Table 20: Themes considered during the project and determined to be relevant when looking back with hindsight

	Importance	1	2	3	4	5	6	7	8	9	10
E	considered	W	E								
1	relevant	SD	M	CL	H	A	E	Sa	L		
E	considered	W	E	SD	CL, Fr	B	A, M, Sa				
2	relevant	W	SD, Fr	E	H, B	CL	N, L				
E	considered	SD	L	E	N	W					
3	relevant	W, SD	N	L	Fa, S	M					
E	considered	B	L	A							
4	relevant	B	A	L	N	M					
E	considered	SD, W	A	B	H, Sa	CL	E				
5	relevant	SD	A	H, Sa, N	B	L	CL	E	W		
E	considered	Conv	A	Comf							
6	relevant	A, Comf	B	H							
E	considered	B	W	N	H	CL					
7	relevant	B	N	M	E	H	A	W	Fa, CL	SD	Fr, Sa, L
E	considered	L	Fr								

8	*relevant*	B	M, L, SD	N, W, H	E, Fr

W= Work, E= Education, SD= Self-Determination, M=Mobility, CL= Cultural Life, H= Health, A= Accommodation, Sa=Safety, L= Leisure, Fr= Friends, B=Belongings (Animals, Plants, Products), Fa= Family, N=Nutrition, Conv=Convenience, Comf = Comfort

Usability

In a group exercise, the evaluators of focus group 1 and 2 had to agree on the usefulness of considering the themes in different phases of the design project. Their answers can be found in table 21.

Table 21: Themes considered during the project and determined to be relevant when looking back with hindsight

	Information gathering	Idea generation	Choosing ideas	Detailing and building	Testing and feedback
Focus group 1	Very useful	Put aside (to avoid placing constraints)	Useful	Less useful	Very useful
Focus group 2	Very useful	Useful	Useful	Less useful	Useful

The participants were also further asked about the relevance for using the themes and topics during information gathering:

o   All evaluators agreed that it is relevant to consider them. Evaluator 8 commented that the themes are "*Really interesting in this form. Feels quite right*" and "*This is just a really clear way of looking at things that are easy to be chaotic*" with which Evaluator 5 and 6 agreed (Evaluator 1 had already left). Evaluator 6 adds that "*we picked up a lot from this*" and "*A lot of these are very social, like the cards [which might help to] address the social impact of your technology*". In focus group 2 the evaluators answered to this question "*Oh yeah!*" (Evaluator 7), "*Definitely […] I think, for in general, designing for development it is very important to think about all the cultural impacts that your design will have*" (Evaluator 3), and: "*Yeah, I think it is at least good to think about all these different things and maybe more themes when gathering information that these are things that you could talk to people about.*" Evaluator 2 stated: "*it is good to have an understanding of all these things*" in order to "*get to know people better*".

o   Three evaluators expressed their concern about the time it will take. Evaluator 6 expressed her concern about the time it will take to use the themes in the field, to which Evaluator 8 responded that the time spend during the focus group was sufficient to get them acquainted. Evaluator 3 explained: "*I think it's typical in the class structure that we have, to be able to think about all these things during the design process, there is just not enough time.*" Evaluator 2 mentioned that "*it might take a while to get people actually start talking about these things*" and "*It is like a whole project in itself to get the information*". Evaluator 4 also pointed out that after gathering the information, it also needs to be transformed to a usable form for incorporation in the design process.

o   Evaluator 7 brainstormed that it would be nice to have "*a list of each of these categories, where like you gather […] all the information that you typically do and then you would say how does the current problem affect this, this, this, this. […]And it would be cool to be able to do it before and*

after, but then in that way it is not like it is a huge part of your design requirement and ehm, complicate the design process, but you can see, you have it in mind".

o   Evaluator 4 argued that not all themes can be addressed by every project, to which Evaluator 3 and 7 agreed.

o   Evaluator 4 also stressed that not everything can be foreseen in advance: "*I think that you definitely have to take like the culture into account and stuff, and, but a lot of these things will be sort of unintended consequences that only they will show up along the way or will show up once you are done. Ehm, or they could be obstacles too.*" And: "*I just feel it is hard to get, to even, the understanding that you need for sort of design appropriately*".

Relevance

Before indicating what the goals of the research and this activity are, the participants were asked broadly about obstacles and limitations in DfD projects. They pointed out multiple obstacles, among which the importance of identifying the right need and the difficulty of knowing which questions to ask. The following statements indicate the relevance of developing the themes and questions:

- A proper understanding of the problem is key according to all evaluators. Evaluator 1 and 7 indicated that determining the need before going into the field will save money and results in better solutions. As Evaluator 3 states "*I think, for in general designing for development, it is very important to think about all the cultural impacts that your design will have.*" And as Evaluator 6 argues, it is very relevant to think about the social impact of the technology that is designed. Evaluator 5 indicated that the reason for the project was to provide work that is meaningful, but that for the potential users work was only about income not about being meaningful, making the relevance of the project limited. She also explained: "*We wanted to use cassava as a binder and eh, in our mind that was the idea and the solution, but as we were doing it we realized that for them, cassava is food and they don't want to be using food for something other than nutrition. So it didn't make sense to them and we didn't think about that.*" Evaluator 7 indicated that the solution that they developed was biased, due to the problem framing and that a different framing of the problem would probably have led to a better outcome. Evaluator 4 indicated that the problem he addressed turned out to be wrong and he had to start the design process all over again when visiting the country. And Evaluator 6 indicated that the people they were working with had no incentive to buy the product, as it did not save them money or time, it only helped to limit environmental impact. Thereby, people often did not own their house and were therefore less willing to make home improvements.

- Two evaluators wondered which questions should be asked: "*But it is hard to even know that, what questions you should be asking. Like, sort of when you get all this information you figure out, like, what if you're missing like this part over here, like this really key part*" (Evaluator 4) and "*So, what kind of questions do you ask them?*" (Evaluator 5).

Results of expert consultation with D-Lab staff members

All themes and topics that came up during the expert appraisal are listed below.

Appendix E

General

- Differences in opportunities available to women and men, gender differences (EC1, 3, 8)
- Class differences (EC3, EC9)
- important to select a good user base, unbiased (EC10)
- "*Getting a group of people who is, who are diverse to talk, openly is a difficult thing to*" (EC10)
- "*if it is a diverse group, it can sometimes be really difficult for all of you to be on the same playing field*" (EC10)
- Different interpretations of meanings, words (EC4, 7)
- Treat the user with respect (EC10)
- The gift to give is context dependent, for example in Ghana it is good to bring soap, oil or sugar, but in the US that would be silly: "*If you, to thank me for this interview, like give me soap, I am like: 'what?'. But I kind of feel okay with doing that in Ghana. Or like, bring oil and sugar.*" (EC4)
- "*Sometimes it is hard to get the information out of people, because they assume that you know it, or they don't want to tell you because they are embarrassed, or for whatever reason.*" (EC2)
- Might be difficult to put aside your own beliefs (EC4)
- Important to consider what people find important, and use that as a conversation starter: "*Well, one it makes me feel better, like recognizing what is important to them and it makes them feel better that I recognize what is important to them, or they don't even think about that I recognize what is important to them. They are just like O, this is a nice guy because he asks me about, like, versus like, why is he keep asking me about the sun, or like, the weather. Or the baseball games or something like, cause in the US it's like, how is the weather.*" (EC4)
- "*all these things CAN have an impact, it's a matter of the extent to which they have an impact, I think*" (EC10)
- Work with Chief / community leader for access (EC5, EC7)

Daily rituals / time

- Available time / lack of time (EC1, EC2, EC8, EC11), Amount of activities to do in a certain amount of time (EC11, EC12)
- Priorities (EC4)
- Value of time (EC5, EC7)
- Time management (EC6)
- Time spending (EC7, EC9)
- Options/choice (EC9, EC12)
- Flexibility of time (EC12)

Health

- Personal well-being (EC5)
- Perception (EC5, EC9) e.g. of giving birth (EC5), of giving blood or inserting things, vaccinations, sacredness (EC9), of menstruation (EC3), Perceptions regarding sanitation (EC12), Taboos (e.g. menstrual hygiene) (EC12), Effects of having your period (for women) (EC3)

- Understanding of diseases origin / Beliefs: *"what they understood malaria and where they thought it came from, sometimes you get like really surprising answers. You know, one woman thought it was from, had to do with the sun"* (EC7)

Emotional health (EC5):
- Fear (EC9), Resilience (EC1, EC8, EC12), Psychological barriers (EC3), Psychological effects (EC4), Dignity (EC4), Confidence (EC6, EC9, EC10, EC12), Lack of confidence (EC12), Acceptance of life situation / fatalism / Dealing with the situation as it is / fate (EC12)

Healthcare
- Healthcare system / situation (EC1, EC4, EC9), Healthcare infrastructure (EC9)
- Private versus public (EC8)
- Access to health (EC2) / healthcare (EC8) /
- Time consumption for going to a doctor / waiting time (EC4), distance to healthcare (EC4)
- Wheelchair (EC1)
- Medicine (EC8)
- Prevention (EC3, EC8), Vaccination (EC2)
- Maternal health, traditional birth attendants (EC9)
- Clinics (EC12), Incentives to go to clinics (EC12)

Physical health (EC5)
- Life expectation (EC12)
- Type of diseases and available remedies (EC3), Infections (EC6)
- Work posture / influence of work on health (EC6)
- Rest (EC10)
- Hygiene (EC4, EC9, EC12), Water (EC2), Soap (EC2)

Nutrition
- Food / Taste preferences (EC6, EC7)
- Perception of food (EC2), Beliefs regarding food (EC6, EC7) – e.g. Kosher food – (EC6)
- Cooking habits (EC2, 6), Time of cooking (EC6), Place of cooking (EC6)
- Water collection (EC5), access to water / water infrastructure (EC2, EC3, EC6, EC10) – handcart, mule, q-drum as support (EC6), gender difference in access to water (EC10), Water contamination (EC12), Water source (EC5), Safe water storage (EC10)
- Diet (EC7), Well-fed (EC10), Survival (EC11)

Accommodation
- Type of accommodation (EC8)
- Sanitation (EC2, EC3, EC4, EC12), toilet (EC4, EC10), toilet style (EC10), Option/ choice for sanitation (EC4)

- Notion of property rights (EC8)
- Urbanization rate (EC9)
- Displacement (EC3)

Energy
- Energy (EC11), Electricity (EC1, EC3, EC6, EC7, EC9), access to electricity (EC2, EC11), Power outages (EC7) / reliability and stability of power (EC1), energy: solar (EC5, EC6, EC9, EC10, EC11, EC12), wind (EC11), diesel (EC6) / energy, Power situation (EC3)
- Electricity source (EC5)
- Lighting (EC9)

Land
- Terrain (EC11), Ownership of land (EC6), size of land (EC6)
- Soil quality of land (EC6)

Education

Information
- Lack of information (EC2), access to information (EC2, EC4, EC5, EC6, EC8, EC9, EC12), Access to information about market prices (EC2, EC5, EC6, EC9), indigenous practices (EC5)
- Where does information come from (EC6, EC7, EC8), How is information spread / information flows in the community (EC7, EC11, EC12)
- Way of processing information (EC11), habit of (not) using information (EC2)
- Money transfer (EC6), internet (EC6, EC12), cell phones (EC9)
- Usability of information (EC9), understandability of information (EC9)
- Good versus bad information (EC11, EC12), Value of information (EC11)

Education
- Lack of education (EC12) / Availability of education (EC4), Access to education (EC12)
- Education situation: teacher student ratio, resources (EC12), Schools (EC3), Teachers (EC9), quality of teacher (EC12), Exams (EC9)
- Educational level (EC1, EC2, EC3, EC4, EC5, EC6, EC11), Literacy level (EC6, EC9), Ability to read and write (EC6), Language (EC7)
- Formal versus informal education (EC4, EC11, EC12), Learning from family members (EC5)
- Value of women's education (EC9)
- Ties with religion (EC9)
- Cost of education (EC12)

Knowledge and skills
- Intelligence (EC4, EC11, EC12), What people learn (EC11), How people learn (EC11)

- Knowledge (EC1, EC6, EC7, EC9, EC11, EC12)
- Skills (EC2, EC6, EC9, EC10, EC12) / Expertise (EC9)
- Experience (EC6, EC11, EC12)
- Trainings (EC1, EC6, EC7, EC9, EC12)
- Intuition (EC1)
- People's capacity (EC9) / Intelligence (EC12) / Aptitude (EC12), Memory (EC12)
- Speed of things happening (EC10)
- Wise decision making (EC12)
- Insight (EC1), intuition (EC1)
- Inquisitiveness (EC12)

Meaningful Work

Finances
- Income (EC1, EC6, EC8), Money (EC4, EC11)
- Expenses (EC12), Spending (EC7)
- Financial constraints (EC9), Economic situation (EC3) / Standard of living (EC6), Financial structure of people's lives (EC3), financial situation (EC4), Ability to pay (EC5, EC10), Dignity/ pride (EC10), buying / purchasing power (EC5, EC6, EC8, EC9), Money at hand (EC2), money available at certain times (EC4)
- Willingness to pay (EC5, EC6)
- Investments (EC9), Capability of investing (EC12)
- Financial resources (EC6, EC9, EC10), Access to credit/financing mechanisms (EC1, EC7), micro-finance (EC4), credit system (EC9)
- Financial literacy (EC9)
- Risk adversity (EC1, EC2, EC6, EC12)

Work
- Household (EC9), washing clothes (EC5)
- Gender differences (EC2, EC6, EC9)
- Value of working together (EC2, 5), Work/activities people traditionally do together (EC5, 9), Community work (EC7), individual versus community approach (EC7)
- Tradition (EC2, EC12), habits (EC11), beliefs (EC12)
- Experience (EC6, EC11, EC12)
- Efficiency (EC6, EC12), doing things by hand (EC5, EC6), Time versus cost (EC1, EC3, EC5, EC12)
- Creativity (EC1, EC6, EC8, EC9, EC12)
- Tenacity (EC10)
- Motivation: desire to contribute versus fame or wealth (EC11), Restrictions by family (EC3),
- Do what you like (EC9), Interest, Passion (EC9)
- Unemployment (EC5)

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Leisure
- Lack of play / sense of play (EC4)
- Time versus cost (EC1, EC3, EC5, EC12), time saving versus social time (EC3, EC7)
- Sports (EC4)

Mobility
- Gender differences -> what is allowed? (EC12)
- Transportation devices (EC6)
- Experience using transportation (EC12)
- Access to transportation (EC2), Infrastructure in place (EC1, EC3, EC8), Roads (EC3),
- Quality of infrastructure (EC1, EC6, EC9, EC11)
- Getting things to market (EC12)
- Physical isolation (EC3), Transportation issues (EC4)
- Cost of transportation (EC4, EC12)
- Distance (EC10, EC2)

Friends

General
- Value of coming together, doing things together (EC5), Value of time spend together (EC2)
- Social network (EC8), social structure (EC9), Things that bond people together (EC11), Isolation from others (EC5), Membership to a group (EC1)
- Social activities (EC9), Social interaction time (EC2), Engagement and doing things together (EC9)
- The way people interact (EC6)
- Deepness vs artificial connections (EC8)
- Creating a relationship (EC8)
- Friendship (EC1),
- Privacy (EC3, EC5)
- Conflicts (EC11)

Community specific
- Community versus individual feeling (EC7, 12)
- Community perceptions (EC7)
- Community roles (EC3), Community leader (EC7), community chief (EC9), council of elders (EC9), Power in community/ hierarchy / Community organization (EC3, 8, 9) Perception of people / power of oldest, wealthiest /class differences (EC12)
- Community trust (EC6)
- Community income level (EC9)
- The way the community works (EC12)

- Community divide, community tensions (EC9)

Self-determination
- Aspirations, desires (EC4)
- Ability to change conditions (EC9)
- Confidence to share (EC9), speak up (EC10)
- Decision making power (EC6)
- Advice from others (EC6)
- Family pressure (EC12)

Cultural Life
- Privileges (EC8)
- Taboos (EC3, EC4, EC12)
- Gender differences (EC1, EC3, EC8, EC10, EC12) / Respect for women (EC6) / Gender roles (EC8), Restrictions for women (EC12)
- Differences between adults and children (EC3)
- Class differences (EC3, 9, 11), resulting in approaching different classes differently / unequal opportunities (EC9), Caste system (EC9), Perception of local status (EC2)
- Traditions (EC2, EC12)
- Values (EC4)

Spirituality & beliefs
- Religious / spiritual differences (EC11), Religious constraints (EC1, EC4, EC12)
- Beliefs: legends, curses and their origins (EC2, EC12)
- Perception of going to church (EC4)
- Conviction (EC4)
- Respect towards other religions (EC8) and perceptions (EC9)
- Sacredness (EC9)
- Religious activities (Prayer) (EC10, EC11)
- Prescriptions (EC6, EC9)
- Time consumption of religious activities like prayer (EC10)

Politics & rules
- Supporting a political party (EC1), Political party (EC9)
- Government tasks / facilities (health, education, sanitation, sewage) / systems (EC2) / Access to water, energy (EC9), government programmes (vaccination) (EC11)
- Legal and political situation (EC2), Local and political structure (EC7), Government system (EC7), Political environment (EC11)
- Regulations (EC11)
- Access to legal system (EC9)

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- Government focus (EC12), Good and bad policies (EC9)
- Political requirements, clearances (EC6), Power of politics (EC6)
- Failing systems (EC5), Bribes (EC4, EC10, EC11), corruption (EC4, EC8)
- Healthy political and legal institutions (EC9),
- Public officials (EC9)
- Amount of bureaucracy (EC4)
- Co-operation (EC5)
- Subsidies / programs (EC5), Support (EC9, EC10), approval (EC11), Protection (EC1)
- Danger to share information (EC11)

Family
- Family roles (EC3), Relationships between husband and wife (EC7) / Gender roles (EC8), Family ties, family communication (EC12)
- Restrictions by family (EC3)
- Family support (EC7)
- Tension (EC7)
- Perception of marriage, children, family (EC4)

Safety
- Danger (EC2, EC7) of getting hurt (EC7)
- Safety mechanisms (EC7)
- Doing harm (EC7)
- Gang structure (EC3)

Belongings
Products
- Technological resources (EC4, EC8), Access and how people value technological resources/ take care of it, mind-set regarding products (afraid to break things, no resources to replace things) (EC4)
- Meaning of technology (EC4)
- Perceptions / preferences: Perception of products (EC1, EC7, EC8), Perception of quality (EC8), Perception of materials (EC2, EC4, EC7), Aesthetic perception of products (EC1, EC7), styling (EC5), Colour and shape preferences (EC7), Brand awareness and perception (EC8), Cultural preference (EC1)
- Appropriateness for women and men (EC1)
- Quality demand (EC10)
- Availability (EC2, EC9, EC12) / Accessibility (EC1, EC3, EC9, EC10), Options/choice (EC10), Pickiness (EC10), Trade-offs (EC12)
- Awareness of products (EC3, EC10)
- Affordability (EC5, EC6), Cost (EC1, EC2, EC3, EC4), Price point (EC11)

- Aspirational products (EC4), Proudness (EC4, EC7), status (EC7), Products that empower / reason for buying products (EC3), Products giving identity (EC4, EC5), Aspirational characteristics (EC4),
- Want versus need (EC4)
- Aspirations/value versus cost (EC4, EC5) -> "*when people really value something they will find a way to pay for it*" (EC5), Willingness to pay (EC7), Willingness and ability to pay (EC5)
- Cell phone (EC1, EC4, EC6), radio (EC7), connectedness with other people, other forms of life (EC5), communication based technology (EC5), internet access (EC6, EC11), communication tools (EC9)
- Ownership (EC12) / Feeling of ownership (EC7), Possessions (EC7), assets (EC11)
- Repair and maintenance (EC4, EC5, EC7, EC9, EC12)
- Required training for usage (EC1, EC4, EC6, EC7)
- Requirement of electricity (EC3)

Animals
- Cattle (EC7)
- Animal dung (EC9)

Plants
- Plants, harvest (EC11)
- Fruit trees (EC12)

Environment
- Habit of throwing things away (EC8)
- Environmentally friendly (EC4), sustainability (EC8, EC9, EC11), climate change (EC9)
- Sun (EC4, EC5, EC6, EC12), weather (EC4, EC11)), rain (EC11), rainy season (EC12), humidity (EC1, EC7, EC12), dust (EC1, EC6, EC7, EC10), climate (EC5), dry/ drought (EC5, EC6, EC12), heat (EC7, EC9), cold (EC9), wind (EC10)
- Proneness to earthquakes, hurricanes, flooding (EC1), volcanoes, seismic activity, natural disasters (EC3)
- Presence of sea / ocean/ water (EC2, EC3 P4, EC6, EC10)
- Waste (EC9)
- Contamination (EC12)

Chapter 6

APPENDIX F

Appendix F

F. Results Evaluations

F.1 Evaluation 1: Try-Out 1

Below, the full results of evaluation 1 are described. Evaluation 1 comprised a try-out by five design teams. Out of the five design teams who had been handed the ODK, two teams (team B and D) used it as intended. Team A conducted ODK interviews, but due to limited access to and limited time with participants, they only questioned them about seven of the twenty-one themes. Team C went into the field halfway their project, their client wanted a product focus and their supervisor did not support the ODK research. Therefore, they did not conduct the ODK interviews. Team E went into the field a bit later and conducted most user context research in the Netherlands. They used the ODK in a different way than intended. Table 22 provides an overview of the interviews conducted by each participating team.

Table 22: Details of ODK usage by design teams

	Team A	Team B	Team C	Team D	Team E
No. interviews	7	6	0	12	> 10
Duration of interviews (hour)	< 1	2-3	-	2-3	0.5 – 1
Team members present	2	3	-	3	2 or 1
Audience present	A lot, much interference	Some with audience	-	Wives of male participants	Often older family members
Themes and questions					
Themes	Selected themes related to the project	Added theme 'Body', used all themes	-	Selected and adjusted them	Addressed all themes
Questions	Selected questions. Changed questions every day.	Added, adjusted and removed some. Used all questions	-	Selected and adjusted them. Posed most relevant	Adjusted them to sanitation and hygiene
Techniques and tools					
Timeline	-	5 times	-	12 times, simpler version	-
Question cards	-	- (got stolen)	-	-	-
Sorting	For different purpose	- (got stolen)	For different purpose	-	-
Drawing and	-	By facilitator	-	By participants	-

mapping

Results meetings before field visit

Manual

Not all teams had looked deeply into the documents. Two teams indicated that they planned to use the ODK (team C and D), two teams indicated to want to investigate the ODK a bit more before deciding to use it (team B and E), one team was more sceptical about using the ODK: it is meant to ask *"non-relevant things to hopefully obtain information that turns out to be relevant in the end?"* (team A). They inquired specifically about the benefits the method offers, because it takes time and they want to spend their time well. Two teams indicated that they would like to contextualize the pictographs (team B and C).

- Theoretical understanding. Team E inquired about the difference between a resource and a conversion factor and indicated they understood the CA's theoretical background.
- Relevance for local companies. Team A wondered if the ODK is meant for Western companies only, as local companies "know the culture, they don't need it, right?"
- Combination with project activities. Team A and E inquired if the method should be used before or after posing more specific product questions, or in combination.
- Combination with 'Context Variation by Design'. Team E inquired how to implement the ODK when multiple contexts need to be addressed.
- Building rapport. Team A wondered if by using the ODK rapport is built automatically, so that it is not required to do before conducting the interviews.
- Amount of time required for conducting ODK research. Team A, B, and C indicated to be worried about their planning, that it would be difficult to conduct these interviews within the limited time they have.

Prerequisites

- Prerequisite C: In the field. Team C points out that they consider it a relevant step to go into the field in person. They indicated that: "*Via email and skype we are not getting all the information we want and need.*"

Steps

- Step 9: Introduce. Team C asked about their introduction: "*How do you introduce yourself? Do you say, I work for this company and we are investigating this product?*".
- Step 14: Thank the participant. Team D inquired about the kind of gift to bring for thanking the participants.

Guidelines

- Guideline A: Appropriate behaviour and attitude. Team E inquired about clothing and looks for them in the field.
- Guideline E: Flexible but focused conversation. Team A wonders what the ODK is: "*There is no strict protocol to follow? It is more a kind of checklist to address all the aspects that might provide information?*". Team E wonders if the interview is "*like one to one, or maybe they can be friends talking together, or a group of people?*"
- Guideline H: Number of interviews. Team C and E inquired about the number of interviews to be conducted to be able to obtain a good view. "*What about the quantity? [..] It can happen that we talk to those persons who want a big device, while most people want a small device.*"*(Team C).*
- Guideline J: Selecting and instructing a translator. Team A asked about how to deal with a company translator, and Team E asked about required translator characteristics.
- Guideline N: Be aware of your position. Team C inquired if it "*Is it a good idea to pretend being married and having children*?".
- Team A, B and E inquired about video and photography restrictions for the ODK interviews.

Themes and Questions
- Can be made project specific for each theme. Team E: "*We went through the cards and for each of them we really came up with questions that are related to sanitation.*"
- Not all project-related. Team A wondered if it is required to discuss all themes, "*because many themes have nothing to do with the product.*"
- Questions. Team D inquired if "*the conversation starters can lead to answers to the bold questions?*"

Techniques and Tools
- Drawing and mapping. Team A wondered what an 'erasable drawing sheet is'
- Visualizations. Team A asked about the perception and understanding of pictographs in different contexts. Team B and C indicated to want to contextualize the pictographs.
- Sorting. Team D: "*How do you use the sorting sheet? What do you sort?*"

Results meetings after field visit
- Team A conducted ODK interviews with potential users, and posed product questions to users already using the product.
- Team C went into the field halfway their project and therefore did not use the ODK interviews.
- Team E went into the field a bit later and conducted most context research in the Netherlands. They used the ODK in a different way than intended.

Prerequisites
Prerequisites A, C and F had beforehand been fulfilled by working with JMP BoP teams and prerequisite E (engaging activities) is fulfilled by the ODK tools. Regarding prerequisite C, team D

specifically acknowledged that "*it helped a lot [being there]. Just to see how the system of coffee processing works. It was different than we imagined, based on the literature and information we had.*". Concerning other prerequisites:

- Prerequisite B: Activities should be conducted in pairs. All teams that conducted ODK interviews conducted the activities with two (team A and E) or three team members (team B and D). One person facilitated, one took notes and observed, and when a third person was present this person also took notes and observed or made pictures.
- Prerequisite D: Training. None of the teams specifically followed a training regarding qualitative interviewing.
- Prerequisite E: Participatory, simple and fun activities. Only team B and D used parts of the ODK tools. Teams A and E posed only the ODK questions.
- Prerequisite G: Iterative data analysis. Team A indicated that they changed the questions every day according to what was working and what not. The other teams did not.
- Prerequisite H: Sharing and checking outcomes. The teams did share insights with the company and with the translators, but not with the participants themselves. Team A wanted to, but because of the changed scope of the client the location was changed and re-visits to participants were not possible. Team D did revisit every participant to follow-up and give them pictures of the conducted interviews.
- Prerequisite I: Critical reflection on limitations. The teams are aware of the ODK limitations and their own limitations.
- Prerequisite J: Learn the themes and questions by heart. All teams looked through the themes and questions. Team A, B, D and E all investigated them in detail and added, removed and changed questions to their own desires and were well-known to them before starting the interviews. According to team E "*It is nice to go through all the cards, so we think about all the aspects of the life and what sanitation means in all different.*"

Concluding: The four teams that executed ODK interviews followed prerequisite A, B, C, F, I and J. However, they did not follow an interviewing training (prerequisite D), and did not take the time or did not have the possibility to share and check outcomes (prerequisite H). Only one team collected data iteratively (prerequisite G) and only two teams used – some of – the ODK tools, which are meant to make the interviews participatory and fun (prerequisite E).

Steps
- Step 1: Get familiar with the ODK. Not all teams took the time to read the complete manual into detail. Team B and E did. Team B even changed all pictographs. However, the ODK interviews were not roleplayed and/ or tested out.
- Step 2: Obtain information beforehand. Team D and E gathered a lot of information beforehand, because they went into the field a bit later than the other teams. Team D noticed that "*It was different than we imagined, based on the literature and information we had*". Team E stated that it was useful to obtain information beforehand, but that it all came together when being in the field.

- Step 3: Localize content. Only Team A tried out the questions with a lady from the guest house and after that, they changed almost all of them.

- Step 4: Select and instruct translator. Team A and B had many different translators. Team A worked with three male translators, and team B even had a different translator for each interview. Team B indicated that in this way it was difficult to get into a rhythm. Both teams noticed differences between translators. "*One shy translator who had difficulty handling the conversation […] one translator who answered back to the participant and did not translate everything back to the researchers […] and one really good translator*" (team A). "*One who adjusted the interview to fit the participant [..] One who translated really well*" (team B). Team D and E used the same translator. Team D only needed the translator for helping the participants out if they were too scared or unable to make full sentences. Their translator was a female coffee expert from the university interested to co-operate. Team E used a translator from the company, which some of the participants were aware of. Their translator "*really translated everything for us. That takes away a lot of the hand and feet language.*" Team E indicated that the person who went with them to interview the participants had a trusted bond with some of the interviewees.

- Step 5: Conduct a local pilot. None of the teams conducted a local pilot.

- Step 6: Select participants. For team A, D and E the company helped them to select participants, based on their criteria. Team B did not work with a company from the country itself, but visited several organizations who helped them to get handicapped people to participate. Some interviews were therefore unexpected. Team A had difficulty to reach the real rural poor, the often met people who were not the 'real BoP'. Team D were linked to co-operatives who linked them to their target users. Team A and E conducted interviews with potential users, not current users of the product. Team E indicated that the participants were selected randomly via via.

- Step 7: Assign roles. The members of team A, D and E changed the roles of facilitator and note taker. The male participants did not seem to have a problem with a female facilitator. For team B, the female DfI student who was most familiar to the ODK conducted all the interviews, the other two took notes and photographs.

- Step 8: Decide on time and place. Team A had difficulty to reach their participants, as they had to travel 5 hours per day to reach them. They also conducted most interviews at work, where the product is to be used, which resulted in a lot of audience, interruption and disturbance. Participants did not want to make time for the interviews. However, team A also conducted creative sessions and, as advised by the translator, they planned those sessions during lunch and brought lunch for the participants. In this way, the participants were willing to participate. Team D could access their participants easily: "*They just called them and the farmers made time. Or we helped in harvesting.*" Team B interviewed in different places: at the organizations they visited, on the street and two times at participants' homes. Team E visited most participants at their home.

- Step 9 & 10: Introduce & Ask for consent. All teams explained who they are, the reason for their research and the interview. Team D videotaped everything, with consent. From the videos it can be seen that they properly introduced themselves and their design goals. Team E voice recorded conversations with their telephone, with consent. Team A and B only took notes.

Appendix F

- Step 11: Obtain introduction. Team B added a product question to the introduction: "*What happened with your leg?*"
- Step 12: Touchstone tour. Team A conducted most interviews at participants' workplace, so they could observe the things happening there, but could not conduct a touchstone tour at participants houses. For team B this was also not always possible, as only two participants were interviewed at their homes. Team D and E visited most participants homes and were guided around inside and sometimes around the houses of the participants they interviewed. According to team D "*mainly during the tour [the participants] told and explained a lot.*"
- Step 13: Build dialogue/ use ODK (see figure 31 – 33).
  a. Team A did not show photographs of themselves, as people were working. It was difficult to start a true dialogue, as there was much interference from customers, things happening on the street and from audience. The person from the company who came along also influenced the interviews. This all resulted in less openness.
  b. Team B noticed that people were quite open, even with 3 team members and a translator present. Only when someone from the client organization was present people were less open. The facilitator of team B noticed that it was difficult to get into a rhythm as all the circumstances changed each time (context, location and translator). She also noticed that it was difficult for participants to go back to experiences long ago. One interview on the street was difficult to keep audience away.
  c. Team D noticed that the wives were often present at the background and that their husbands "often sought confirmation with their wives." Their wives presence might therefore have influenced his answers. From the videos of team D it can be detected that the note taker pays attention to the interview and complements the facilitator, taking over when required, but being at the background most of the time. This is a good interplay. It can also be observed that during some interviews the three designers are sitting in a row opposite of the participant, or the facilitator sits next to the participant both opposite to the translator. These positions make it more difficult to face each other and build rapport and dialogue. During most interviews, however, the designers sit in a circle with the participant and translator.
  d. Team E found people very willing to answer their questions: "*When we visited the houses with just the women in the house, watching television*", while their husbands "*are usually out for work*". They were willing to talk, even about sanitation. Only one time a girl did not want to talk to them, she wanted permission from her husband first. Often older family members were present during their interviews and they considered the influence of this: "*And when we heard the comments from women, in our mind we labelled them as possibly biased by the situation. Because they weren't completely free to express. Because sometimes the men said, oh, no, no they wouldn't use it, and they say, then we asked them and they say, yeah it's true we wouldn't use it. But maybe that is not true.*" During one interview there was so much audience that it did not work out, as everyone kept on interfering.

Figure 31, 32 and 33: Different interview settings (Team A, team D and team E)

- Step 14: Thank the participants for their time and effort. Team A noticed that it helps to provide lunch or snacks to stimulate participation. Team D provided ceramics from Delft which people were very happy with, which can also be observed from the videos of the interviews. One participant of a focus group also wanted one, but they did not bring sufficient for the focus groups as well, there they provided food. They also gave the participants pictures of their own interviews when they went in for the second time, which was also "*really liked*".

- Step 15: Document. Team D videotaped everything: "*Yeah, we placed the camera on a cabinet or couch and they didn't even always notice it. It was a small camera in a corner in the room, so we ourselves also forgot about it.*" Team E voice recorded conversations with their telephone. Team A and B took notes.

- Step 16: Analyse, interpret, reflect. Team A discussed the results with the sales person to point out possible errors or possible falsehoods. All teams discussed the results within the team.

Guidelines

- Guideline A: Appropriate behaviour and attitude. Team D noticed that they first had to go to a manager before going to the farmer, and afterwards thank the manager. "*It was a lot of talking and smiling.*" From watching the videos of team D it can be observed that the designers, during the interview, deliberate on how to continue in their mother tongue, while the participant answers a question. This is not favourable behaviour, as it limits the building of rapport.

- Guideline D: Document everything. All teams took notes and two teams took recordings. All insights were immediately documented. Team D indicated that behaviour is important to observe / detect.

- Guideline E: Flexible but focused conversations. The facilitators of team A read out the questions, while they would have preferred to focus on establishing a conversation. However, as they were afraid to skip questions, they needed the list of questions to remember them, making the activity more an interview than a discussion. Team D and E also indicated that they followed their list of questions. Team D indicated that "*the interviews had a lot of small talk. Mainly during the tour they told and explained a lot.*" They sometimes had to urge participants to move on.

- Guideline F: Select a variety of participants with different characteristics for a broad range of insights. Team A indicated to have little access to women. The other teams spoke to a variety of participants.

- <u>Guideline G: Duration of interviews.</u> This varied highly. From half an hour up to 3 hours. Team A and E deleted and adjusted many questions and could therefore conduct the interviews within one hour. The teams that did conduct the ODK more or less as intended and at least covered all themes conducted the interviews in 2 to 3 hours. Those interviews can be considered to be a good yardstick.

- <u>Guideline H: Number of interviews.</u> Varied. From 6 to 12.

- <u>Guideline J: Selecting, instructing and working with a translator.</u> The facilitator of team B indicated that she "*tried to talk directly to the participant and not to the translator, but I found that pretty challenging. After some time you start to understand the Spanish language and you try to pick up some answers so you already have an idea, before the translator translates it*". From the videos made by team D it can be seen that the facilitator tries to talk to the participant, but that it also happens regularly that the conversation goes via the translator. This is also sometimes caused by the sitting arrangements in the house.

- <u>Guideline K: Dealing with sensitive questions.</u> Team B indicated that "*Some interviews were quite intense, because of the sensitivity of the topic of amputation*". The other two team members had to leave during one of these sensitive interviews and that made it easier for the facilitator to continue the conversation. Team E made the female team member pose sensitive questions about menstruation: "*One time the female team member interviewed a female participant who she could ask also sensitive questions related to menstruation [..] she could speak English.*"

- <u>Guideline N: Be aware of your position.</u> Team D indicated that although they were all white females and the translator was also female, this was not a problem: "*because we were white, we were great anyway.*" And the translator was from the university which was explained and appreciated. This can also be observed in the videos team D made: during one interview the participant calls with 'grandfather' who wants the address of the designers so he can visit them in the future. Another participant expressed happiness that someone from the local university had come along.

Techniques

- <u>Touchstone tour / Show me / Observation.</u> Team D was able to walk around on participants' farms and in their houses and made videos, team E looked around in participants' houses and took pictures there. Team B looked around in participants' houses when they were there (two out of the six interviews) and team A looked around at participants' work, but not at their homes. See figure 34-36.

Figure 34, 35 and 36: Tour through the shop (team A), the farm (team D), the living area (team E)

- <u>Drawing /mapping</u>. Team A and E did not use drawing and mapping. The participants of team A were working and had limited time, team E "*just*" conducted interviews. Team B and D did use drawing and mapping techniques. For team B the facilitator drew the answers of the participants, because the 2 other team members present did not feel comfortable drawing (see figure 37). The facilitator of team B indicated that the drawing and mapping worked as a confirmation, helped to maintain an overview of the conversation and that it triggered discussion about time periods. During the interviews of team D the farmers drew themselves (see figure 38). The designers asked the participants to draw their family and the area of their farm (see figure 39-42). From the videos of team D it can be observed that during one interview the translator drew for the participant.

Figure 37 and 38: ODK interview with facilitator drawing (team B) and with participant drawing (team D)
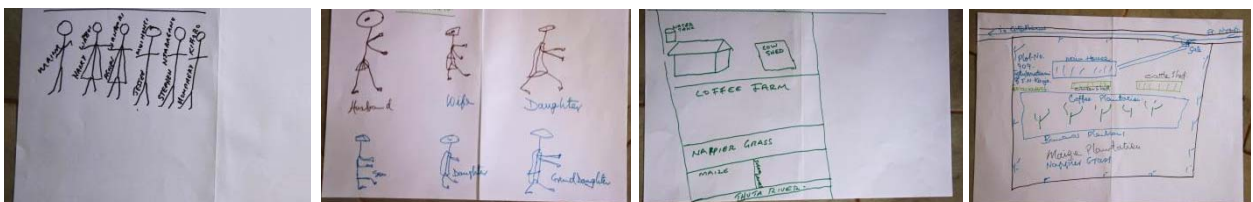
Figure 39, 40, 41 and 42: Drawings made of family and farm area of participants in ODK interviews of team D

- <u>Sorting</u>. None of the teams used the sorting exercise. Team A and team C used the sorting sheet, but not to sort the themes. Team A used it to prioritize product requirements together with the client (see figure 43), Team C used the sorting exercise to make potential users prioritize between product characteristics (see figure 44 and 45). Team B wanted to use it but the ODK got stolen.

They did argue that "*the comparison, prioritizing is a strong point of the ODK*". Team D also wanted to use the exercise, but things went differently than expected and therefore they only inquired about what people liked most and what things caused problems. Team E did not use any of the techniques, they only posed the questions.
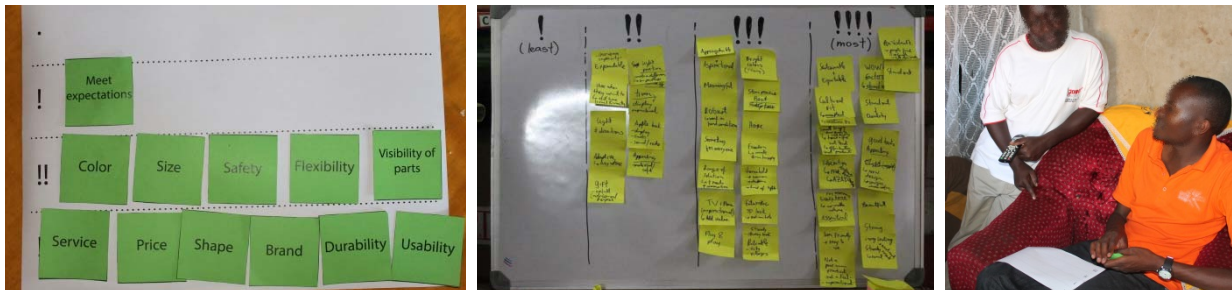
Figure 43: Sorting as conducted by team A. Figure 44 and 45: Sorting as conducted by team C.

- Other: visualizations. Team A and D prepared photographs. Team A make participants compare and choose between product characteristics. They experienced that people interpret pictures in their own way, often different than how they themselves looked at the pictures: "*you need to like pre-test this and we didn't have time for that*". Team D let participants make collages with the visualizations they brought along (see figure 46).

- Other: historical data. Team B used a historical timeline to obtain more information about the things that had happened in people's lives. They indicated this to be "*useful for the researchers to keep an overview and for the participant to go back to experiences*". Team D also let participants write down their coffee farming activities throughout the year on a timeline (see figure 47).
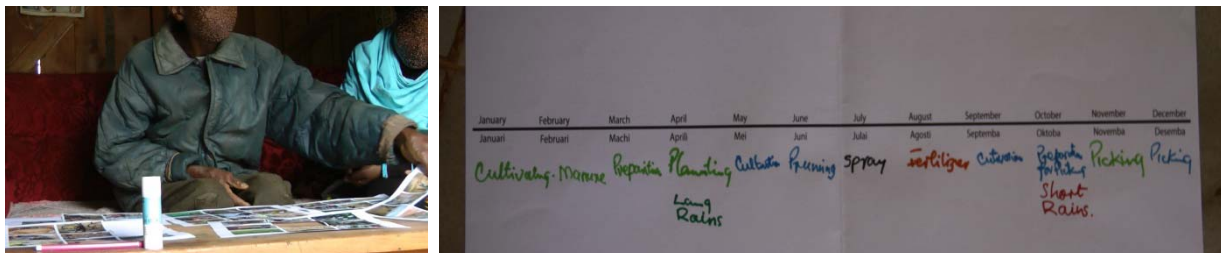
Figure 46 and 47: Other techniques deployed: Collage making and timeline of the year (team D)

Tools

- Question cards. All teams used the questions of the ODK, but not the question cards. Team B had prepared their own question cards with added and adjusted questions and adjusted pictographs, but the ODK was stolen and they did not have the time to replace it. Therefore, they used the questions only. The facilitator argued: "*If they would have been used, it would have helped to keep a better overview of the themes discussed, which would have been useful to deepen the discussion*". What team B found lacking is that "*The cards show a lot of aspects of human life, but they do not show much about change in time*". Team A, D and E selected and adjusted the questions and used

a list of questions, not the cards. One team member of team C indicated that: "*I cannot conduct interviews from a list, but do it 'in the moment' and therefore, I liked the cards a lot.*"

- Timeline. Team A and E did not use the timeline. The participants of team A were working and had limited time, team E "*just*" conducted interviews. The ODK of team B was stolen, but the facilitator drew a timeline during five of the six interviews and stated that the "*timeline helps in seeing which topics need to be addressed and to pose more questions. You get more information*". Team D adjusted the timeline to a simpler version and used it at the start of each interview. They indicated that "*the timeline was an easy conversation starter. And provided insight in their activities and what they find important during a day*". It also stimulated them to ask follow-up questions. They only encountered some difficulties with writing on the timeline, as some participants wanted to write horizontally, but that did not fit the timeline (see figure 48-50). They noticed that some participants "*really wrote whole stories and others just some words.*"
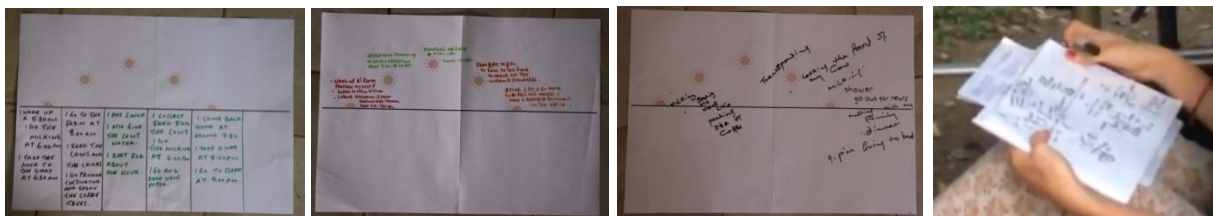
Figure 48, 49 and 50: Timeline made by team D filled in in different ways.
Figure 51: "Cluttered" mapping by team B.

- Drawing sheet/paper. Team B indicated that they "*needed a bigger piece of paper to draw it all, it became a bit cluttered*" (see figure 51). Team D used the timeline for participants to draw on, but as mentioned above, participants had difficulty deciding how to place their writing.

- Pictographs. Team A and E did not use the question cards or the sorting exercise and therefore they did not use the pictographs. Team D did not use the pictographs, as "*we didn't think that they really fitted the topic or would not be well understood. We considered changing the pictographs and make them ourselves, but we eventually choose for pictures and collages.*" Team B had prepared their own pictographs in the Netherlands (see figure 52). However, as the ODK was stolen and there was no time to make a new set, they have not been tested in the field. The team grouped themes by using similar colours: "*the topics about mental things have more a yellow colour, or the topics on social things have more a red colour. So, in that sense you have a good overview of the topics that you cover*". They wanted to create pictographs in one style, to make it look more professional: pictographs of the same type, with the same line thickness, and indicating the most important things in the pictograph with a white colour. They also adjusted the pictographs to the context, as regarding to information found on the internet: "I looked at the houses there and made two pictograms like it. I also looked at the jobs they have there and visualized some of them." For 'Leisure Time' two pictographs have been made, as, according to team B "*you can relaxing see as activity / leisure time or also very passive.*"

Figure 52: Pictographs as developed by team B. From left to right and top to bottom: 'Introduction', 'Education', 'Land', 'Nature', 'Animals', 'Nutrition', 'Products & Services', 'Accommodation' (2 options), 'Significant Relationships', 'Kindred Family', 'Nuclear Family', 'Dreams & Plans', 'Health & Emotion', 'Health & Fitness', 'Healthcare', 'Prosthesis', 'Body', 'Mobility', 'Leisure Time (active)', 'Safety & Security', 'Meaningful Work' (2 options), 'Income', 'Leisure Time' (passive), 'Speaking Up', 'Politics', 'Spirituality' (2 options, as mostly catholic), 'Information Supply'.

Themes

- Team A purposively selected themes in order to be able to conduct the interview within 1 hour. They selected the themes 'Nuclear Family', 'Accommodation', 'Meaningful Work', 'Leisure Time', 'Income', 'Products and Services' (33% of all themes). They combined the themes 'Nuclear Family' and 'Accommodation' in one, as well as 'Meaningful Work' and 'Leisure'.

- Team B changed some of the themes beforehand in the Netherlands. They noticed that the introduction card did not fit with the rest and added a question "*What happened with your leg?*" to start off the interview. They furthermore added two project related themes: 'Prosthesis' and 'Body'. This last theme is about "*body and how you see yourself*", "*personal care*", and 'satisfaction with looks'. According to team B "*that is not yet directly in the ODK*". Moreover, they split 'Education and Information' into 'Information supply' and 'Education' and 'Health' into 'Health & Emotion' and 'Health & Fitness.'

- Team D selected and adjusted the themes. They removed the themes 'Mobility', 'Health', 'Healthcare', 'Spirituality' and 'Safety & Security' (24% of all themes) and they split the themes 'Education and Information' in 'Education' and 'Information'. They furthermore added two project related themes: 'Coffee' and 'Working Area'.

- Team E combined the themes 'Nuclear Family' and 'Kindred Family' into one theme 'Family' and changed the name of 'Significant Relationships' into 'Social Life'. They generally started with the theme 'Family'.

Questions

- Team A selected questions in order to be able to conduct the interview within 1 hour. The following questions have been added (9,7%, of which 7,2% product questions):

    a. Regarding 'Nuclear Family': "*Does your wife stay at home or does she work?*" and "*Do your children go to school or work?*".

    b. Regarding 'Products & Services' questions specifically about the project and product: "*Where do you get your drinking water from?*", "*How much money do you spend on gas-wood-coal per*

month?" , "Do you have a cell phone?" , "How much money do you spend on cell phone per month" , "Do you have electricity? IF NOT, how do you light up your home? " , "Do you use kerosene/diesel? IF YES, What do you use it for? (move around the house, go outside, attach to the bicycle)" , "How long do you use them (hours)? How long do you need them to work? " , "How much do you spend per month on kerosene or diesel? " , "Do you have emergency lamps? IF YES, What do you use it for?" , "How long do you use them (hours)?" , "How long do you need them to work?" , "Do you have any other lighting product?" , "If you had the money, would you prefer solar power or electricity? why?" , "Why not solar power? IF YES, How much money do you spend on electricity per month?" , "What kind of electric products do you have? how many?" and *"Which one do you like most?"*

c. Regarding 'Meaningful Work': If it's a man: *"Do you help your wife at home*?" and *"Where do you go to work?*

d. Regarding 'Income': *"What are you saving for?"*

e. Regarding 'Accommodation': *"Would you please describe your house?"*, and *"What have been the most important changes to the house?"*

The following questions have been adjusted (2,2%):

f. Regarding 'Nuclear Family': *"Are you married?"* instead of *"Do you have a partner*?"

g. Regarding 'Products & Services': *"Do you use gas, wood or coal to cook, how do you cook*?" instead of *"How do you cook?"*

h. Regarding 'Income': *"How much money are you earning in a day? In a month?"* instead of *"How much money does your family earn?"*, *"How much money would be enough for you and your family?"* instead of *"With which amount of earnings would you be satisfied?"*

i. Regarding 'Accommodation': *"Do you live in your own house or is it rented. If rented; how much do you pay for the rent. If owned: how did you get your house, build it or inherit it?"* instead of *"How did you acquire the house (rented, bought, build)?"*

j. Regarding 'Leisure Time': *"When you are not working, what do you do (in your free time)?"* instead of *"What do you do in your free time?"*

The following questions have been removed (83,91% of all questions, of the selected themes 15,1% of the questions has been removed):

k. Regarding 'Nuclear Family': *"How did you and your partner get together?" , "Are you happy with your family?" , "What do you like most about your partner?" , "What do you talk about with your partner/family?", "Did anything change in your nuclear family or family relations recently?"* and *"Is there anything that you would like to change in your relationship with your partner or children?"*

l. Regarding 'Product & Services': *"Do you have light, electricity, gas?", "What type of energy sources do you use?", "What kind of household products do you have?" , "Which household product/service do you like most?", "What kind of communication products do you have?", "Which communication product/service do you like most?", "What kind of transportation products do you own?", "What kind of transportation services are available in your surroundings (private and public transportation)?", "Are there any other products or services*

that you have or use?", "Did anything change recently in products/services that you had or have?"

m. Regarding 'Meaningful Work': "*Do you feel appreciated in your daily activities?", "Do you like the activities that you do in a day?", "What do you dislike about your daily activities?", "If applicable: Do you have a boss / co-workers / employees?", "Do you have a good contact with them?", "How long do you know them?", "Do you meet your colleagues also outside working hours?"* and *"Do you feel accepted at work?"*

n. Regarding 'Income': "*Do you have to pay taxes?", "On what do you spend this income?", "Do you find it difficult to choose between options to spend your money on?", "Do you save money?", "Do you feel you can buy everything you want?"* and *"Did anything recently change in the amount of family earnings?"*

o. Regarding 'Accommodation': "*When did you start living here?", "Why did you choose to live here?", "How do you pay for this home?"* and *"Do you think you will live here the rest of your life?"*

p. Regarding 'Leisure Time': "*Do you have free time, when you don't have to do anything?", "Do you feel free to do nothing?", "How much time is free in a week?", "With whom do you enjoy time together (family/ friends/ community members/ colleagues/ other)?", "What do you do when you meet them in your free time?", "Do you enjoy this?", "Do you feel you need more free time?"* and *"Are there other activities you would like to do?"*

q. All questions regarding 'Health', 'Healthcare', 'Nutrition', 'Land', 'Education', 'Mobility', 'Significant Relationships', 'Dreams and Plans', 'Spirituality', 'Politics', 'Kindred Family', 'Safety & Security', 'Animals', 'Nature' and 'Speaking Up'.

- Team B changed the questions beforehand in the Netherlands. The following questions have been added (16,5% , of which 6,5% product questions):

a. Regarding 'Nuclear family': "*Do you have a maid?*"

b. Regarding 'Products and services': "*Who cooks?", "Where do you do grocery/shopping?", "What are the most important belongings you have?"* and *"Do you repair/maintain products?"*

c. Regarding 'Animals': "*Do animals have a special place in your life?*"

d. Regarding 'Nature': "*How important is nature to you?*"

e. Regarding 'Income': "*Do you have loans?", "Do you get money from the government or insurances?"* and *"Who is responsible for the expenses?"*

f. Regarding 'Mobility': "*How long do you spend travelling?*"

g. Regarding 'Healthcare': "*How do you know you can trust him/her? ", "Where do you buy medical products (medication, supporting products)? "* and *"What is the role of family and friends according to healthcare?"*

h. Regarding 'Spirituality': "*What is the importance of religion/spirituality in your life?", "Do you get any support from your community?"* and *"Do you believe in guilt and punishment?"*

i. Regarding 'Dreams & Plans': "*Are you fixed to your social class / social state*"

j. Regarding 'Body': "*How much time do you spent on body care?", "What kind of products do you use?", "And what kind of activities do you do? Do you do work outs?", "What kind of body*

exercises do you do?", "What do you know about the effect of nutrition on your body?", "How often do you go to barber?", "What kind of dresses do you like?", "How often do you buy new ones?", "Differences last years?" and "Anything you would like to chance?"

k. Questions specifically about the project and product (prosthesis): "*Who advised you to have a surgery / amputation?", "Where did you had your surgery?", "How did you experiences the medical aid?", "How long were you from home?", "Why do you (not) have a prosthesis?", "What can you do with/without your prosthesis?", "Are you satisfied with the current situation?", "What activities (cleaning, adjusting, exercises) do you do to have it the best?", "Do you know (other) people with a prosthesis?", "How much do you want to pay for a prosthesis?", "How much time did it take between amputation and getting your prosthesis?", "What did you do in that time?", "Do you still remember what you (emotionally) felt that time?", "Where did you got your prosthesis?", "Did you have a choice which prosthesis you want?", "How is the prosthesis financed?", "Do you need to visit the hospital/doctor often?" and "Can you show how you put it on and explain what you know?"*

The following questions have been adjusted (15%):

l. For all themes the questions about recent changes and desire for change were shortened to: "*Differences last years?*" and "*Anything you would like to change?*"

The following questions have been removed (1,1%):

m. Regarding 'Healthcare': All questions regarding the dentist.

• Team D changed the questions beforehand in the Netherlands: "*We didn't really do it per theme, but more adjusted it to the farm and the lives of the farmers. Some questions we formulated differently.*" When being in the field and conducting the interviews, they left many questions out, they posed the same questions during each interview. The following questions have been added (4,3%):

a. Regarding 'Kindred Family': "*Are your family members helping you in your work?*"

b. Regarding 'Significant Relationships': "*Do you meet with other farmers?*"

c. Regarding 'Products & Services': "*What for work related products do you have?*"

d. Regarding 'Animals': "*Do animals play a role in farming?*" and "*Do you use animals for work?*"

e. Regarding 'Speaking Up': "*Who makes the decisions about your farm?*"

f. Regarding 'Coffee': "*Do you know what product you are producing?*" and "*How do you know that?*"

g. Regarding 'Working Area': "*What kind of product do you use for you work?*", "*Where do you mostly work?*", "*With how many people do you work?*" and "*Would you like to change something in you working area?*"

The following questions have been added beforehand, but were not asked (1,8%):

h. Regarding 'Significant Relationships': "*How do you consider the people from the coops (as your friend, boss, etc.)?*"

i. Regarding 'Coffee': "*How do you know how to work with coffee?*", "*Who provides you this information?*" and "*What is of influence for coffee?*"

j.   Regarding 'Working area': "*Do you feel like you miss something in your working area?*"

The following questions have been removed (38.0%):

k.   Regarding 'Nuclear Family': "*With whom do you live together? ", "Do you have a partner?", "How did you and your partner get together?", "What do you like most about your partner?", "Are you happy with your family?", "How much time do you spend with your family?", "What do you do together, what do you talk about with your partner/family?", "Did anything change in your nuclear family or family relations recently?*" and "*Is there anything that you would like to change in your relationship with your partner or children?*"

l.   Regarding 'Products & Services': "*Do you have light, electricity, gas?", "What type of energy sources do you use?", "How do you cook?", "What kind of household products do you have?", "Which household product/service do you like most?", "What kind of communication products do you have?", "Which communication product/service do you like most?", "What kind of transportation products do you own?", "Did anything change recently in products/services that you had or have?*" and "*Do you feel you can buy everything you want?*"

m. Regarding 'Meaningful Work': "*Who does the household work?*" If applicable:" *Do you have a boss/co-workers/employees?", "Do you have a good contact with them?", "How long do you know them?", "Do you meet your colleagues also outside working hours?", "Do you feel accepted at work?", "Did anything change recently in your job of the jobs of family members?", "Do you like the activities that you do in a day?", "How did you choose your work?", "Where did you learn how to do this work?*" and "*What do you dislike about your daily activities?*"

n.   Regarding 'Income': "*How much money does your family earn?", "Do you have to pay taxes?", "Do you find it difficult to choose between options to spend your money on?" , "Are you able to save money?", "Do you feel you can buy everything you want?", "Did anything recently change in the amount of family earnings?*" and "*With which amount of earnings would you be satisfied?*"

o.   All questions of 'Health', 'Healthcare', 'Mobility', 'Spirituality', and 'Safety & Security'

The following questions were listed, but not asked (37.3%):

p.   Regarding 'Kindred Family': "*Do you still have parents and how old are they?", "Where do your parents live?", "Do you have any brothers and sisters?", "How often do you meet your family (parents/siblings)?", "Are you happy with your family (parents/siblings)?", "Do you feel appreciated by your family?", If applicable: All above questions for the in-laws. "Did anything change in your family or family relations recently?*" and "*Is there anything that you would like to change in your current family relationships?*"

q.   Regarding 'Significant Relationships': "*Do you have any friends?", "How did you get to know these friends (family, neighbours, work, other)?", "How long do you have those friends?", "When do you meet your friends?", "What do you do when you meet your friends?", "What kind of things do you talk about with your friends?", "Do you feel like you can tell your friends everything?", "Do you like to meet your friends? Would you like to meet them more often?", "Do you know a lot of neighbours/ people in your community?", "Do you feel accepted in your community / neighbourhood?", "When do you meet the people in your community?", "Do you*

fit in your community?", "Are there people who do not fit in the community?", "How does your community perceive outsiders?", "Did anything change in relation to your friends recently?" and *"Is there anything that you would like to change in your current friendships?"*

r. Regarding 'Nature': *"Do you have any plants or trees in your surroundings?", "Is the area you live in clean or polluted?", "Where do you dispose waste?", "How is the climate / weather in your surroundings?"* and *"Are there any dangers from nature in your surroundings?"*

s. Regarding 'Land': *"Did your possession of land change recently?", "Do you use the products from your land for own consumption or for sale?"* and *"Do you want to have (more) land?"*

t. Regarding 'Education': *"Did you follow any courses?", "Can you count?", "Do you have a signature?", "Do you want or need any of these?", "Which languages do you speak?", "Do your skills and talents fit your current activities?"* and *"Do you ever use reasoning in your daily activities?"*

u. Regarding 'Information': *"What kind of problems? Then what do you do?", "Would you have wanted to go longer to school back then?", "Would you like to learn more right now (trainings, courses)?", "Would you like to use more of your knowledge in your daily activities?", "Would you like more of your skills in your daily activities?", "If you have a question or need information, where do you go?", "Do you have devices that can help you to find information?", "Do you feel that the information you obtain is useful?", "Do you always find an answer?", "Is there a need for you to find information?"* and *"Are there any ways that would be convenient for you to gather information?"*

v. Regarding 'Nutrition': *"Do you have a special diet (vegetarian or other)?", "What do you generally eat? Do you like that?", "What else would you like to eat?", "And what do you generally drink?", "Do you keep a stock of food in your house?", "Do you have a refrigerator?", "Do you like to eat meat, chicken or fish?", "And vegetables?", "Do you feel you can eat sufficient meat, chicken or fish?", "And vegetables?", "Do you feel you can drink sufficiently healthy drinks?", "Do you ever feel hungry?", "Do you feel you can provide your family with sufficient food and drinks?", "Do you feel you and your family can eat varied enough?", "Do you feel you can eat whenever you want to?", "And drink?", "Any changes in food and drinking habits recently?"* and *"What would you like to change in your food and drinking routine?"*

w. Regarding 'Speaking Up': *"Who makes the decisions in your family?"*

x. Regarding 'Politics': All questions

y. Regarding 'Dreams & Plans': All questions

z. Regarding 'Accommodation': *"What type of house do you have (roof, walls)?", "How many rooms?", "How did you acquire the house (rented, bought, build)?", "How did you pay for this home?", "Do you feel that this is your own house?", "What have you changed in the house since you started living here?", "Is there anything that you would like to change in your current house?", "Do you think you will live here the rest of your life?"* and *"Are there any other houses/places that you would like to live?"*

aa. Regarding 'Leisure Time': *"Do you feel free to do nothing?", "How much time is free in a week?", "Do you feel you can enjoy your recreational activities?", "With whom do you enjoy*

time together (family/friends/community members/ colleagues/other)?”, *“What do you do when you meet them in your free time?”* , *“Do you enjoy this?”* and *“Do you feel you need more free time? Are there other activities you would like to do?”*

- Team E adjusted all questions towards sanitation and hygiene beforehand, in the Netherlands (100%): "*We used the ODK to ask questions about all the different aspects. But eh, since we were already in like halfway of our process, we ehm, we tried to make our questions a bit more direct towards sanitation. So, we formulated like, for each card, so for each topic we formulated sanitation specific questions.”* When being in the field team E started each theme *“with a more general question. And according to the answer we just selected what we wanted. And we just observed the situation, if some questions were inappropriate and. Because for example when we interviewed a young child, 11 year old. There were some questions about the possibility of affording a toilet, make decisions about buying a toilet and they were a bit difficult for her.*"
    a. Regarding 'Animals': *“So, now we should be able to answer these questions, except from the animal questions. Those were very difficult to ask.*"
    b. The questions for all themes have been adjusted towards sanitation and hygiene. They will not all be listed below, but to provide an example, regarding 'Family' the questions were changed to the following: *”What are the different sanitation habits among family members?”,* *“Are there some taboos about sanitation between partners?”* , *“What do partners feel at ease sharing in sanitation?”,* *“Are there some taboos about sanitation between parents and children?”,* *“What do parents and children feel at ease sharing in sanitation?”,* *“How is knowledge about sanitation conveyed from parents to children?”,* *“Are there some taboos about sanitation between adults and their old relatives?”,* *“What do adults and their old relatives feel at ease sharing in sanitation?”* and *“What kinds of sanitation facilities are appreciated at a family level?”*

Usefulness: is it relevant to use the ODK?

+ The ODK provided relevant insights for the design team
    o Team A explained that the information they obtained was not new for the company, but it was the only way to obtain that knowledge themselves: "*Because the company was not able to transfer that information for us.*"
    o Team B stated that "*when conducting the interviews you are learning and understanding so much at the same time. You can learn a bit beforehand, but many things are new*".
    o Team C did not use the ODK in their project but the DfI student expressed that she "*really wanted to do it*” and that she thinks *“that it really works*”, but that for this project it was not the most important thing. She added that their supervisor did not support the ODK research and advised to *“read about what people have written about it and talk to people, but don't do it all over again*"
    o Team D conveyed that the ODK interviews gave "*a lot*” and that *“based on the results we developed a product that is currently being tested*". The timeline provided them information about what the farmers did and did not understand about the connections between seasons

and weather circumstances. They noticed that "*people like to follow instructions, they do not want to decide themselves, they do not connect information*". This knowledge they tried to include in the product.

o Team E obtained multiple relevant insights, such as that good-looking girls in slums better not go alone to the toilet, that men and women feel ashamed to "*go from the house with a bucket*" and that religious beliefs sometimes interfere with sanitation. For example the shape of lord Shiva's symbol (the 'lingam') cannot be used in toilets, as it is a holy shape. Another example is that for "*Muslim people, the toilet shouldn't be […] in the direction of Mecca. And for Hindu people the toilet, so when you squat, you shouldn't face east, because it is where the sun rises.*" Those insights did not solely came from posing the questions, also from observations: "*Yeah, we noticed that, because we went in the first house, we opened the door and the toilet was like this and we asked, why???*"

+ The ODK helps to keep a broad view

Team B stated that "*we did not use the cards as such, but the cards can help you to pose more questions towards different topics than you address organically.*" And team E indicated that "*it is nice to go through all the cards, so we think about all the aspects of the life and what sanitation means in all different.*" Team E also indicated that it was "*very inspiring to have like all these topics and say, what are all the sanitation related topics that you might have about this [..] topic.*"

+ The ODK helps participants to reflect on their own lives

Team B indicated that the ODK helped the participants to reflect on their own lives.

+ The ODK could help to trigger attention and conversation

The ODK of team B was stolen before it could be used. They did use the timeline, themes and questions, but not the tangible kit. According to the facilitator: "*I think, if I had been more persistent, it would have really helped to have the kit*". She expressed that the kit would have been a trigger for attention and could have helped to trigger conversations. In the end, she is happy with the outcomes, but thinks that "*it would have been nice to have a bit more grip and then such a kit is very tangible, and you can show it and convince others with it.*"

/ Outcomes depend more on participant's personality than on ODK tools

The facilitator of team B expressed that most outcomes, according to her, depend on a person's personality and openness, not necessarily on using the ODK tools.

/ Useful, but frustrating

Team D indicated that looking broad was useful and frustrating at the same time, as they could not help participants with dealing with all the issues they have in their lives: "*it also caused a lot of frustration, as there are so many things where they are very passionate about and that we like to address, but we cannot help them with. They are so much out of the scope of our project.*"

• The obtained view is too broad

Team D explained that they started to expunge things, as they "*got too much context and not sufficient that we could use to actually design*". Therefore, "*after some time, we didn't ask all about the family, as that was too much context*" and "*sometimes you touched upon a really interesting*

topic, which had not much, or little to do with the project, but then we had to urge them to move on."

- <u>Usefulness during other phases in the design process</u>
  Team B wondered if the ODK can also be used in the second phase of their project. Thinking out loud they stated: *"If you are questioning the same people, maybe you should not use the ODK, but if you talk to new people, you are using conclusions about opinions and experiences that are not theirs."* Team C, however, had decided that when they went into the field halfway their project, their focus was already clear and the ODK interviews were not useful to conduct: *"Maybe we went there a bit too late"*

User-friendliness: Is the ODK designer-friendly and easy to use?

+ <u>The ODK offers a good guidance for conversation</u>
  Team A and C both indicated that the questions are useful as guidance. However, according to team C *"quickly you can indicate which ones are relevant for your project."* According to team B the timeline and drawing exercised provided good guidance to conduct the interview and team D also indicated that *"the methods we used offered such a good grip for a conversation, because you want to know a lot. We never followed a specific order in the questions, we just started with the timeline, and each time they said something, we could go deeper on that topic."*

+ <u>The ODK helps to keep an overview of the conversation</u>
  Team B: The drawings and timeline helped to keep overview, as it is difficult to oversee the whole without the ODK. It helped them to *"stay on track. So, that you know where you are and what you still have to cover. [..] It is so easy to divert and you notice only afterwards what you haven't covered."* Specifically regarding the question cards the facilitator of team B stated that *"we did not use the cards as such, but the cards can help you to pose more questions towards different topics than you address organically."* Team C did not conduct ODK interviews, but also indicated that the cards help to not forget things *"without making it a question-answer exercise."*

+ <u>The ODK is adaptable</u>
  Team C indicated that they liked the ODK's adaptability: *"What I also liked is that for our own project we could make our own cards. So that the thought is there, but that we can use the ODK in our own way."*

- <u>Conducting ODK interviews takes a lot of time</u>
  - o Team B and D conducted interviews but expressed that there is so much to discuss in one interview that there is not sufficient time to do so. For team B, their product topic already had so much life story attached to it that discussing that took most time and therefore most questions were related to the product. For them it was difficult to go broad. Team D stated that they wanted to know everything, but that they did not have the time to ask participants everything: *"You want to know so much about the person, but also about the coffee process, and also things more relevant for our research."* They sometimes had to urge participants to move on to the next topic and they couldn't use all tools with all participants, as this would have taken too much time.

- o Team B suggested therefore to split the interview into two: "*that you first do the ODK, and then the questions about the prosthesis part*". However, they also acknowledged that "*on the other hand, different information triggers different questions and lead to different questions, and the interviews are therefore not all on the same level.*"
- o Team B also indicated that, after adjusting the pictographs and questions, it took them one full day to make their own tangible ODK, as they had to print, laminate and cut it.
- o Team A used part of the ODK, as they had limited time in the field, difficulty to reach participants and limited time with participants. Therefore, they selected themes and questions in order to be able to conduct the interview within 1 hour. They used the themes they could link to their project themselves and brought along an extended list for if people had more time. One team member explained that they would have wanted it differently, but that they did the best they could: "*Yeah, I don't really know how we could have had the situation that we could have asked all those questions. I really don't think we could have. Well, maybe if we stay in a village and we know them really well, and they have a lot of time.* "
- o Team A and C indicated that in JMP projects there is not much room for user context research. Team C did not use the ODK, but they expressed their worries that the ODK is "*maybe too broad*" for JMP projects, that "*although JMP is half a year, it is very tight considering everything you have to do and want to do and can do*" and that "*it can better be used when you have more time.*" Team A advised immersion in context for 1 week in order to improve access and have people participating. They indicated that now there was too limited time with the people.

- To use the ODK you need time and space (opportunity to use it)

  Team A had difficulty using the ODK, as they interviewed potential users during work time. There was limited time, limited space, and a lot of audience. Team D experienced similar issues with one participant who they interviewed when they helped this participant with harvesting: "*we couldn't use the toolkit, but we just asked the questions that we normally asked and one person wrote everything down sitting on her knees.*" Team B noticed especially the lack of space during some interviews, especially when they interviewed one man who was working on the street during the interview.

- How to process and convey the data?

  Team B indicated that there is so much data coming out from the interviews and that they wanted "to have the full, rich picture conveyed to others", which is difficult to do. They wondered how the richness of the data can be 'translated' to others, as "pictures do not convey that" and "things are sometimes difficult to name". Thereby, they argued that "i*t would be nice to give some aid in how to process the data. There is a lot of interview data and you know a lot, but how to communicate it to the other persons in the group and to provide some structure to it.*"

- The ODK needs to be accepted by the full design team, the client and the translator

  Of the three team members from team B that went to Colombia during the first visit, only the DfI student knew the ODK well while "*the others did not see the value of it*". According to the DfI student everyone needs to be willing to use it in order for it to work out. She wanted to print the

kit again, but she didn't push it through as the others were not convinced and she "*could not really explain what [she] wanted to do with it*". Thereby, "*the translator also had his own will*". She thinks that "*with a kit that looks professional and serves as a point of attention*" she would have been strengthened to use the ODK. For team C, the reason of not using it was because they went to the field halfway the project, but also because their supervisor did not support using the ODK: "*our supervisor said that already so much research has been executed to get to know the context. So, 'read about what people have written about it and talk to people, but don't do it all over again'.*" Another factor was that their client wanted them to focus on making the product cheaper and that "*that is why from the beginning we thought, okay, of course we want to take the user into account, but then we do not have the time to investigate everything.*"

F.2 Evaluation 2: Try-Out 2

Below, the full results of evaluation 2 are described. Evaluation 2 comprised a try-out by three design teams. Below the results of the data analysis regarding the three design teams is summarized. All teams went into the field two times: first two team members and during the second field trip the other two team members went in country. Team F and H adjusted the ODK after their first experiences and the second team that went in conducted more interviews using their improved version of the ODK. The results after their first field visit are therefore referred to as results of team F1 or H1. The results after their second field visit are referred to as results of team F2 or H2. Statements coming from the reports of teams F and H are referred to as coming from the full team and therefore no number is indicated. Team G also went into the field twice, but they used the ODK interviews only during their first visit. Table 23 provides an overview of the interviews conducted by each participating team.

Table 23: Details of ODK usage by design & research teams

	Team F1	Team F2	Team G	Team H1	Team H2
No. of designers	2 (IPD, SPD)	2 (DfI, IPD)	2 (DfI, IPD)	2 (both SPD)	2 (DfI, IPD)
No. of interviews	2	3	7	3	2
Interview time (hour)	3 – 3.5	1.5 – 2	1.5	2 – 3.5	2 - 2.5
Team members present	2	2	2	2	2
Themes and questions					
Themes	All covered	All covered	All covered, divided in 6 clusters	All covered	All covered
Questions	All used, incl. product questions	Adjusted & colour-coded, incl. product questions	All used, incl. product questions	All used, did not include product questions	All used, did not include product questions
Techniques and tools					
Timeline	No	No	Yes	Yes	Yes

Question cards	Yes, with pictographs	Yes, 1 with pictographs, 2 with photographs	Yes, with local photographs	Yes, with pictographs	Yes, with pictographs
Sorting	Yes	Yes	Yes	Yes	Yes
Drawing and mapping	No	No	Yes	No	Yes

Results interviews

Below all results of the ODK interviews of teams F1, F2, G, H1 and H2 are described.

Prerequisites

As mentioned above, prerequisites A, C and F had beforehand been fulfilled by working with JMP BoP teams.

- Prerequisite B: Activities should be conducted in pairs. All teams conducted the interviews in pairs. One designer acted as facilitator, the other designer took notes. During one interview of team G, only one designer was presented to create a situation with solely women. This helped in obtaining answers to sensitive questions, but "*being alone was very difficult when having to ask questions, write down answers and make pictures at the same time.*"

- Prerequisite C: In the field. This prerequisite has been fulfilled by all teams, but team G pointed out specifically that observing the potential users was very important for their project: "b*y observing the family, it could be seen that the child Yasmin was completely ignored. This insight was very important for our research and couldn't have been discovered by only asking questions.*"

- Prerequisite D: Training. None of the designers followed a training for conducting qualitative interviews, besides the training offered in the curriculum of Industrial Design Engineering.

- Prerequisite E: Participatory, simple and fun activities. All teams used the question cards and the sorting exercise, three teams used the timeline and two teams used the mapping and drawing exercise. However, team G indicated that "*the interviews were not playful and somehow there was a hierarchy between the interviewer and the participant.*"

- Prerequisite G: Iterative data analysis. Team F and G both evaluated and revised the ODK after each session. Team G started very broad and focused the interviews more and more towards their design project: "*This change in focus felt very naturally because many of the themes somehow reflect things about the use of a diaper*". Team F followed a similar strategy. They indicated that by conducting full ODK interviews in the beginning "*you get an idea of an interesting direction.*" Then they suggest to "*continue and that more and more cards can be dropped. And then you end up with like six cards towards you can ask broadly but more specific towards the direction you are looking for.*" Team H posed all questions during each interview.

- Prerequisite H: Sharing and checking outcomes. The teams shared and checked the answers with the translator and local partners, but not with their participants.

- Prerequisite I: Critical reflection on limitations. The teams have been aware of the influence of themselves, the translator and audience on the outcomes.

- Prerequisite J: Learn the themes and questions by heart. All teams looked critically at the themes and questions beforehand to become familiar with them. Team F2 indicated that "*I indeed noticed that when I did two interviews, that the questions are in top of your mind and that you automatically repeat the questions for the context where you are. And that you realize that this is just a friendly conversation and not a conversation to retrieve all information.*"

Manual

- It is not clearly explained where in the design process the ODK should be used. Team F2 was confused about when in the design process the ODK can best be used. One team member indicated to find the information in the manual confusing. From the manual she had understood that the ODK can be used in every phase of the design process and did not pick up that the ODK is specifically meant to obtain user insight in the analysis phase to inform the design process.

- The goals and benefits of the ODK are not clearly explained. According to team H2 the manual does not explain well enough what the added value of using the ODK is: "*we did not really have an idea on what could come out of it [..] that you really underestimate that, how much it can give you.*" And: "*I think that because you used and did it, that only now you know what it really brings you. And beforehand that is really difficult to understand.*" Team H argued that "*the value of the ODK […] should be clear from the beginning in the project*", it should be explained what "*understanding culture*" exactly entails, and they also argued that the design team should have "*a plan how to implement the cultural knowledge that will be gained.*"

- Building rapport beforehand really helps. Team H2 experienced that by spending time with people, even by just being there without being able to speak to people without a translator, a relationship was build which made it easier to conduct the ODK interview: "*so we had this group of people were we kind of belonged to and therefore, the whole village kind of accepted us. They made a lot of jokes with us, we did not understand them, but it was well-meant and we all got nicknames in their own dialect. So, at a certain level, we were really part of the group. And when we interviewed that man it also went well, because we knew him, although we didn't know him.*"

- You need to plan for it. Team H2 experienced quite some time pressure from the JMP project and therefore conducted the ODK interviews, but did not stick to the full CDD protocol. For a next time, one designer argued, she would "*want to do it right, you also want to verify your findings. Because it really is a nice research, but I propose to take some more time, because we had such a tight schedule.*"

Steps

- Step 1: Get familiar with the ODK. All teams investigated the manual, themes and questions. Team G, H1, and H2 roleplayed the ODK beforehand. Team F1 and G both piloted the ODK, team F2 went through all the questions, adjusted them and colour-coded them regarding their relevance. Team G: "*I do think it is useful to test the ODK with each other, then you detect all kind of things already.*" However, they also admitted that during the first interview they really needed the question cards, but "*when you do it a few times, then the questions are in your head.*" Team F2

had the same experiences, during their first interview they "*asked the questions per card*", but thereafter it was easier to "*follow their answers and think, oh, now I can ask about this. Then I didn't even take the card, but because I knew the question I could pose it."* The two members of team H2 both conducted one interview and acknowledged that they did not "*get used to*" the interview and both followed the cards instead of taking the freedom to follow-up on interesting dialogues.

- Step 2: Obtain information beforehand. All teams obtained information beforehand about the contexts they would visit and design for. Team F1 thinks "*that you really need to read about the context in advance*" so that obtain an understanding of "*the basics of interaction dynamics and to avoid mistakes.*" Team H1 combined the information from literature and theory in a model: "*We added things from theory and you added things that you experienced and heard over there from the ODK*". According to them this combination worked well, as assumptions from literature could be verified and the literature became less "*dry*" with experiences from the field.

- Step 3: Localize content. All teams discussed – part of – the ODK's content with local partners. Team F1 organized a session with ten people from a local design agency to discuss the ODK, sensitivities and possible improvements "*to obtain more honest answers from participants*". They were advised to use local photographs instead of pictographs and add the theme name in the local language. Team F stressed the importance of discussing the ODKs content beforehand with a local person in order to obtain good outcomes. Team G spoke to the local client organization about the pictographs and conducted a pilot after which some themes and questions were adjusted. Team H1 discussed the pictographs and the procedure with the local client organization. Team H1 noticed that wordings locally can be different: "*For example 'wifi' does not exist in Swahili. [if the participant] did not get it, [the translator] just repeated it in English with a Swahili accent.*" Team H2 also encountered a difference in perception: the client organization told them that "*the design was inspired by the traditional handcart they have around there, but those handcarts look really, really, really different!*" Team H advises to "translate all the theme titles to the local language in advance" to avoid misunderstanding by the translator and / or participant.

- Step 4: Select and instruct translator. Team F1, F2, H1 and H2 used different translators, team G used the same translator for most interviews, but switched to a female translator one time to pose questions about menstruation. During another interview team G used two translators, because one of them knew the –disabled - participant very well and could comfort her, but could not speak English. The teams recruited their translators through their existing local network. Team F got in touch with them via the smartphone application 'Whatsapp'. They recruited the translators based on knowledge of English and personality.

- Step 5: Conduct a local pilot. Team F1 and team G conducted a local pilot to become acquainted with the interview flow and the local circumstances. Team F indicated that this pilot "*helped significantly to adjust the interview to local standards and circumstances and to get a feel for the context.*" Team F stressed the importance of conducting a local pilot in order to obtain good outcomes. Team H2 "just didn't have the time to conduct a pilot with the people over there", but noticed that "*it is so much different if you do it with someone over there.*" The participants did not

answer all questions, "*they were like, what do you exactly mean? And then I am like, yeah, what do I mean exactly?*"

- <u>Step 6: Select participants</u>. Team F and G both gained access to participants through their translators. Team H recruited participants "*through co-workers, entrepreneurs and translators*" Team F selected participants based on their "*requirements set for the target group, e.g., age, gender, living conditions, income, place of residence*". Team G interviewed the mothers of disabled children who visited the local centre of their client organization and selected them "*based on income level, mental or physical disability, age, and the location of the interview*". They also interviewed a rich family in Dhaka, as the client organization knew this family. However, this family was hesitant to participate. Team H selected participants living in rural areas on less than 4.65 dollars a day, from different gender and age. Team H1 and H2 experienced that finding participants "was really easy. And also without telling people that they would get something in return." For team H1, one interview was arranged by an entrepreneur owning a kiosk of their client organization, one interview was arranged via a local 'Bajaji' (taxi) driver, and the third interview was arranged by their translator. For team H2, one interview was arranged via a local 'Bajaji' driver as well, and the second one was selected from a group of people that the designers had become familiar with. All participants seemed to have time immediately for the ODK interview. One participant of team H2 appeared to not match their criteria, as he turned out to earn a higher income than he indicated before the interview.

- <u>Step 7: Assign roles.</u> One designer acted as facilitator, the other designer took notes. Team F and H took turns, team G assigned the same roles for each interview.

- <u>Step 8: Decide on time and place</u>. Team F1, F2, H1 and H2 conducted the interviews at participants' homes. Team G conducted three interviews at participants' homes, and four interviews at the day-care centre of their local client organization. They indicate that the office they used at the day-care centre was familiar to their participants as "*the mothers do usually come here for discussing the development of their child.*"

- <u>Step 9 & 10: Introduce & Ask for consent</u>. All teams introduced themselves, the interview and asked for consent. Team F1 noticed during one interview that they "*did not get honest answers from the participant's side*", therefore they again "*explained that we are not from the company, we are externally hired, and even with the reseller being present, we obtained answers that were more honest.*" Team H1 indicated that: "*We told them we wanted to do a project for them and therefore need to know your culture. And that was okay. They were immediately happy about the answer they got.*" Team G experienced that "pri*vacy is something they don't know. For them, everything is open. That was very noticeable. They never ask why. Why is this interview? It was just ok.*"

- <u>Step 11: Obtain introduction</u>. All details of the participants were noted down by the design teams.

- <u>Step 12: Touchstone tour</u>. All teams walked around in participants' houses when interviews were conducted at the participant's home.

- <u>Step 13: Sit down and build dialogue</u> (see figure 53 – 55)
  a. Team F. Team F1 experienced that in their context the participants were friendly and hospitable, but generally "*required a slight push to be more elaborate on their answers.*" They

noticed "*it is sensitive to ask questions about people close to the participants. They will not talk negative about them or critique them. It therefore might result in dishonest answers.*" Therefore, "*other people being present during the interview influenced the results highly.*" They also noticed that female participants "*dodged certain questions that required their opinion on a matter.*" Team F2 learned from team F1 about sensitivities, do's and don'ts in their context. They "*thought about the order of themes, which themes follow each other logically*", and posed sensitive questions later on in the interview. They further indicated that "*if you have them in the modus of being critically and then ask something what normally is difficult to be critical about, you have the chance that they are more critical about it than if you ask those questions in the beginning.*" Team F2 indicated that after conducting one interview they "*could follow the conversation better*", as they had become more familiar to the themes and questions. Team F further experienced that "*curious neighbours were able to walk in at any time*" and they did came in to have a look at the 'Bulai' (foreigners). However, they noticed only during one interview that it affected the openness of the participant negatively.

b. Team G. Team G followed the question cards during the first interviews. The facilitator of team G explains that "*In the beginning it is a bit scary [and] then it is nice to follow the toolkit.*" However, she also explains that "*it is quite disturbing, also for the mother, if you have to search for the right card.*" It also makes it harder to follow-up on the conversation. Therefore, they clustered the themes, to keep a better overview of all themes. Thereby, after the first interview, it became easier. Team G started each interview with the 'Timeline' and the theme 'Family'. When they conducted interviews at people's homes they started with a tour through the house. The same designer facilitated each interview. She indicated that '*mostly, the [participant's] answers gave an indication on what question to continue with.*' When this was not the case the facilitator chose a theme "*which was not yet been used for questioning.*" Team G further indicated that "*if a question gave an interesting, important or striking answer, then a 'why' question was asked.*" The interviews team G conducted in the office were without audience, the three interviews they conducted at participants' homes resulted in curious family members and neighbours coming by. This sometimes caused made it "*difficult to continue with [..] confronting questions.*" Team G indicated that it was easier to start with more general questions and "*try to deepen into that to get to the confronting part.*"

c. Team H. Team H1 experienced one participant who kept on talking and one participant who kept his answers short. The first interview lasted 3.5 hours, the second one 1.5 hours. The designers found the participants generally to be very open. Team H roleplayed the ODK interviews with each other, but noticed that translation "*is really a barrier.*" as "*a lot of things got lost there, about how they describe certain things.*" Team H1 did not really follow a specific order in the themes, but started and ended with an 'easy' topic and tried to follow-up on what the participant shared. During their first interview there were a lot of curious villagers present, during the second interview someone from the client organization and the participant's wife were present. According to team H1: "*they also liked it that someone [from the client organization] was present, I got the feeling they felt more important because of that*".

The presence of his wife also influenced the interview: "*when we asked what he liked most about his wife, he started laughing out loud and said 'everything', but yeah, she was standing there around the corner.*" During the last interview the participants' parents and little sister were present. The designers noticed that, after his father left, he liked to speak in English "*so his mother could not understand it.*" However, "*he did not give his political preference, because his mother was there of course.*" The first interview of team H2 was conducted with the participant's children, her sister and her sister's children, but "*her sister was sitting a bit further away with the biggest amount of children, only the twins were a bit restless.*" During their second interview only the man's little daughter was present who "*did not really interfere with the interview and that man could himself better speak English than our translator, so he was playing with the child most of the time.*" Both teams have the impression they obtained honest answers.

Figure 53, 54 and 55: Different interview settings at participants' homes. From left to right: team F2, team G and team H1.

- <u>Step 13: Sit down and document</u>. Team H1 explained that the note-taker documented "*how participants looked around, what they were doing and if someone found the question difficult or not.*" According to team F2: "*the note-taker also had to keep an eye on the interview, if not important things are missed or if follow-up questions are required, so you can complement each other.*" Team F2 also indicated to have difficulties making notes, as "*a topic can come in multiple times. It is not a range of questions from one card and then a range of questions from another card*" They acknowledged that making notes was easier when the themes and questions were better known.

- <u>Step 14: Thank</u>. All teams provided tangible gifts after the interviews and food items during the interviews. Team G also brought along balloons. According to team F presents were "*considered a token of friendship [..] which indirectly shows […] respect for the other person.*" However, team H1 experienced that "*you really do not need to bring a gift, the people just want money, that is the only thing they can use.*" They brought porcelain clogs as a gift and the first participant "*was happy with it, because her children liked it. The last guy liked it because his sister liked it. [..] But the guy we spoke with for 3,5 hours literally said 'what do I need this for?'*" Therefore, they paid the participants a compensation for their time and effort.

- Step 15: Document. All teams took notes during the interviews and team H1 and H2 also voice recorded all conversations and listened back to them.

- Step 16: Analyse, interpret, reflect. Team G indicated that their observations did not always match participants' answers. They think that the participants adjusted their answers because of the translator's presence: "*Yeah she often said that she indeed cared about the child, but we interpreted that a little bit, because of the translator.*" They indicate that it is important to look at body language. The designers noted down the answers and their own interpretations: "*when it could have been difficult to be honest about it, we interpreted it. It is our own ideas, we don't know the truth.*" They indicated that "*you must not just follow everything they say.*" The teams checked certain outcomes with the translator or a local partner. Team H1: "*The woman said that she could not leave the house or go the field without permission of her husband. We found that pretty intense, so we thought, ok, maybe it is because she is a Muslim and we asked our translator how that works and he said, no, that doesn't matter, that is culturally. All women have to do that.*" Team H2 recognized that it is important to process the obtained data directly. They did not take the time to do so during their project, and they indicated that they "*could have used it more, but we did not process it fast enough.*"

Guidelines

- Guideline A: Appropriate behaviour and attitude. The male designer of team G acknowledged that "*I think you think very quickly it is like this [..] But it turns out not to be that way. And it is important to know that, yeah.*" Team G therefore indicates that you should not mind feeling a bit stupid in order to learn more. Team H2 experienced impatience from one participant. They continued the interview, but more superficial: "*you noticed, about everything, that she was done. Then you start doing things faster, because you don't want to bother such a person, and it also feels bad for ourselves to do that.*" Team F1 indicated to stay open-minded and not to make assumptions. By reading about the context beforehand, they learned that Indonesia has a literacy rate of 92.8%. They indicated that "*there is a small change of someone not being literate. But if you don't ask it, then you run the risk that you interview someone that is not literate.*" Team F pointed out that regarding etiquette, that in Indonesia you are supposed to take off your shoes before entering someone's house, that there are "*very strict linguistic formalities when it comes to different ages*" and that therefore the greetings differ from person to person, and that it is common to sit down on a carpet, which can become uncomfortable after some time. Team G indicates that the timeline, family questions and touchstone tour made the participants "*feel special*" and "*allow designers to sympathize with the participant.*" Team H indicate that, as less skilled interviewers, they paid "*less attention to the why, why not and other follow up questions.*" They also indicated that it was difficult to let go of their personal biases and fears: "*This manifested itself for example in the menstruation question that was skipped during the interview with P1. During the interview with P4 the interviewer, speaking with an extra highly pitched voice, stressed that the participant did not need to answer if she did not feel comfortable.*"

Appendix F

- <u>Guideline B: Appropriate questioning.</u> Both designers of team G who conducted the interviews conveyed that it is important to pose 'dumb' questions. According to the male designer, his team member "*was so good, she just continued with the questions resulting in extraordinary answers, which you do not expect. And I think that is important with the ODK. That you have to dare to ask 'dumb' questions.*" Team H2 experienced that it is important to ask open-ended questions. According to team H2 if you ask 'Do you want…' the answer is automatically 'yes'. Therefore they stress to ask more 'How?' than 'Do you want..?'.

- <u>Guideline D: Document everything.</u> Team H1 indicated that it is important to note down "*how participants looked around, what they were doing and if someone found the question difficult or not.*" Team G noted down the answers of the translator, the background information as conveyed by the translator and the attitude and facial expressions of the participant.

- <u>Guideline E: Flexible but focused conversations.</u> The female team member of team H2 admitted that she conducted the interviews "*almost like a structured interview. Because there are so many questions.*" She posed all questions, but sometimes wondered how someone's day then looked like, she missed the full picture and found it difficult to pose follow-up questions. She indicated: "*but there were so many topics, that I thought like, I think we already covered this, but I can't recall right now.*"

- <u>Guideline F: Select a variety of participants</u> with different characteristics for a broad range of insights. The design teams selected participants based on their potential users group. Team F1 therefore selected participants from the same income class, between 30-50 years old of different gender. They noticed that "*Indonesia is very segmented in case of culture. In Bandung you have three different groups: Sundanese, purely Javanees and Muslim. Going from Java to Bali, it is a like going to a different world. Jogya and Bandung are also a world of difference. In similar cities things can be totally different. That complicates things. We have to pay attention to the differences. The results cannot be generalized for all of Indonesia, at most for Java.*" Team G interviewed mothers of disabled children and could interview one disabled child herself. They were all from poor to middle incomes living in rural areas. One interview was conducted in Dhaka, with a rich family. Team H did not specifically interview potential users, they searched in a broader group basing their criteria on income mainly. Team H1 conducted three interviews with participants of different gender, age and occupation. Team H2 conducted 2 interviews with participants varying in gender, age and occupation. One participant fell out of their income criteria: "*Yeah, that was a bit weird. When we asked him he had a very low income. And then we interviewed him and then it was a bit more. And then, only later, I thought, huh, that was not the criterion, but okay, we already interviewed him.*"

- <u>Guideline G: Duration of interviews.</u> The interviews of both team F1 and H1 took significantly longer than the interviews of the other teams (2 to 3.5 hours compared to 1.5 to 2.5 hours). Team F2 explained that "the time consumed differed a lot per person. Some people could easily talk about certain topics, but others answered very shortly and it depended on the topic if they told somewhat more or not." Team H1 also noticed differences in duration due to differences in openness of participants. Both team H1 and H2 indicated that the time of the interviews is less

than the time spend at participants' houses, because "*besides that you also have chitchat, because he showed his house, and we stood between his chicken in his chicken farm. [..] and that is not even added to that, so, we have been there 4 hours for sure.*" Team F pointed out that "*it is impossible to ask every single question of the ODK and expect a quality answer. This simply takes too much time, because of the extensive amount of questions.*" None of their participants complained, but they noticed during the pilot interview "*that the answers became more superficial over time.*" They also noticed that after some time participants started to become tired and it "*also became harder for the interviewer and the translator to be as accurate and elaborate as in the beginning.*" Team H indicated that "*you actually want the ODK questions to become less. And that is also not something you want, because then you don't cover everything.*"

- <u>Guideline H: Number of interviews.</u> Varied from 2 to 7 interviews per team. Team G conducted seven interviews, but "*after four interviews we had the idea we were not getting any new information anymore. The ODK was good because you had a lot of themes, so we asked all kind of questions that you would normally maybe not have asked, but after some time, we had, when discussing all themes it takes a lot of time, so you cannot go very deep into each theme. So, at some point, you have to put the ODK away and ask deeper why, why, why.*"

- <u>Guideline I: Bring along the required supplies</u>. Team F pointed out that "*West-Javanese Indonesian love to talk over food and drinks. It makes them more open.*" They therefore brought different forms of finger food to each interview, which "*served as an ice-breaker for the sessions.*" Team G brought Dutch waffles ('stroopwafels') along. Team H2 indicated that "*before we could have better arranged that there is something to eat and to drink. That you don't have to arrange that halfway. We were fortunate that every time there was someone present who could do it.*" They advise "*to bring a snack for everyone involved*" and to consider lunch-time as well. Team G also brought along pictures of their family and indicated that showing these pictures "*works very well as an icebreaker. People start laughing and become interested.*" Team H also indicated they brought along pictures of family and friends which they felt they were appreciated.

- <u>Guideline J: Selecting, instructing and working with a translator.</u>
  - Team F. Team F1 used two different translators who were both social workers working in the area. They paid their translators. Team F2 also used two translators: "*One we already knew, the social worker who knew English very well and knew the neighbourhood. So he helped in finding participants. He knew the method, knows the people and is kind of a person people trust. That worked well.*" They noticed that participants open more up to translators they are familiar with: one interview was easy to conduct "*because he was not a stranger to the participants. And if that would have been the case, people are more closed. Now they were really open. And also about questions about menstruation, while the translator was a men and I am also, the woman was very open about it. I was like, did she really just say that she is taking the pill to be able to have sex with her husband? We expected that people would not tell those things to someone close to them, but she was really open. We noticed that it is very important that there is a relationship of trust and that they also really understand the goal and that you instruct them what they can and cannot say.*" However, he could not help the team

during the last two interviews, but "*he helped us to find another translator. He did that via WhatsApp, everything there goes through WhatsApp.*" One of those "*felt uncomfortable to pose certain questions [..] we noticed that he posed questions differently.*" Team F did not use a female translator and indicated that female participants seemed "*to be closed and careful about intimate topics towards the male translators.*" Team F2 furthermore shared that "*With another interview it went wrong, because they started out of themselves to the participant that 'they are here to design a water filter etc.', which we didn't want to tell. So, before, we drank coffee or ate something with the translator, discussed the themes and our goal and what they can and cannot say to the participants.*" They furthermore discussed which criteria they specified for participants and how they wanted to be introduced.

o   Team G had their interviews translated by someone from their client organization. However, they "*weren't really sure if it was the right person, because he was kind of the boss or something [...] and a man, which makes it complicated.*" They indicated that during these interviews, probably, the participants did not share everything, because of the translator. They also pointed out that "*it seemed the translator was actually already interpreting the answers by the participant.*" When the facilitator noticed this, she posed follow-up questions. Team G pointed out that "*it is important to have a good relationship with your translator.*" The female designer once interviewed a female participant with a female translator. They could have "*a whole conversation about menstruation, while that normally didn't happen because of the men being present. It really makes a difference if you use a male or a female translator. But it was difficult, because the translator did not really speak English.*" They also noticed during one interview that "*the translator knew the participant and therefore the participant felt more at ease and gave more input.*"

o   Team H. Team H1 and H2 paid the translators for their services. Team H1 hired an employee from their client organization, an ex-employee, and a "*girl who just finished her study and someone from the company knew her.*" They explained to the translators that they "*were going to ask all sorts of things and that if someone said that it was weird to answer, that that was our fault and not theirs*" and they "*showed everything and we walked through the questions shortly. What kind of questions they could expect.*" Team H1 concluded that "*you really need to go through the interview with the translator before doing them.*" And "*that you have to be really clear about what you expect what someone does. Especially when someone is not trained to be one.*" Still they experienced problems as translators translating the answer short: "*They just say: 'the answer is that they like it' and then the whole answer is gone. And you can explain it a 100 times, but it was, they just didn't do it.*" Team H2 also used different translators for both interviews, which "*was a shame. If I have to do this for a company, then I just want one translator. [..]*" They admitted that when using a translator only once it might be "*better to 'jump ship', then to interrupt the interview again*" as "*it is not nice if you start to speak English with your translator and that is not translated. That does not work. If [the participant] gets the feeling you talk about him. So, you do it afterwards. But that is not of use if you do not use that person as a translator anymore.*" They experienced with one translator

that she was "*filling in the blanks*" and gave her own interpretation: "*it was that you first got her answer, and then had to ask about the answer of the participant.*" Team H advises to use one translator for all interviews to save training time and avoid "*discrepancies in how someone translates, their gender etc, which might make the data less reliable*". They also indicated that they used "*unskilled translators*" which "*impacted the reliability of the research*"

- <u>Guideline K: Dealing with sensitive questions</u>. All teams encountered sensitivity in questioning. Sometimes these questions were perceived to be sensitive, but turned out not to be.

  a. Team F2:"*About health for example, first you talk about pain and diabetes etc. and then there are questions about what you do when you feel sad and lonely. Yeah, that is quite a sensitive topic and how do you place that. Once we asked a woman what she was proud of and she started crying, which was not the intention. But she explained that she was so proud of her daughter, who earned the main family income. From then onwards, we were more sensitive towards certain questions.*" Team F indicated that "*questions about sensitive topics became easier to answer for participants after asking more distant questions. It seems easy for Indonesians to talk about 'Politics' and 'Education'. Once they are in a 'complain mode' it is easier to be more critical about, for instance, the family, their friends and the community*"

  b. Team G: "*[my team member] was so good, she just continued with the questions resulting in extraordinary answers, which you do not expect. And I think that is important with the ODK. That you have to dare to ask 'dumb' questions.*" The female team member of team G also had a conversation with a woman without her male team member and with a female translator. Then she could easily talk about menstruation: "*And then we had a whole conversation about menstruation, while that normally didn't happen because of the men being present.*"

  c. Team H1 did not dare to pose questions about menstruation. However, the female designer of team H2 did pose the questions concerning menstruation – through a female translator, which she felt really uneasy about. However, the participant "*unfaced, just answered it, no problem.*"

- <u>Guideline L: Time and place of the interview.</u> Team F indicated that "*West-Javanese / Sundanese people in general are really helpful and flexible in time (rubber time)*", but that it was therefore sometimes "*hard to set a fixed time / place and do everything as planned.*" They conducted interviews at participants' homes, but noticed that participants "*were reluctant to let [them] in.*" They learned from their translator that the participants were "*afraid they cannot please the guests.*" They "*might feel that you are a guest and need to meet expectations, they have to care for you. That they feel uncomfortable not being able to offer you a chair or something.*" The team members therefore suggested to "*start at people's homes and then go to a restaurant to continue the conversation.*" Team H1 and H2 experienced that in Tanzania it was too hot inside the houses (due to the roofs made of corrugated sheet) and therefore they went to sit outside. Team H2 had one time difficulty to find a place in the shade: "*that is why we sat in a line, which did not make it easy. Because then you had her, the translator, me and [the note-taker]*" Because of that it was difficult to draw along and to "*really connect*". They were also offered a chair, but refused to sit on a chair while the participant would sit on the ground: "*So, I also sat down on the ground, and then*

she herself set down on the chair, which worked well, because in this way she was much more in control, which worked much better. I was so happy that I did not sit on that chair, because that would have made the interview very uncomfortable, if you talk down on people." Team H also indicated that background noise, from for example chickens, children and motorised vehicles, was annoying and disturbed their recordings.

- <u>Guideline N: Be aware of your position</u>. Team F1 stated: "*At Bali they were with 3 white people [two team members and a white re-seller] and a translator. That probably putted some pressure on the women. Maybe when [female team member] conducts the interviews with a female translator, it might be different.*" Team F also indicated that their ethnicity "*could have influenced the behaviour and answers of the participants, who aimed to please their guests.*" Both team G experienced that people looked up to them: "*I think they really liked meeting western people, that is very special for them, a real honour. They really look up to western people*". They also indicated that not all answers were honest, and that with help from the translator and combining different answers, they could identify and interpret the truth. They also indicated that "*very likely many of the answers were given because the participant thinks certain answers were expected by the interviewer.*" One of the translators of team H2 explained to them that in some areas the participants "*are more impressed by the fact that you are white*" than in other areas where people are more familiar to see "*white persons*"

Techniques

- <u>Touchstone tour / Show me / Observation.</u> Team G found it a good start of the interview: "*then you have already seen a lot and you can place it in perspective.*" They also stated that "*the house visits helped immensely to gain a visual impression of the life of the participant.*" Team G also made mappings of the houses afterwards, which helped them to convey information to other team members and place things in perspective. Team H1 learned that one participant did not perceive his chicken as animals. When they posed the animal questions he indicated that he had no animals, but they noticed he had a chicken farm during the house tour. Team H2 conducted a tour after the interview and indicated: "*later on we saw the house and thought: you have more products than that.*"

- <u>Drawing /mapping</u>. Team F1 and F2 did not make drawings and/or mappings, as "*one was really busy with taking notes, the other with conducting the interview. And the note-taker also had to keep an eye on the interview.*" Team F2 only drew Java so participants could indicate where their family lived. Team H1 also did not draw, as they felt it to be distracting and redundant, as "*they told about their day from the beginning to the end, it was not really required.*" They also indicated, like team F2 that the drawing is one task too many: "*I had difficulty enough with deciding which questions to pose.*" However team H1 also admitted that it could be helpful, when drawing yourself "*to check if you understood it correctly*". The facilitator of team G drew along with the timeline on a "*large piece of paper*" (see figure 56-57). They pointed out that "*by drawing the responses of the participant, you are forced to give shape to the answer and you automatically find things that are not clear yet. Also it works well to remember answers.*" They furthermore pointed

out that "*the participant is more involved and can also verify the answers by looking at the drawings, together with the translator. The distance between the participant and interviewer is in this way decreased.*" In earlier interviews the team was "*earlier inclined to make assumptions about how the situation was.*" They indicated the drawing technique to be "*interesting, because, she told that she was going to wash her child and you think you understand, but because you have to draw it you have to give it shape, and then she said: No, it looks like this and then she started drawing and the translator as well.*" They conclude: "*We think that by drawing the answer gets more real or practical and therefore it is easier to find the things you still not know.*" For them, it worked well, but they also indicated that "*it takes a lot of time, so you can't cover everything.*" They also mapped the houses of the participants, but they did that themselves after the interviews. It was helpful as they started thinking: "*wow, the kitchen is very small, or they have only a small piece of land outside.*" Team H2 also tried to draw along, but during one interview they had to sit in a row to stay in the shade and therefore the drawing "*didn't work at all, because you sit in a row and you cannot really connect*" (see figure 58).

Figure 56 and 57: Team G drawing along with the participant
Figure 58: Team H sitting in a line to stay in the shade, making it more difficult to make contact and draw along

- <u>Sorting</u>. Team F indicated that "*the people found everything important during sorting. The people do not really sort.*" Team H1 had similar experiences: "t*hey found everything important or very*

important. They ranked only in those two categories" However, one participant of team H1 indicated "*that it really had given her insight. [..] in what I find important and what I need to get there. The last exercise is really nice to do with people, they like it themselves as well, it is a good way to end.*" The other team member agrees: "*Yeah. For self-reflection. The woman literally said: 'I never realized that I find this more important that this'.*" Based on the results of team H1, team H2 adjusted the sorting exercise and added two importance categories (see figure 59-62). This seemed to work better: "*we did 2 persons, so it is not like, this whole research proves that it works, but with the last two persons it was that we really had a distribution*". Team G used the sorting exercise only if there had sufficient time, which was during two interviews. Besides making their participants sort, they also asked their participants why they placed a theme at a certain importance category. According to team G the exercise "*was very nice, the mothers really started thinking. Before they just provided answers, but now they had to really make choices between what they found important.*" According to them the "*importance scale made the priorities of the participants clear and was insightful.*" Team G also added their product to the sorting exercise, to learn how important participants perceived a diaper to be. Team F pointed out that their participants "*seemed to struggle ranking the different categories on importance, even when they were guided category by category. This made it hard to actually uncover the most important categories.*" It also did not help that the participants had difficulty to understand the pictographs.

Figure 59, 60, 61 and 62: Sorting exercise in four categories (team H1) and in six categories (team H2)

Tools

- Question cards. All teams used the question cards (see figure 63 and 64). Team F2 and team G replaced the pictographs with photographs, the other teams used the question cards with the pictographs. The teams did not follow a specific order, but tried to pose the more sensitive questions later on in the interview. Team H1 had no specific order in their cards. They started with the introduction and then went "*to the next one in the pile.*" Team G "*clustered all the cards in themes and sub-themes*" to keep an overview. They did so to save time during the interview. When they roleplayed the ODK beforehand they "*noticed that it became chaos, because there are so many cards and you lose track of what is what.*" Nevertheless, the first interviews they really looked at the cards, which "*is quite disturbing, also for the mother.*" They also indicated that they considered turning the question cards too time-consuming and therefore separated the picture from the questions. Team F2 also started by asking "*questions per card*", but it became easier to

"*follow their answers and think, oh, now I can ask about this. Then I didn't even take the card, but because I knew the question I could pose it.*" The two members of team H2 both conducted one interview and acknowledged that they did not "*get used to*" the interview and both followed the cards instead of taking the freedom to follow-up on interesting dialogues. Team H indicated that "*there are a lot of different cards to deal with, it is hard on the interviewer.*" According to team F1 and G, the question cards are useful for guidance. Team G explained: that the cards are useful when "*the conversation hits a dead end, because then you can fall back on the cards.*" However, during two interviews they did not use the cards. One time the participant herself was disabled and during the interview sitting on a chair. There was not table around and the designers did not want to ask her to sit down on the floor. During the other interview the question cards were not used, mainly because the translator did not spoke English limited. Team H2 further argues that the pile of cards is an indication of the interview's progress: "*you just see the stack moving from one side to the other, slowly*" and during one interview when the participant became impatient: "*we could end it pretty nicely, that it went faster, that she also thought like, okay, we go through the cards quicker, that goes well.*"

Figure 63 and 64: Conducting ODK interviews with question cards. From left to right team F2 and team G.

- Timeline. Team F1 and F2 did not use the timeline, but team G, H1 and H2 did. Team G used the timeline during three interviews and noticed that their participants "*just stopped after the morning, they didn't continue with the afternoon.*" They also indicated that the timeline stopped the flow of the interview as the participants "*came up with a lot of different things that they wanted to talk about*" instead of continuing with the timeline. However, they thought the timeline "*was a good start*" which helped to trigger discussion: "*they often told that they washed their children, and then it was a good link to health cards.*" Team H1 found the timeline too small and crowded to draw on (see figure 65 and 66) and they had difficulty drawing on the timeline while sitting on the floor. They advised "*to erase things*". Team H2 agrees that the timeline is too small and crowded: "*the sun takes too much space. That one needs to be more faded, because then you can draw over it. It is really small to do something with it with such a thick marker.*" They propose a new timeline with faded suns and moons (see figure 67) and the use of thinner markers.

Figure 65 and 66: Drawing along with the participant on the timeline (team H2)

Figure 67: Proposed timeline for future use (team H)

- <u>Drawing sheet/paper.</u> The facilitator of team G drew along on a "*large piece of paper*", and team H1 also thinks that drawing can work "*not on the timeline, but on a white piece of paper.*"
- <u>Importance sheet</u>. Team H2 adjusted the importance indication on the importance sheet. They replaced the exclamation marks with five-point stars, as they considered stars to be more important in Africa. The first category is indicated with one faded star, the second is indicated with two somewhat darker coloured stars and so on (see figure 68). However, they noticed that "*it didn't matter*" if they used the exclamation marks or the stars. With the stars one participant asked: "*this is important right?*" and then started sorting. In the experience of the designers "*it was just like with the icons, it is what you say it is.*" Team H also changed the order of importance. In the original sorting sheet the least important is at the top, in the sorting sheet of team H this

category is at the bottom. "*Having the important themes at the top felt as an improvement to the researchers.*" As team H used 6 categories of importance in their new ranking sheet they changed the paper's orientation to 'portrait'. However, "*this reduced the space to place cards beside each other, which was not ideal*"

Figure 68: Importance sheet with importance categories represented by five-point stars (team H)

Team F2 and G used the importance sheet with the photographs (see figure 69 and 70). Team G indicated that the importance sheet was too small to place all the cards. However, as can be seen in figure 69 and 70, they did not use smaller cards for sorting, as was intended.

Figure 69 and 70: Sorting the themes. From left to right: team F2 and team G.

- Pictographs. Team F1, H1 and H2 used the question cards with pictographs (see figure 71 and 72). Team F2 used the pictographs during one interview and photographs during the other two interviews. Team G replaced the pictographs beforehand with local photographs, as their client organization indicated that they would not work. Team F1 experienced difficulty using the pictographs: "*Because some of them are so abstract, that specifically during prioritization, the link to the theme could not be made.*" Team F2 also indicated that they "*were constantly explaining what it means. Also with prioritizing, we had to explain it again.*" Thereby, team F indicated that

they themselves also found it hard to memorize which pictograph represented which theme. Team H1 and H2 had a different experience: "*We noticed during the interview that it does not really matter which pictograph it is*" (team H1) and: "*Our expectation was that the icons wouldn't work for Tanzania and then you go there and then you say just this is that and then it is no problem, no trouble, nothing*" (team H2). Also "*for the small cards, you just say, this is this*" (team H2). According to both team H2 "*it is nice that there are some sort of symbol for it, but if it is really important what it exactly is, that is not necessarily so. I mean, it is nice if the house looks like a house*". Team H1 agrees: it is nice "*when it corresponds, but if you say, this is this and they recognize it there, then it is good enough.*" According to team H2 it might have played a role that their potential users watch a lot of television and commercials, and download DVDs and in this way "*many people watch western things.*"

Figure 71 and 72: Using pictographs to visualize the different themes, From left to right team F2 and team H1

Some pictographs, however, were not directly clear to the participants. The teams indicated the following difficulties regarding certain themes:

o 'Health' and 'Healthcare'. "T*he pictogram of the doctor did not work, because they thought it was religion or electricity, but if you say it is a doctor, then they are fine with it*" (team H1). Team H1 explained to participants that the 'Health' pictograph was adjusted after being used in India and found that their participants "*like to know that information.*" They also noticed that when they explained they themselves also did not understood the pictograph when they saw it "*it also creates a kind of bond [..] they think, okay, it is not me, they had it as well.*" Team H2 also had difficulties with the difference between the pictographs of 'Health' and 'Healthcare', they mixed those pictographs up themselves. Team F indicated misunderstandings of the 'Health' pictograph.

o 'Land' and 'Nature'. According to team H1 "*the land pictograph was intense*", as participants sum up everything "*from a road to trees, to the sea and a shell. The whole spectrum*". Team H1 indicated that the problem is not with the questions, but with the pictograph: "*It is not really about land that you possess, it is more the landscape than land.*" They indicate that 'Nature' was mainly linked to vegetation. Team F also indicated that participants had

difficulty understanding these pictographs. They commented that the natural surroundings of the 'Land' pictograph better suits the theme 'Nature'.

a. 'Meaningful Work'. This pictograph "*is understood in the city, but not in the country*" (team H).

b. 'Politics'. Participants of team H1 often thought the pictograph of 'Politics' concerned a religious leader. Team F also indicated that participants had difficulty understanding this pictograph.

c. 'Spirituality'. "*Religion was not understood by everyone*" (team F).

d. 'Nutrition'. "*Nutrition was mainly thought of as fruit, because it is an apple*" (team H).

e. 'Speaking Up'. According to team F this pictograph was not clear to the participants and the local design agency they consulted.

f. 'Products and Services'. According to team F this pictograph was not clear to the participants and the local design agency they consulted. Team H indicated that it was perceived to be a moving or storage box.

g. 'Dreams and Plans'. According to team F this pictograph was not clear to the participants and the local design agency they consulted.

h. 'Animals'. Is mainly linked to pets (team H).

i. 'Leisure Time'. Is mainly linked to sports (team H).

j. 'Mobility'. Is connected to running (team H).

- <u>Photographs</u>. Team F2 and team G replaced the pictographs with local photographs. Team F2 used photographs from the internet and photographs they made themselves. They also discussed them with a local design agency (see figure 73). Team F2 indicated that the photographs worked well: "*The good thing about this is that by means of the picture, you give an extra boost to think about it, while with the pictograms, they were more busy with thinking about what the pictogram means.*" According to team F2 the "*photographs were better received than the pictograms.*" They indicated that they still had to explain what the photograph meant, but not three times, like with the pictographs. They suggest that the photographs can again be made more abstract by making "*line drawings from these photographs. Make them more like a colouring picture.*" Team G used photographs of their client organization. They indicated that they "*started with too many photographs*" (see figure 74-79). After reducing the amount of photographs it worked well, also for the importance scale (see figure 80). One designer of team G explained: "*She always had a photograph about the theme. And, the lady looked at it and then when we did the importance scale [..] the photographs she always understood. It was maybe 2 or 3 that she did not understand. It was a bit unclear if she did not understand the photograph or that she doubted where to put it. I really liked it.*" Eventually, they also replaced some photographs with pictures they made themselves: "*After each interview we adjusted them, a few of them.*" According to team G "*the picture also decreases the distance between interviewer and participant. A picture is something that is better understood than a sentence translated and reformulated by the translator.*" They also indicated that "*the use of pictures increases the chance that the participant comes up with stories herself.*"

Figure 73: Photographs used by team F to replace the pictographs

Figure 74, 75, 76, 77, 78 and 79: Photographs made by team G showing the photographs initially used per cluster of themes. From left to right and top to bottom: 'People', 'Work', 'Environment', 'Home', 'Belief' and 'Health'

Figure 80: Photographs and visualizations eventually used by team G, shown per cluster of themes. From left to right and top to bottom: 'People', 'Work', 'Environment', 'Home', 'Belief' and 'Health'

Team F2 and G indicate some things that designers should be careful about when choosing photographs:

k. Don't use too many photographs. Team G indicates "*the organization had a whole list with pictures of Bangladesh and we used them. Then it turned out to be too many pictures which resulted in chaos.*"

l. Stay neutral. According to team F2 it is difficult "*to keep [the pictographs] neutral and not evoke too much different associations with participants.*" They indicated that the photographs should be "*gender neutral, country neutral and age neutral.*" The photographs they found difficult to keep neutral were for the themes 'Spirituality' ("The solution we thought of is a photograph of a person with his hands in the air, without specific clothing [..] And if you want to do it really specific for Bandung or Indonesia, there is a picture of a church with all important religious leaders of the country.") 'Products and Services' (the design agency "indicated that we could best use a service familiar to everyone") and 'Dreams and Plans'.

m. Be aware that visualizations are perceived differently in different regions. Team F2 explained: "*We adjusted the cards, we tried to keep them neutral, but Indonesian. We tried to make them not typically representing a specific class. But, eventually, we discussed the cards with one translator and asked what he thought the cards meant. He indicated that for example for 'Work', the card represented industry, which is a common job in the south, but that it wouldn't work in the north, as people more work in farming there.*"

n. Make it recognizable. Team F2 indicated that in their region "*placing people together where one person plays the guitar, that is something that people will recognize. As something you do*

with friends." And they found out that the government promotes a certain food guide that can be used for nutrition. They also indicated that for 'Land' better rice fields can be used.

o. Mind preconceptions. Team F2 noticed that one photograph "*was indeed recognized as friendship, but because they are three men, it also gives a weird overtone. It is like brotherhood, but it could also be something different.*"

p. Choose pictures regarding aspired yet achievable situations. Team F2 noticed that pictures representing what people strive for work well. The team did not want to stress that their participants "*live in hovels, and [and] only eat soup at the ground in the mud.*" One of the translators of team F2 indicated that they "*could think of a businessman*", and while the team "*thought that might not fit the BoP*", the translator argued: "*that is what they strive for, they want to achieve that and that is why it is not bad.*" Team F2 indicated that "*that is the same for accommodation. It must not be like a palace, but should be above modal, but which connects with them.*" According to team F2 this also fits the purpose of the ODK interviews: "*I think that also links well to the CA, as you again bring up aspirations there, that you look at, ok, those dimensions of freedom, what are they looking for, what are their aspirations. So, in that way, the visuals serve as an extra means*"

q. Make the photograph represent all the topics within the theme. The design agency with whom team F2 discussed the photographs indicated that for 'Kindred Family' the pictures include all family members, also grandmothers and grandfathers. Team G also argues that the photograph should properly represent the theme.

r. The photograph for one theme should not link to another theme. When team F2 discussed their photograph regarding 'Health' with a local design agency, the people of the agency suggested to use an old person who can still ride a bicycle. However, the team indicated that "*that can also be perceived as mobility*", which is confusing.

Team F2 advices to discuss the photographs with a local partner. They discussed the photographs with a local design agency who pointed out some problems and made suggestions for improvements: "*And also from the design agency we received compliments about them, that it were good-looking pictures. But also that some things do not cover the topic. For example with mobility, in the questions it is about freedom of mobility, and a traffic jam is far from feeling free. So, then use a picture of a scooter in an empty road.*" and "*for speaking up I had a small group of people and then one person raising his hand. I asked if it wasn't methodical, but they said no.*"

The teams indicated the following difficulties regarding certain themes:

s. 'Introduction'. According to team F2 the introduction card they interpreted too much and was not clear to the participants

t. 'Politics'. Team F2 wanted to keep the politics photograph and used a ballot. However "people did not associate that with politics, but with a school exam. Some people suggested to use the president. But then you also have a specific tone. We discussed it with a design agency and they said, people vote over here by putting their pink in ink and then it means that you voted. So, if you make a photograph of a pink which is purple, then everyone knows it is about voting and it doesn't have a political message."

u. 'Speaking up'. Team F2 found it difficult to find suiting photograph for this theme. They used a picture of "*an Indonesian looking woman, but she turned out to be a popstar. So that resulted in gossip, instead of information about the topic.*"

v. 'Products and Services.' Team F used a picture of a store, but because people are in there, it focuses too much on the people instead of on the products.

w. 'Religion'. It is difficult to find a clear picture that truly represents this theme (Team F)

x. 'Kindred Family' and 'Nuclear Family'. "It is hard to distinct these types of family" (Team F)

- <u>Nice to add: options for visualizations</u>. Team H2 argues that it would be nice to have some options of pictographs: "*So it might be nice to have three or four icons per subject and that someone just chooses one, I use this one, this is understood with me and that you can provide feedback on that it worked in the country where it was.*" Designers can then choose, together with the translator or based on a pilot. Team G also indicated that "*it is difficult to have one image that represents a certain theme.*" They suggest to use one picture per theme during the interview, as otherwise the interview becomes chaotic when the facilitator has to search for the right picture.

- <u>Nice to add: 10 commandments</u>. Team H advised to add a card with '10 commandments' to the tools: "*I think that one card needs to be added with – vary basically- 'pay attention to this'. Just for the interviewer. Because this toolkit, you know it fully, but the people who just start with it do not have that. And then it is just so much, that you tend to forget things, like: It is not a structured interview let that go. You don't have to pose all questions, let that go. There are just a few things that you just do not remember throughout the conversation […]* that you always have to keep on asking 'why?' and 'why not?'. *That you can also continue with a topic you think is interesting and the other person finds interesting, that he wants to tell more about, just continue on that topic, ask more, although those things are not on your card. That kind of things.*" They argue that "*when there is just a small card saying, these are the 10 commandments, stick to them. Then you think, ok!*" The team indicated that they once read the manual in the very beginning of their project, but did not read it again before conducting interviews, and that a card with '10 commandments' would have helped them to remind them to the most important interviewing rules. In their report team H advised to include: "*tips about location: seating, disturbance and people*" and to "*give a short summary of what needs to be addressed at the start of the interview*"

Themes
- <u>A lot of themes to discuss</u>. All teams indicated that there are a lot of topics to go through. Team F2 indicates: "*Especially like you said do them all, but maybe not all fully, but sometimes we thought, pffff, and we need 11 more… We are already interviewing for 1 hour and we need 11 more.*" Team H2 indicated that they lost the overview and could not always recall if certain topics were already covered or not. Team G therefore clustered the themes in six categories of four after they role-played the ODK interview within the team (see figure 81 and 82). The clustering made it easier for them to keep the overview and the flow and to ask follow-up questions: "*the mother sometimes starts discussing a different theme and you want to follow-up on that instead of, ok, thanks, but we go on with the next theme. Then the conversation does not flow.*" They also

indicated that clustering saved time, as it saved them from searching for "*the right theme in the full stack of cards.*" Team G clustered the themes in six categories:

a.   Family: comprising 'Nuclear Family', 'Kindred Family', 'Significant Relationships' and 'Speaking Up';

b.   Home: comprising 'Accommodation', 'Land', 'Safety & Security' and 'Products & Services';

c.   Work: comprising 'Education & Information', 'Meaningful Work', and 'Income';

d.   Environment: comprising 'Mobility', 'Leisure Time', 'Nature' and 'Animals';

e.   Health: comprising 'Health', 'Nutrition' and 'Healthcare';

f.   Belief: comprising 'Spirituality', 'Politics', 'Social status' (the introduction questions), and 'Dreams & Plans'.

Team H indicated some themes missing, such as connectivity, upbringing and punishment, but also indicated that they do not necessarily need to be added to the ODK, as there are already a lot of themes. They questioned "*How many themes do you need to discuss to have a basic understanding of the culture?*"

Figure 81 and 82: Team G clustering themes in 6 categories: 'People', 'Work', 'Environment', 'Home', 'Belief' and 'Health'

- <u>Communication is little exposed.</u> Team F2 and H2 indicated that communication does not come forward in the themes and topics. Team F2 added questions about communication and information, regarding for example internet and WhatsApp usage. They suggest to split 'Education and Information' into 'Education' and 'Communication and Information.' The project of team H was about mobile phone charging and they realized that they did not detect information about mobile phone usage through the ODK interviews. According to one designer of team H2 mobile phone usage is a very specific topic and from the ODK interviews they learned more about the more noticeable things: "*like that woman who has kind of a marriage that you think like: shit, hey, that guy, you know. That makes much more impression [..], that are things that are more striking.*"

- <u>Hygiene is little exposed.</u> Team H1 experienced that in Tanzania 'Hygiene' is very important: "*the second man said, in the end, 'If you ask all about my life, why don't you ask anything about hygiene?' Because that is very important.*" They also noticed that people keep on cleaning their cars and commercials also pay attention to it: "*the more cleaner your car, the more attractive you are.*" Therefore, team H2 added a 'Hygiene' theme (see figure XX-XX). They noticed that some questions about 'Hygiene' are in the theme 'Health', but generally, "*this one worked really well.*" They obtained interesting insights about water being "*too expensive*" and children being washed less because of fright for pneumonia. Based on their experiences, team H propose to add a Hygiene theme.

- <u>Upbringing and punishment are missing</u>. Team H indicated that "*upbringing and punishment were not in the cards, which seemed strange since the first forms a person into who he becomes and the latter explains norms and values in feelings of right and wrong*"

- <u>'Kindred Family' and 'Nuclear Family' can be combined</u>. Team F2 discussed the themes and questions with a local design agency, who suggested to "*combine nuclear and kindred family.*"

- <u>'Speaking Up' and 'Dreams and Plans' can be combined</u>. Team G indicated that those themes can be integrated and that the questions should be changed in order to make participants open up about these sensitive topics.

- <u>'Health' and 'Healthcare' can better be divided in 'Health' and 'Emotional Well-being'</u>. Team F and H indicated that within the theme 'Health' the topics divert a lot and that the distinction between 'Health' and 'Healthcare' was difficult. Team F stated: "*if you ask 'do you have health problems?' and 'do you then go to the hospital?', that is an easy link. Are you sometimes sad and what do you do then, that is pretty much different.*" And team H2 indicated: "*with 'Health' and 'Healthcare', we ourselves were like 'is this the one, or the other?'*" Team H1 suggested to distinguish between 'Health' and 'Well-being', team F2 suggested to distinguish between 'Health' and 'Emotional Well-being'

- <u>'Products and Services' is too broad.</u> Team H1 indicates: "*That one is very difficult, because there are no examples, you are not in a specific category and 'Products and Services' is soooo broad.*" Team H2 agrees "*Yeah, that one is difficult [and participants] tell you like: 'what kind of products?' and I gave them like five different options and they answered only for that if they had them. Later on we saw the house and thought: you have more products than that.*" Team H noticed that they did discuss many products within this theme, but not specifically mobile phones, which their design project is about.

- <u>Politics is not related to design</u>. According to team G, the theme 'Politics' can be removed as this theme has no connection to design. They only learned whether people vote or not.

- <u>There is overlap between 'Products and Services' and 'Mobility'</u>. Team H indicated that questions about transportation devices are in 'Products and Services' as well as in 'Mobility' and indicate that, while this provides a bridge between the two themes, they mainly perceive the double questions to be redundant, and indicated that "*less overlap results in more fluent conversation and less irritation from the participant*"

Appendix F

Questions - general

- <u>There are many questions.</u> Al. teams indicated that there are many questions. According to team H2: "*because there are a lot of questions […] it is more difficult to follow-up*". Which team G also conveyed. They also indicated that if a participant brings up stories him or herself, that it is difficult to keep the overview of the topics being discussed: "*we had someone who himself told so much, that we automatically received a lot of answers to completely different topics.*" Both designers of team H2 therefore paid attention to the topics discussed and the note-taker could assist the facilitator. Team F2 indicated that "*you really need to select.*" Therefore they colour-coded the questions beforehand: "*questions we really wanted to ask, questions for women, questions for follow-up, and questions less relevant.*" Team H2 followed a different strategy: "what we did after some time, is crossing with the erasable marker which questions we already…"

- <u>Missing questions.</u> Team F and H added questions to the ODK.

    a. Team F2 added questions about communication and information: "How are things with social media?", "Do you have a mobile phone with internet?", "Are you on WhatsApp?", "If you want information about something that is broken or you want to find out things, how do you do that?"

    b. Team H2 added a 'Hygiene' theme with related questions, which can be seen in figure 83 and 84. Team H2 used a 'Hygiene' question card in the field and based on their experience propose a new set of questions (see figure 85).

    c. Team H furthermore proposes to add the question 'How many hours do you work' to the theme 'Meaningful Work' to obtain more information about workload and time consumption for certain tasks.
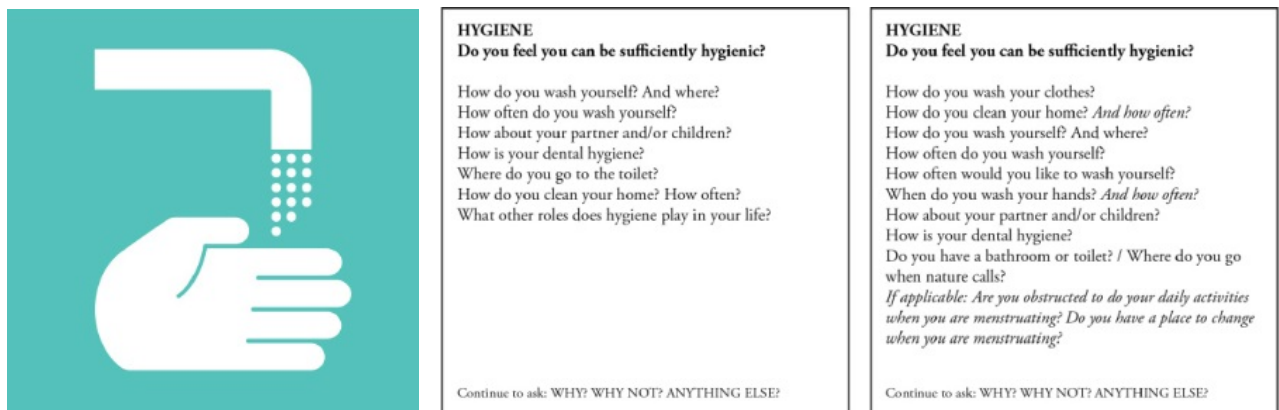
Figure 83 and 84: 'Hygiene' pictograph and questions as proposed by team H and used by team H2.
Figure 85: Final proposed questions for the theme 'Hygiene', as proposed by team H, after conducting the ODK interviews.

- <u>Project related questions can be added.</u> Team F2 and G added project related questions to the ODK interviews. Team F2 pointed out: "*we could implement product-related questions during a topic like nutrition or health. And that you could then ask about polluted water. In that sense, we could probe about these topics during the ODK interview.*" Team G also indicated that "*it is very easy and useful to go from a broad theme towards practical questions [..] It feels very natural to use*

the themes as a starting point." Team H did not pose project related questions during the ODK interviews. They argue that asking all project related questions in an ODK interview, that would become too much, however, they do suggest that within the theme 'Products and Services' or separately they could have added a section about their project. Team H indicates that, with hindsight, they could have added "*five questions about connectivity, what very much fits within the themes and also is about culture in general, because then I learn a lot within my domain.*" One designer explained that if she would use the ODK again "*I know that beforehand I should look at all the topics, that I really have to combine it with my own. Maybe not that literally with the product questions that you have, but with the themes, that you add them, like about connectivity [..] but theme wide, and not too specific questions.*" Team H2 advises to explain that designers can add a theme: "*that is something you need to be aware of: is your theme in there, because that is not necessarily the case, then make a theme for yourself.*"

- <u>Some questions are too broad / abstract to answer – although they can also lead to unexpected insights.</u> Both team G and H indicated that some questions are too broad and /or abstract. Team G indicated: "*I do think that some themes, for example dreams and plans. In some way it works better with a concrete example. […] That is something they couldn't… it is too broad. That is what we noticed, some things are that broad that they don't understand it anymore.*" However, team G also indicated that "*at the same time it worked very well, because then things came out like, wow, that is something we did not expect*" They therefore advice to, in the beginning, ask the questions in a broad way, even if you think that participants will not be able to answer them. Both team H1 and H2 were re-questioned by the translator and / or participant about broad questions, as they wanted to know 'about what?' According to team H2 participants might have difficulty answering the broad and abstract questions as "*they always think in a practical manner, I think.*" Team H2 provided examples when participants did not understand what was meant, but noticed that participants only answered regarding those examples. The teams indicated the following questions to be too broad:
  a. 'Mobility'. "*Which places do you go when you leave your house?*" (team H)
  b. 'Speaking Up'. Questions about decision making (team H)
  c. 'Education and information'. Questions about information (team H)
  d. 'Dreams and Plans'. All questions (Team G)

- <u>Some wordings are not understood.</u> Team H2 experienced that the translator did not always understood certain words or questions and had difficulty to come up with alternatives on the spot..
  a. Team H2 changed the question of using imagination or fantasizing in daily activities' to: "*Do you use creativity in your daily activities?*" That question opened up conversation: "*creativity was always picked up and enabled us to continue, but, that imagine or fantasize…*"
  b. Both team H1 and H2 also encountered difficulty with the themes 'Health' and 'Healthcare': "*I think, for them, that it both got translated, with what, according to me, what they call 'Health' in Swahili.*"

Appendix F

- <u>Some questions are belittling</u>. Team F indicated that "*some questions were a bit belittling towards the participants, that we thought, 'oh, shit'.*" They indicated that it was "*also because we interviewed the higher BoP, some answers were: 'yes, of course I can read!'. And then you get a wrong relationship as interviewer with the participant. Especially when you do it for the first time and you do not yet master all the questions.*" The questions perceived to be degrading are:

  a. Significant Relationships: "*Do you have any friends?*" and "*Do you feel accepted in your community / neighbourhood?*"

  b. Kindred Family: "*Do you feel appreciated by your family?*"

  c. Income: "*How much money does your family earn?*", "*Is this amount sufficient for your family?*", "*Are you able to save money?*", "*With which amount of earnings would you be satisfied?*" and "*Did anything recently change in the amount of family earnings?*"

  d. Meaningful Work: "What kind of work do you and your family members do during the day?"

  e. Education and Information: "*In your day-to-day life, do you ever face problems you cannot solve by yourself? What kind of problems? Then what do you do?*", "*Have you and your partner ever been to school, how many years?*", "*Would you have wanted to go longer to school back then? If yes: why didn't you?*", "*Did you follow any courses / trainings? Do you have any other diplomas?*", "*Would you like to learn more right now (trainings, courses)?*", and "*Can you read and write? Can you count? Do you have a signature? Do you want or need any of these?*"

  f. Mobility: "Are you able to go wherever you want to go?"

  g. Speaking Up: "*Who makes the decisions in your family?*", "*Do you make your own decisions?*", "*Would you like to be more involved in decision making?*", "*Are you confident?*", "*Did anything change in decision making recently?*", "*Are you able to speak up freely?*", "*Are you able to express emotions?*", "*Are you able to express aspirations?*" and "*Would you like to speak up more?*"

  h. Health: "*Do you have a bathroom and/or a toilet?*", "*Where do you go when nature calls?*", If applicable: "*Are you somehow obstructed to do your daily activities when you are menstruating?*", "*Do you have a place to change when you are menstruating?*", "*Do you worry much? Do you ever feel stressed?*", "*Do you sleep well?*", "*Do you ever feel sad or lonely?*", "*Do you ever feel happy?*", "*Who do you go to when you feel sad or lonely?*", "*Who do you go to when you feel happy?*", "*Do you find it difficult to express your feelings?*", "*Is there anything that you would like to change regarding your feelings and sharing them?*"

  i. Nutrition*: "Do you feel you can eat whenever you want to?*", "*Do you ever feel hungry?*", "*Do you feel you have sufficient food for you and your family?*", "*Do you have a refrigerator?*", "*Do you feel you can eat sufficient meat, chicken or fish?*", "*Do you feel you can eat sufficient vegetables?*", "*Do you feel you can eat varied enough?*", "*Do you feel you have sufficient healthy drinks for you and your family?*", "*Do you feel you can drink whatever you would want to?*"

  j. Accommodation: "*What type of house do you have (roof/walls)?*" and "*How many rooms?*"

  k. Dreams and plans: "*Do you have a plan of what you want to do or be in life?*"

- <u>Some questions are gender-specific.</u> Team F1 indicated that "*some questions are feminine*", for example questions about 'Speaking Up' "*were received kind of insulting by men*" and questions about tasks such as cooking and cleaning were perceived sensitive to pose to men. This concerns the questions "*How do you cook?*" and "*Do you keep a stock of food in your house?*". Questions regarding what people are proud of where also indicated to be feminine by team F1, as: "*if you ask such questions to a man, you get an answer like 'of my motorbike', he won't start crying. Quite some questions like that are in the kit, while questions more specific towards men are not really in there in our opinion. So specific women questions are there and less for men.*"

Questions – context specific
- Indonesia. Team F indicated that in Indonesia:
  a. People will always answer 'yes' to questions with 'happy' in it: "*Indonesian people are very different in what they say and what they actually feel. You can't ask things in relative terms.*"
  b. "*It is sensitive to ask questions about people close to the participants. They will not talk negative about them or critique them. It therefore might result in dishonest answers. Other people being present during the interview influence the results highly.*" According to team F it "*is unlikely that problems related to, for instance close friends or community members, will be mentioned.*"
  c. "*Questions related to jobs and income are 'not done'.*" "*Money is really sensitive. You can ask about expenses, but not how much they earn. You can also not ask about savings, you will not get honest answers.*" However, team F1 noticed that it is "*easy to ask about expenses*" and that by asking about expenses "*the economic capability of the participant could still be derived.*" Team F2 therefore reformulated the income questions, based on findings Team F1. Thereby "*people are very quickly ashamed*" about the work that they do. "*If they are a waiter, they do not want to admit that, as it is not a profession of status, they do not like to discuss that. They ask for the next question. They keep on telling that they work at a restaurant. They leave it open which exact job they fulfil there.*"
  d. 'Speaking Up' does not work well as a separate theme, as it is a sensitive topic. Team F included questions as "*How are decisions made regarding to (family / education / groceries / household purchases)?*" In order to get a feeling about this theme.
  e. "*People like to talk about health, complain about it.*"
  f. People answer questions about 'Politics' very different: "*some like to complain openly about all things that are wrong. But some people are holding back. I have the idea that that stems from the old days, when people could not openly discuss this.*"
- Bangladesh. Team G indicated that in Bangladesh:
  a. It was difficult to obtain answers to 'Why?' questions: "*In Bangladesh, they didn't really understand it, they thought like, we just do that, why asking why?*" They indicated that "*that makes it difficult, because you want to go deeper to identify the emotional values.*"
  b. The participants did not have 'Dreams and Plans': "*What was it? Goals and dreams? That is something they don't have, that does not exist for them.*"

    c.   The theme 'Politics', 'Dreams and Plans' and 'Speaking Up' "*didn't give any useful responses due to the hierarchy in Bangladesh and man-woman distance women aren't allowed to give their opinion about these subjects*"

- Tanzania. Team H indicated that in Tanzania:

    a.   Questions should be posed in a positive way: "*the translator said, you can't ask this, you can ask 'how long do you still want to live?', you cannot ask ' how old do you want to be when you die?'. You have to ask it in a positive way, otherwise it is a taboo.*"

    b.   If you want to start a dialogue, you should just ask "*about what they want to do in the future.*" as "*Everyone has different goals than what they are doing […] that really comes forward.*" The questions in 'Dreams and Plans' therefore did not need to be posed, as everything regarding that was already discussed in the other themes.

    c.   Questions about having a doctor caused confusion. People do not have their own doctor, except for the rich people. The theme 'Healthcare' starts with 'where does your doctor live', but for Tanzania Team H suggests that "*it can better be 'Do you have a doctor'.*" They also indicated that "*there sometimes is a nurse or something like that, but that question is not there. I just realize now.*"

    d.   "*You really cannot see on their face what people think. Facial expressions is something they do not do. Or do very little.*" According to team H people show joy, but not deeper emotions.

    e.   "*You do not discuss anything important with your neighbours*" or with your friends. One participant shared: "*I don't discuss things with my neighbours, so I feel safe and good, because they don't know what is going on.*" Audience can therefore highly influence participants' answers.

    f.   'Income', 'Work' and 'Health' are difficult to discuss. "*Finances they are frustrated about.*" 'Education' was also difficult: "Education was sort of semi. It was fine, but everyone would have wanted to go to school longer. So, it is not really something you want to end with."

    g.   'Plants', 'Animals' and 'Nutrition' were easy topics. Team H indicates that 'Nutrition' is good to start with, "*because it is pretty personal, but it is accessible.*"

Usefulness: is it relevant to use the ODK?

+   <u>The ODK provided relevant insights for the design team.</u> All teams obtained relevant insights by using the ODK.

    o   Team F indicated that they learned to understand people's thought process and priorities: "*I think the most important thing about this is that you learn to understand the considerations of people. Whatever product you have in mind and are going to execute, you better understand the thought process of where people's priorities are.*" Team F implemented product-related questions during the ODK interviews. The main things that team F got from the ODK interviews are 1) that "*people in the BoP of West-Java are not looking for a product designed for them; they are looking for a product that is (or could also be) used by the people in the middle class of Indonesia*"; 2) that "*the women in West-Java were found to be in charge of the decision making of household purchases. This resulted in the final design leaning towards the*

preferences of the women"; and 3) that "*instead of disruptive change, they prefer step by step changes. This resulted in the final design being a recognizable product, resembling familiar existing products.*"

o Team G learned "*many things that seem 'normal' for Bengali people [but] where surprising for us and would have never been revealed without the ODK toolkit.*" During their first interview "*that the women can actually not go outside and that was like, oh?*" This was a relevant insight, because "*if the mother is not allowed to leave the house, the father has to buy it. The father therefore also needs to understand the added value.*" Team G indicated that "*with the ODK we detected things, if we had only thought about functionality of the diaper alone, then this topic would not have come up.*" When deciding for a connection of the diaper pants they were developing, they considered that the mothers have very little time and that a diaper has a stigma of shame. Therefore they decided to use a somewhat more expensive, but quick Velcro connection: "*it turned out that the Velcro was immediately understood by everyone. But that was more expensive. But it is important that the pants can be put on quickly, as the mother has so many other tasks. So, that was our starting point, that the mother has quite a tough life, so the diaper must be quick and easy.*" As team further G explains: "*because it is quick, she has more patience for the child, and then she treats the child less rough*" and: "*Yeah, we didn't think that to be so important beforehand. We thought, well those people will not have a job or so. You have these preconceptions. They are doing nothing the full day. And then you find out that they are super busy and more busy than we would be.*"

o Team H main point of attention for designing their solar charging station was 'status': "*that defined the full project. And it came for a big part out of the interviews with the entrepreneurs, but also for a big part out of the ODK's. Because that kind of underlined that that truly is important. That it is culture wide, that status truly is important. Everybody wants more and bigger and that kind of things.*" The ODK "*triggered awareness on the importance of pride and property, and therefore status.*" They furthermore learned that "*being an entrepreneur is super important since this means that you take care of your own and are not depending on the government that is functioning inadequately.*" They also obtained insights not directly relevant for their design, but striking: that chicken are not animals, that it is weird to have plants inside the house and that women have to tell their husbands where they are going all the time.

+ <u>The ODK helps to place things in context</u>. Team G and H indicate that most of the insights stayed implicit, but helped to place things in context. Team F stated: "*you can really place things in context if you later on hear more about it. Like 'oh, when I spoke to that men, he told… , Oh!'*" Team G questioned afterwards if the ODK interviews were worth the effort: "*it was mainly when we had a lot of information and we developed a lot of nice ideas and then we thought, yeah, actually the thing needs to be biodegradable, cheap and easy to understand. And quickly being fastened. And then you start thinking, did we really need to do all that research? But if we look back at the design, I think yes. Because I do not think that we would have come up with the 'roll' without that research. And regarding marketing, the business side you also need it.*" One team member of team H

explained that the team members who had been to Tanzania in the first trip obtained implicit knowledge that was useful when developing the product: "*it was very nice that they knew a lot. You know a lot of small things that you do not really notice*" and: "*we had those details, in discussions about ideas or concepts then you said: 'no, that cannot be, because of this and that.' And then we were like: but we never heard about this! So, you obtained a lot of implicit knowledge, you really make it your own with such an ODK, apparently.*" One team member of team H indicated: "*Yeah. I don't know where it all had effect, but because for example the things that you see around you, the things that people around you say, that you are able to respond to differently, or that you think, yeah, I can put that in this and this way.*" According to team F: "*to make it successful, you need to understand the context and this kind of tools are very important to do that. So, very important, for sure. And it is also, that everything comes more alive.*"

+ <u>The ODK helps to understand the context quickly</u>. All teams agree that the ODK helped them to quickly get to know the context. Team F indicates: "*When we got there and we didn't know the context very well, the ODK was very useful to use this method [..] to quickly learn about how things are in that context*" and: "*even though you come for something more specific, it really does help you, let's say, when you do such a session in the first or second day, you immediately better understand the people. If you do it right.*" Team H also indicated that "*It is like suddenly you are pushed in head first and you immediately immerse in someone else's life, and thus in someone else's culture. So, for me it really worked well.*" Team G explained that "*the ODK was good because you had a lot of themes, so we asked all kind of questions that you would normally maybe not have asked.*" They obtained "*extraordinary answers, which you do not expect.*" Team H also indicated to "*have a better view of how people over there live*", which they did not obtain from discussions with entrepreneurs and customers of their client. They argued that "*you really start to understand things better, besides everything that you see, what also really helps.*" For team H, the ODK gave some interesting insights in perceptions: "*it was very funny, because health was in the most important layer, and in the layer below that there was nutrition, while with us it is like nutrition is health. That is something we found very interesting that it came out from the interview*", and also "*that chicken are not animals.*" Finally, when they asked about plants, one participant "*started laughing like 'which idiot has plants in his house, I have all those trees around me'.*" Team H indicated that the ODK also adds value when going in halfway the project: "*for us it was, we were team 2 and there was already so much known and transferred and you have all kind of expectations and then it just falls into place.*" Team H also "*found the ODK [..] the most confronting. Because, they told about finances, what they earn and if they are getting by and if they can eat, and then the answer sometimes is: no, no, no. And then it is. Yeah, ok, I am going home, having food. I found that pretty intense to see that. With the other interviews it is not about that. With the ODK you just know their whole life and you realize that you have it pretty chill at home.*" Team G did also convey, that "*after some time, we had, when discussing all themes it takes a lot of time, so you cannot go very deep into each theme. So, at some point, you have to put the ODK away and ask deeper why, why, why.*" Team F furthermore indicated that while the outcomes are not generalizable, "*if you talk to more people, even informally, you get confirmation, or you notice that*

there are contradictions, and then you can take a more specific look at it. So, it is a good basis for your knowledge and understanding of the culture and also about how people think. And that is very important."

+ The ODK helps to keep the design team open-minded. Team F argued that the ODK helped them to "*keep the bigger picture in your head, and to try to ask questions broader*" while also asking more specific questions. Having the themes and topics in mind, they could use it as a kind of reflection to not ask too specific questions and to not steer conversations. One team member of team G explained about their project: "*I thought from the beginning onwards, we have to put aside the diaper. So, I tried to get that idea into the team. Because the client was very much occupied with the diaper and the adsorbing [material] that needs to be put in. She was pretty much focused on that. I found that annoying, because that limits you and you start only thinking about the diaper, which leads to idea generation in a kind of tunnel vision. And with the ODK we looked very broadly at all aspects.*" By looking broader they also developed ideas in a broader way, leading to new ideas. They pointed out that "*the kit consists of questions that might seem needless and one wouldn't ask in the first place, but these questions take away one's assumptions about a yet unknown culture.*" However, team G also indicated that it was sometimes difficult to "*stick to all the themes*" when knowing their focus.

+ The ODKs broad view helps to obtain a 'true' view of participants' lives. Team F indicated that "*because of the thoroughness and broadness of the ODK method, things that might have gone undetected in more basic and static interview methods were, through this method, uncovered nonetheless*", which "*proved especially useful in the West-Javanese context, since people here tend to stick to answers that they consider to be pleasing towards the interviewer.*" Team H indicated that even when people do not always tell the truth and you do not know when they tell the truth, the comprehensive questioning provides a decent view of people's lives: "*for example, I had this woman of which her husband lives somewhere else, and then you also ask things about in-laws and that kind of things. And then you see that, with many things she is not that happy, and she also communicates that she pities that, and then you ask 'what do you like most about your husband?', or 'Is there something you would like to change regarding your husband?', then she responds with 'No, he is very friendly'. But you had all those answers, so then you do know that she is not fully happy with the situation. You don't know exactly how, but she is disappointed in certain things, that is obvious. So, I do not need the exact answer.*" Team H adds to that: "*You ask so many things, that I really had the idea that I had a good feeling about what that person thought. And whether that is a bit twisted… yeah, then that is just the way it is. That is in every interview.*"

+ The ODK helps to build rapport. Team H indicated that "*through the ODK you also build rapport with people.*" One participant of team H2 belonged to a group of people that they met for some days in a row, but with whom they could not speak. "*Because of the ODK [their relationship] became better.*" After the interview, the participant "*had something like, these people I know.*" Team G also indicated that "*the toolkit consists of elements that allow designers to sympathize with the participant [and make] the participant feel special.*"

- <u>The ODK provides inspiration</u>. Team G indicated that the ODK "*also provides a lot of inspiration, if you obtain information very broad about a lot of things, that you can use to design.*"

- <u>The outcomes of the interviews support the design team in decision making</u>. Team G conveyed that through the insights the ODK gave them they could "*assess really well which design is going to work and which one not. I think that is very nice. Otherwise you keep on doubting.*" They add to that: "*Every time we could argue why something would or wouldn't work. And I think that is truly important, I think that is the reason why you do a research like this.*" For the diaper connection the team indicated that they "*did doubt for a long time, but we could make a choice which was reasonably informed, from the research we conducted. If you don't do that research, then which one do you have to choose?*" The team members of team H that stayed home during the first trip noticed that during discussion that the other team members had reasons and opinions that they could not know, which "*was a real benefit in our team, especially in the beginning stages.*" The team members that visited the country could indicate why things would or wouldn't work.

- <u>The ODK gives the design team confidence about the product to be designed.</u> Team H indicates that the ODK – misplaced or not - gave them "*some self-confidence about understanding how it will function in this culture. I understand what they find important, we are going to test it. And what came out was that we needed more shade, which was very practical. But all that status, that was spot on.*" Team G also indicated that through the ODK interviews they gained "*a good sense of what designs will work, and which won't.*"

- <u>The outcomes are a verification of conducted literature search.</u> Team H indicated that from literature they assumed that education was important and that the ODK interviews confirmed this: "*All three indicated that education is important. All three of them said they would have wanted to have studied longer of that they are still studying, the youngest man*" while "*it was only an assumption of us, as we looked at what the government spend money on and where they made commercials for, then it must be important, and it indeed appeared to be important.*"

- <u>The ODK helps participants to reflect on their own lives</u>. One participant of team H1 indicated that the ODK gave her insight in her own life: "*the woman said that it really had given her insight [..] in what I find important and what I need to get there*" and: "*The woman literally said: 'I never realized that I find this more important that this'.*"

- <u>The ODK helps local companies to better understand the people</u>. One translator of team H was from the client organization and "*said that he found it super interesting and that he learned a lot, because we were really in a poor area, and he does not get in touch with them. He also lives in the city, so for him it was also new.*" Team F indicated that the employees of the Indonesian design agency that aided to localize the content of the ODK "*were interested in using the method themselves*"

- <u>The ODK can also be used for in other domains and for other purposes</u>. Team F indicated that the ODK "*is also a very good tool for marketing. Because you can derive who is in charge and who makes the financial decisions. You know much better, do I need to focus my marketing on the woman or the man. And, okay, they seem to, for example, I do not know if this is true, but find*

nature very important, they like to be in the nature, that you use a picture of nature in your marketing. So, you can use it everywhere." Team F furthermore suggested that the ODK can also be used for research in "*all creative domains*" and "*for a different type of research, you can use it in order to sensitize people.*"

/ <u>Acceptance by the client organization</u>. An employee of the local client organization of team H stated: "I want to say one thing about the Delft University, this is the best University, only because of this [points at ODK]. ODK is the best thing you're doing! This way you don't bring your Brittan/Germany/Holland here, which will never work!" However, the client organization of team H – a Dutch organization – became impatient and wanted the team to more focus on the product development than on getting to know the context.

/ <u>Usefulness during other phases in the design process</u>. Team F indicated that during the prototyping phase it was not so relevant to conduct ODK interviews: "I did not see the added value conducting this research when the prototypes were already ready." However, the second team also indicated that "In the beginning it was nice, because, even though we were already halfway the project, we came in new in Indonesia. So, in that sense it did help us a lot. And it is also interesting just to see how people respond to the questions. So it was a research in itself, of course." Team H had a similar viewpoint: during a discussion they concluded that the ODK is especially useful in the beginning stages and less during concept development, but that also for the second team, the ODK provided a rapid picture of the cultural context.

/ <u>The ODK is too broad?</u> Team G indicated that "*the broad set of questions avoided the probing questions when touching a certain topic which could lead to an (interesting) deeper level.*" However, they also pointed out that "*the general questions allow to quickly go from one theme to another, and when something is interesting, can be easily deepened with a 'why' question.*" They indicate that "*it is not possible to have both the holistic view and the deepening 'why' questions in one interview.*" They therefore suggest to start with broad interviews and to deepen the following interviews towards interesting topics. Team F indicated that "*many topics were also less relevant*"

- <u>It is difficult to address deeper emotions.</u> Team G indicated that the questions of the ODK are very general and that they did not obtain 'emotionally deeper' answers by asking 'why'. The team indicated that probably the participants found it "*really difficult to express their emotions and/or explain why they do certain things. They are expected to behave in a certain way, and they reflect this in their answering.*" Team F, however, indicated that the ODK helped their participants to open up and not " *stick to answers that they consider to be pleasing towards the interviewer.*" Team G indicated that during the first interviews it is good to go broad and that after some interviews it is better to go less broad but deeper, to obtain more insights in feelings and emotions.

- <u>The ODK outcomes are not generalizable.</u> All teams noted that the ODK outcomes are not generalizable. They did discuss outcomes with their translators, but they did not verify their findings in a bigger group of potential users. Team F indicates that "t*he results cannot be generalized for all of Indonesia, at most for Java.*" Team G noticed significant differences between rural and urban areas, mainly due to difference in income: "*In the rural areas you have poor to*

middle incomes and in Dhaka we interviewed the more rich ones. And there was a big difference between middle incomes and rich." However, they also indicated that "*the rich family was just a bit weird, so I don't know if you can base any conclusions on that.*" Team H pointed out that "*you have little time to do a lot of them, so they are all things that you learn as if you would live there and talk to a few people. And make a few people your friend. So you cannot scientifically prove that something is like something, but because you truly spoke to someone from the culture and that person explained it to you in that way, it is of significant value and you perceive it as true.*" Team H also pointed out the problem that they sometimes did generalize these findings: "*you already have the feeling you have a lot of knowledge. And it is not like that. If two out of three people say that something is important, then I say, the majority of the population finds that important. You just do that.*"

- <u>The ODK does not take away all bias and assumptions</u>. Team H indicates that it is "very easy to be biased with this interview, that you very easily think like 'One and one makes two, because in my culture one and one makes two'."

User-friendliness: Is the ODK designer-friendly and easy to use?

+ <u>Good guidance / basis / grip</u>. Team F noticed that, once they knew the themes and questions by heart they could have a friendly conversation and still retrieve all information. One designer stated that it felt "*odd*" to get so much out of a person: "*because I just got to know this person.*" Team F also indicated that the ODK offers guidance but also let them free: "*Now you are very free, but still you can ask, if you say, okay, apparently, he thinks this to be an interesting topic, and that you can again go back to those questions, so you have a certain thing to hold on to, but you don't have to exactly follow something. So on the one hand you are very free, but on the other hand it offers guidance, and for that purpose it is really nice. Instead of doing an interview and ask some questions about this. But this offers specific questions and a lot of topics you can choose from.*" Another designer of team F agrees: "*Yeah, you have an overview of the full picture and in your preparations you can specify, but you are aware of that you checked everything and not randomly pose questions and that makes it a good grip, a good basis.*" Team G also indicated that the cards are useful when "*the conversation hits a dead end, because then you can fall back on the cards.*" And: "*when things get awkward, the interviewer can switch to a new theme.*" They argue that "*in the beginning it is a bit scary, then it is nice to follow the toolkit, that you understand the questions.*" However, this only works when knowing the themes, questions and ODK procedure. Team H indicated that, because they all conducted an interview they did not "*get used to*" using the ODK.

+ <u>Helps in keeping overview</u>. The question cards helped to keep an overview of the interview progress. Team H explained about the pictographs that "*it was mainly nice to look at during the conversation, that you could see how far you are*" and "*Yeah, that was really nice, that you could explain, these ones we still have to do and these ones we already had.*"

+ <u>The ODK saves time</u>. According to team G, the ODK "*saves the designer time in creating their own questionnaires*"

+ <u>The ODK is adaptable</u>. Team F indicated to be happy with the freedom to add questions and follow-up on the unexpected. They indicated that the ODK "*could be fairly easily adapted to fit the West-Javanese context.*" Team G adapted the visualizations and team H conveyed that they would adapt the ODK when they would use it again.

+ <u>Helps to sympathize with the participant</u>. Team G indicates that the timeline, family questions and touchstone tour made the participants "*feel special*" and "*allow designers to sympathize with the participant.*"

/ <u>Combine with product questions</u>. Team F and G combined the ODK interviews with questions related to their project. Team H did not do so. They felt the product questions "*were so much specific [..] we could not link it together.*" Thereby, they indicated "*if we would combine that, it would have become really long interviews. So, for us, that was not really an option. So that is why we separated it.*" However, they also indicated that they could have added "*five questions about connectivity, what very much fits within the themes and also is about culture in general, because then I learn a lot within my domain.*"

/ <u>Online platform to facilitate designers</u>. Team F indicated that it would be useful to start an online platform where "*people can use it and share pictures*" and "*that you can also provide feedback about what to do and don't also per context.*" They argued that "*designers in general do not really like reading, in general. Unless they are teased. If you have a platform and link that to scientific articles…*"

/ <u>A lot of data to process.</u> Team G and H analysed the obtained data. Team F did not explicitly do so, they conveyed the knowledge they obtained from the interviews to their team members and used their insights during the design process. Team G indicated that they noted down all the answers during the interview instead of recording the interviews, in order to reduce data processing time. However, the analysis of the data took a lot of time, making the client organization becoming impatient. The DfI student indicated that she "*found it very difficult to come from that broad [..] to come back to a concept.*" She wondered how to "*make the translation back to the design.*" With the team together they could do it and identified patterns and themes by taking out the interesting quotes and making 'statement cards' from it: "*on one card you put one quote and above the quote you put what you got out of it. [….] We clustered all the cards in themes and sub-themes and for each theme we developed ideas and those we used.*" Team G developed 9 categories comprising 19 themes based on 30 concerns (see figure 86). These gave the team direction to the design process. Team H used the 'Vision in Product Design' (ViP) method to process their data. They found it difficult to put the knowledge in a report and do not see the use for designers to transcribe all interviews. They grouped the outcomes of their literature study and from the interviews in a ViP model (see figure 87). They selected and clusterd context factors "*to create a representation of the future context in which the design will be placed.*" This resulted in "*kind of the context in themes.*" One designer explains: "*We added things from theory and you added things that you experienced and heard over there from the ODK. Not that you can say it is one to one, but that is where the knowledge came from.*"

Appendix F
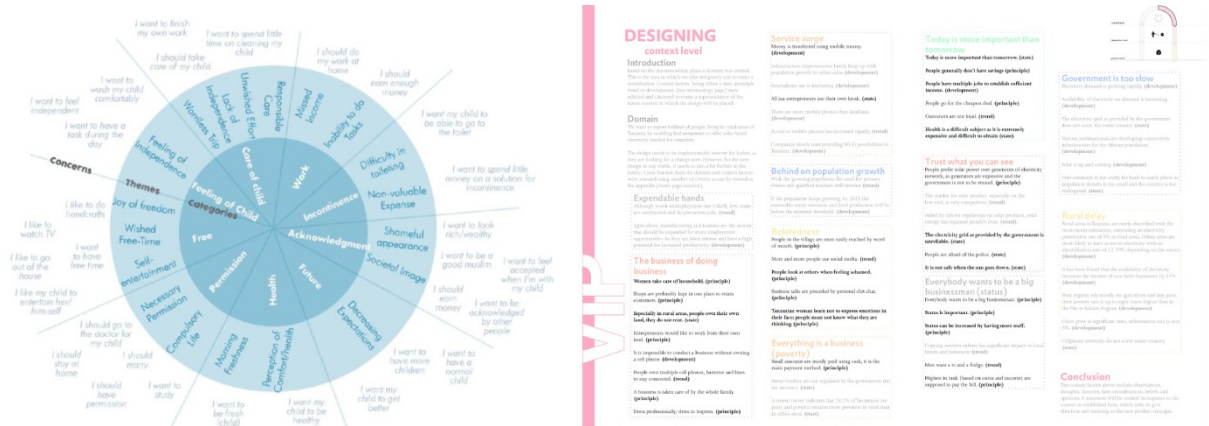
Figure 86 and 87: Data analysis outcomes of team G and team H

/ <u>Knowledge is mainly implicit and difficult to pinpoint</u>. According to team G and H it is difficult to pinpoint which knowledge the ODK interviews brought them and what they used from it. Team H pointed out that it is difficult to give the ODK "*as the source*" or to put the outcomes "*down on paper in [a] report.*" Team H suggests to make the outcomes more explicit: "*at a certain point we all know it all, especially because we also did them, but it is not made explicit. So that can lead to miscommunication, because you interpret the same things in a different way. But we didn't.. We could have, should have made that more explicit.*" Team H indicated that the implicit knowledge became most visible in the ViP exercise "*where the team members that were in Tanzania and the team members that were back in the Netherlands, who did the external literature analysis, complemented each other in finding the search fields*"

- <u>Conducting ODK interviews takes a lot of time, which is not always there.</u> All teams indicated that the ODK interviews take time. Team F pointed out that "*it is impossible to ask every single question of the ODK and expect a quality answer. This simply takes too much time, because of the extensive amount of questions.*" None of their participants complained, but they noticed during the pilot interview "*that the answers became more superficial over time.*" The client organization of team G became impatient and team H indicated that because of the time pressure the ODK interviews "*is something you leave out quickly, maybe.*" The team members of team H that went into the field the second time found it "*a pity that we could do it so little, but building the prototype took so much of our time.*" They pointed out that "*you really need to plan time for it.*" Team H furthermore indicate that "*you actually want the ODK questions to become less. And that is also not something you want, because then you don't cover everything.*" However, team F also argued that "*if you want something that matches the target group, it is important to invest in it.*" And team G and H also indicated that the ODK interviews have been very valuable for their projects.

- <u>Sometimes feels forced.</u> Team F indicated that it sometimes felt forced to use the question cards, "*because sometimes you touched upon a topic, but not yet posed the questions. When you later come back to a topic and then it was like 'we just discussed that right, make up your mind'.*"

- <u>Does not offer sufficient emphasis on follow-up questions</u>

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Team G advised to put more focus on asking follow-up questions. They state: "*the sentence at the bottom of each question card that has the purpose of reminding, doesn't work very well. Since it has the same font as the other questions it doesn't attract attention. Something separate from the cards or a highlighted sentence would work better.*" Team H indicated that, because they are designers first and interviewers second, they were less skilled in interviewing and "*this resulted in less attention to the why, why not and other follow up questions.*"

- <u>You need space</u>. Team G indicated that in participants' homes "*there were no chairs and table present, which makes it difficult to use all the cards and scales.*" During one interview the participant, translator and designers sat on chairs, without a table and that was the reason for not using the ODK tools. Team H2 experienced during one interview a lack of space to sit, as there was not much shade and it was too hot to sit in the sun. This made it difficult to use the tools and to connect with the participant: "*that is why we sat in a line, which did not make it easy. Because then you had her, the translator, me and [team member]. And [team member] tried to draw along, but that didn't work at all, because you sit in a row and you cannot really connect.*"

- <u>The cards blow away</u>. Team H indicated that the cards easily blow away outside and suggest to use "*a Velcro sheet to stick the cards to.*"

- <u>Exhausting interviews</u>. Team H wanted to conduct two ODK interviews in one day, but pointed out that "*that cannot be done, after one we were exhausted.*"

- <u>The ODK needs to be accepted by the full design team and the client</u>. The DfI team member of team G was the person who wanted the team to first focus less on the diaper and more on the user. Not all team members agreed and the client organization also "*was very much occupied with the diaper and the adsorbing [material] that needs to be put in. She was pretty much focused on that. I found that annoying.*" Due to the perseverance of the DfI team member, the team did use the ODK interviews and looked broad, but it took effort to convince everyone.

Results Focus Group Session Try-Out 2

Below the results of the data analysis of the focus group session held with the design teams is summarized. Table 24 provides an overview of the evaluators of this session.

Table 24: Details of ODK usage by design & research teams

	Team F1	**Team F2**	**Team G**	**Team H1**	**Team H2**
Master programme	SPD	IPD	DfI	SPD	IPD
Gender	Male	Female	Female	Female	Male
No. of interviews facilitated	2	3	7	1	1
No. of interviews documented	0	0	0	1	1

Effectiveness, efficiency, designer-friendliness

Appendix F

- All evaluators agree that the ODK help the designer to make design decisions, to understand the culture, to understand participants' priorities, to keep the bigger picture in mind and to offer design inspiration. All evaluators, except G, agree that the ODK helps the designer to understand thought processes.

- G did indicate that people are sometimes embarrassed to say certain things and H1 did point out that the outcomes do depend on how elaborate and involved participants are. F1 pointed out that the outcomes also depends on a participant's openness.

- All evaluators, except for F2, agree that the ODK aids to detect things relevant for design purposes that would otherwise have gone undetected. F2 indicated that the ODK opens up conversation and keeps "*the focus on learning all aspects of life, not just what the design brief might focus on*", but is not sure if it would otherwise go undetected. F1 added that it also depends on the other methods used during the fieldwork if these things might have gone undetected or not.

- All evaluators agree that the ODK interviews take a lot of time, but that it is worth the effort. However, F1 indicated that he "*generally fully agrees*", but experienced that participants "*can be really introvert which can lead to a low outcome in relation to the time put into that specific interview.*"

- All evaluators fully agreed that the ODK challenged them to pose questions they would normally not ask.

- All evaluators agreed that the ODK helped them to overcome their own assumptions by making them ask questions that they thought they already knew.

- All evaluators agreed that conducting ODK interviews is exhausting, and H1 agreed that it is not possible to conduct two interviews in a day. However, F1, F2, G and H2 argue that it is possible to conduct 2 interviews per day. F1 added to that, that it is best to switch roles when conducting two interviews in a day, as "*asking the questions and keeping the conversation going is the most exhausting*"

- F2 and H1 agree that it is difficult to convert the obtained data into usable input for the design process. However, F1, G and H2 agree it is not. H2 argued that most information is subconscious, but in that way also brought in into the design process. F2 and H1 agree that the ODK's influence is difficult to indicate. However, F1 and G disagree with that.

- All evaluators, except for F1 agree that in their design projects they did not have sufficient time to truly consider all insights during their design process. F2 indicated that it takes a lot of time to process the data.

- All evaluators agree that the ODK is a good basis to fall back on and that it can be adjusted to personal preferences.

- All evaluators, except for G, agreed that the ODK sometimes felt forced to use. F1 indicated that he felt forced to ask certain questions just because they were part of the ODK.

- F1, G and H1 agreed that the ODK also offers the participant insight into his or her own life. However, F2 and H2 indicated to not have noticed this.

- All participants indicated that they would use the ODK again in another DfD project. H2 added that in a developed region the ODK might work as well. H1 added that she would use it, but only if there is sufficient time to do so.

- H1 indicated that she could not directly obtain design guidelines from the ODK. H2 shared that the ODK resulted more in a 'gut feeling' than in design requirements. He indicated that for sure the interviews influenced the design outcome, but that it was not like: conducting an ODK and now I know what to design. He admits that maybe because the time was limited for processing the outcomes. F1 indicated they did, that they used parts of the ODK interviews in their design criteria. F2 indicated that they indeed based their design goal on information from the ODK interviews, but that they could not identify concrete, functional guidelines from these interviews. G shared that they did, as the thickness of their diaper was related to 'Hygiene', 'Mobility' and 'Accommodation'. However, she indicated that that was also because they combined product-related questions with the ODK. H2 adds that they mainly used their 'gut feeling' and the interviews might have had more influence than they realize, but that it is not so relevant to quantify the influence of the ODK.

Manual

- Evaluators F2 and H1 agree that it is difficult to understand what the ODK will bring for the design project, for the other three evaluators this was clear. H1 clarifies that it is clear that the ODK will aid in gaining a better understanding of the local culture, but not so clear what it will bring for the to be designed product and / or service.

- All evaluators agree that the ODK interview will last too long when posing deep AND broad questions. F2 added that it also depends on the context and on what you want to get out of the interview if the interview is too long. G indicated that they started broad and after three or four interviews focused more towards the product and probing deeper. F1 indicated that they did something similar and that it is very relevant to pose all questions first and then delete questions that do not work and add questions that are more project-focused.

- All evaluators agreed that the ODK works well in combination with making observations. G added that, according to her, it is even required to combine the ODK interviews with observation. F2 also indicated that it helps to see where and how someone lives, because that also indicates status. H2 added that he did not see a question about a house tour on the cards, but that it should be on a card. He added that observation does not require a lot of effort and adds significant information to the interview. H1 admitted that she found it difficult to ask participants for a tour.

- All evaluators agree that the ODK is most relevant in the beginning of a design project, but F2 added that she also obtained a lot of insight in people's lives and how they handle their products, providing relevant insights for the marketing strategy. F1 and F2 indicated that they found out that their product has to be marketed for a higher market segment, but should be affordable for their potential users or they should be able to find ways for paying for it. They also found out that the women make the decisions concerning household and that that was something they would not have found out without the ODK interviews.

Appendix F

Steps

- *Step 1: Get familiar with the ODK.* F2 indicated that the first time conducting an ODK interview it is a bit uneasy, but that the second time you know better how to enter the conversation, which things can and cannot be asked or how they can be posed differently.

- *Step 3: Localize content.* F1 indicated that they discussed the ODK locally with a design agency and that that had been really useful. It helped them to learn what can be asked and what not, what sensitive topics are and how questions can better be posed. G stated that they also spoke to the translator beforehand to discuss the ODK contents. All evaluators agree that contextualizing visualizations will work well during the interviews. However, according to H1 and H2 this is not required. All evaluators, except for G, indicated that the translator sometimes had difficulty understanding and translating certain words. G did not experience any difficulties regarding wording.

- *Step 6: Select participants.* F1 indicated that their translators randomly selected participants in the kampongs and F2 noted that they were lucky in finding participants that fitted their criteria. F2 could indicate that they wanted someone better off or someone worse off and that their translator then picked someone. G also indicated that they varied in their selection criteria. H1 and H2 also found participants easily. H2 noted that they had one participant who knew a bit of English and that they did not really use the translator then, only if the participant did not understand something. He first indicated that this was fine, but later on realised that it could have been the reason why this participant misunderstood some of the questions.

- *Step 13: Sit down and build dialogue.* F2 stressed that difficult themes or questions can be posed after starting with easy topics and building rapport during the conversation. She also indicated that most themes are related and it is easy to switch between them, but that some, for example 'Land' just had to be put in somewhere, which sometimes felt odd. H2 added that indeed some questions, for example about 'Income' or 'Animals', which were not asked yet suddenly needed to be put in, which did not always happen smoothly.

Guidelines

- *Guideline J: Selecting, instructing and working with a translator.* G indicated that the translator sometimes did not translate everything, as he was too busy and hasty, but that he was well educated and translated well. H1 indicated that their translator started to join the dialogue and gave his own opinions instead of the participant's. F1 and F2 drunk coffee with their translators beforehand, which worked well. They explained to them that some questions might sound dumb, but that she still wanted them to ask those questions. They also noted that their translators were familiar to the participants, which helped to create a good atmosphere in the beginning. However, F1 indicated to once have a translator who answered before posing the question to the participant. F1 indicated that it is a question of luck, who is available. F2 indicated that networking is important and that luck also plays a part. H2 indicated that it did not work very well to have different translators all the time, but F2 did not have any problem with that.

- *Guideline F: Select a variety of participants.* H1 indicated that they did not obtain a view of their Tanzanian target group, as they interviewed only Muslims and by interviewing others, they would probably obtained different answers. G agreed that religion plays an important role and both F2 and G agreed that the obtained view is not generalizable.

- *Guideline K: Dealing with sensitive questions.* H1 indicated that she was held back by her own culture, that she did not dare to ask all questions, because she felt uneasy about them, not necessarily the participant. H2 was surprised that one female participant openly shared about menstruation, with him being present. F2 indicated that she ended up talking about anticonception with a female participant having a male translator, and that she expected it to be a sensitive topic, but that the participant openly shared details about such an intimate topic. G indicated that there was a lot of shame in Bangladesh and that only one participant opened up about menstrual hygiene, because no male person was present.

- *Guideline N: Be aware of your position.* G indicated that the Bengali people really looked up towards western people and that they therefore added their own interpretations to the outcomes, as participants might have just told what they thought they would want to hear. They also discussed the outcomes afterwards with the translator. H2 also doubted about participants' honesty about income, he had the idea that participants pretended to be lesser off in order to get more money from the designers. G indicated that her participants not wanted them to notice how miserable they were.

Themes

- *Amount of themes.* All evaluators agreed that it is required to discuss all themes in the beginning, but that you can focus more after conducting some interviews. F1, F2 and G agreed that there are too many themes to keep a good overview. However, H1 and H2 did not have a problem with the amount of themes. G indicated they clustered the themes into six categories to keep a better overview. All evaluators, except for H1 agree that it is a good idea to cluster the themes.

- *Hygiene.* F1, H1 and H2 agree that 'Hygiene' is missing as a theme. F2 argued that 'Hygiene' is covered in other themes, but could be added separately. They added questions about hygiene when discussing 'Nutrition'. G did not see the need of adding a 'Hygiene' theme, as there are already sufficient themes.

- *Communication.* All evaluators, except for G agreed that 'Communication' can be added as a theme. F2 and H2 did indicate that it might depend on the context if this theme is relevant, and F1 did note that communication is also present in some other themes. G indicates that there are enough themes and it was not relevant for their project. F2 indicated that they added questions about communication and connectivity and added them to the 'Mobility' theme, as it was relevant for their business plan.

Questions

- *Amount of questions.* All evaluators, except H1, agree that it consumes too much time to pose all ODK questions and that designers need to select. F2 adds that it is not required to pose all

questions and that they can be adjusted to the conversation and the context. G added that the motivation and patience of the participant decreases over time.

- *Adding product questions.* F1, F2 and G combined product questions with the ODK questions and indicated that this was useful. G shared that it results in a good mix between more abstract and more focused questions, to which H1 agreed. H1 and H2 did not add product questions to the ODK interviews and indicate that this will take too much time. However, during the discussion they learned that the other teams got more detailed information out of the ODK interviews because of adding product questions. H2 indicated that it might have been useful for them to have done that as well. H1 added that their project might have been to open to do that. F1 did comment that it also depends on the phase of the design process that the team is in if it is relevant to combine product questions.

- *Belittling / difficult / scary questions.* Team F indicated that some questions were perceived belittling by their participants. H1 agrees but indicated that she is not sure if that is actually true or just her "*opinion because of my culture.*" G and H2 disagree, but participant G indicated that her participants were ashamed to discuss some of the questions. All evaluators agree that some questions are difficult or scary to pose.

- *Ambiguous questions.* All evaluators, except G, agree that some questions are ambiguous. G did not encounter problems with the phrasing of the questions.

- *Open and broad questions.* All evaluators, except for G, agreed that some questions in the ODK are too open and broad to be answered by the participants. G indicated that if participants did not specifically answered the posed question, those answers still often conveyed relevant information. F2 explained that the open and broad questions were not difficult to pose, but uncomfortable to answer and that they therefore negatively influenced the interview atmosphere. H2 indicated that it might be good to make the questions regarding 'Products' and about recent changes more specific, as their participants did not understood what to answer and they often had to provide examples. H2 pointed out that their translators were better educated than their participants and therefore understood most, but not all, questions. Evaluator F2 also provided examples, but when the participants understood what the question was about they did open up. Evaluator F2 indicated that the examples should not be too specific.

- *Inappropriate questions.* Questions about 'Speaking Up' were not posed by G, as they found those questions inappropriate for the Bengali culture. H1 found the questions of 'Speaking Up' vague and therefore hard to pose and explain.

- *'Dumb' and 'irrelevant' questions.* Evaluator G indicated that not the participants had difficulty with broad and open questions, but that the translator had difficulty understanding the relevance of posing such questions, as they did not concern the to be developed product. F1 also indicated that their translators sometimes had difficulty posing certain questions, as they found some of them dumb or difficult to pose. Both teams urged their translators to still pose the questions. F2 indicated that this is useful, as the answers might be as you would have expected, but if one out of ten answers differently, this can be a 'deal-breaker'.

Techniques

- *Drawing / mapping.* F1, F2 and G agree that it improves the designer's understanding when drawings are made during the interview, H2 adds to that that drawing can be used to dig deeper into issues, and G noted that it helps to obtain details. H1 and H2 both agree that drawing can support the interview, but add to that that you need to have adequate drawing skills to keep up with the interview tempo. H1 also indicated that drawing while sitting on the floor is difficult. F2, G, H1 and H2 all agree that drawing takes a lot of time and that it is difficult to combine the drawing and mapping with the tasks of either note-taking or facilitating. They also agree that drawing is not really required, although G stressed that it is useful. F1 indicated that drawing can be combined with note-taking, especially when the interviews are recorded and does think that drawing is required.

- *Sorting.* All evaluators, except H1, encountered participants who had difficulty understanding the sorting exercise. G indicated that the technique needs a clear explanation from a good translator. All evaluators agree that sorting is a nice exercise to close the interview and all evaluators, except G, agreed that sorting added additional insight. G found it more a summary of the conversation, although she did admit that the sorting was sometimes contradictory to participants' answers. F1 adds the side note that the technique can be "*pretty challenging*" for the participant.

Tools

- *Timeline.* All evaluators agreed that discussing the day – whether or whether not by using the timeline – is a good conversation starter.

- *Visualizations.* The evaluators agree that the visualizations are useful during the conversation. H1 argued that the interview otherwise becomes too "dry" and tiring. She also indicated that the pictographs indicated interview progress. G indicated that they used multiple photographs per theme to indicate what the theme was all about and that that made the participants think and leaded towards sharing stories. She also indicated that she placed down photographs to subtly guide participants towards a new topic.

- *Pictographs.* Evaluators F1, F2, H1 and H2 agree that pictographs will work as a reference during the interviews, but that they have to be clear. F2 indicated that she had the feeling that the pictographs were conceived as childish, because they are very colourful and childlike. She argues that for a serious dialogue you have to use serious visualisations. However, she also indicated that it might also depend on the context if colours should be used and how bright they should be. H1 and H2 indicated not to have had that feeling and H2 added that according to him it does not really matter what visualization is used, but that it has to be recognizable to some extent and the designer has to know what the visualization depicts. H1 indicated that, if the pictographs were not understood that sharing that you also did not understood them directly was a nice way to bond. According to F1, some of the current pictographs are ambiguous / multi-interpretable. He also indicated that during questioning the pictographs worked fine, because they explained them and talked about them with the sorting exercise participants did not remember the meaning of the pictographs and therefore chose to rank only those pictographs that they did understand. He

indicated that they just took one or two cards and immediately explained which theme it concerned and that in that way they did not face any problems. H1 shared that their participants just picked up the cards with pictographs they did not remember and then just asked what it meant. The participants of teams G and F did not do so. F1 indicated that he felt that their participants might have been ashamed, that they did not want to admit that they forgot what it meant. He also added that that might be culturally dependent. F2 referred to a suggestion of one of their translators; to use pictographs with de title added in the local language, as in the region they worked in not many people are illiterate.

- *Photographs.* G did not try to conduct ODK interviews with pictographs. After a discussion with the client organization team G immediately decided to use photographs to have a better link to the specific culture. H2 does understand that team G has decided to do so and commented that it "*may work better when you use pictures as reference*". All evaluators did agree that photographs probably work better than pictographs as a reference point during the interviews. H2, however, wondered if participants might be steered towards certain answers with photographs. F2 indicated that she did not noticed that happening, but that it is difficult to find suitable photographs for each theme. The assumptions team F made for photographs suiting certain themes did not always turned out to be correct. F2 indicated that you have to test if the photographs covers the theme's contents. Team F did that by discussing the photographs with their translators.

- *Question cards.* All evaluators agree that the question cards helped them and the participants to keep track of the interview progress. G indicated that they taped four themes together and that it helped them to establish more fluent conversations, because it was easier to switch between those four connected themes. H2 indicated that they clustered the cards on the spot and that that sometimes resulted in chaos and straying from one topic to another. While their participants did not seem to mind, H2 argued that it is better to cluster beforehand. F2 explained that she, at some point, knew which questions to ask, but that her team member placed down the cards regarding the topic being discussed. She liked that, as a reference for the conversation, plus that it helped to see which cards were left.

- *Card with 10 commandments.* The evaluators agree that a separate question card with tips to keep in mind during the interview would be useful. H2 added that "*the reminders are nice for the first few interviews.*" G commented that it might be useful to have designers creating their own tips.

F.3   Evaluation 3: Expert Appraisal

Below, the full results of evaluation 3 are described. Evaluation 3 comprised an expert appraisal by 53 experts. Below the results of the data analysis of the workshops are summarized.

Results session Ahmedabad

Below the results of the data analysis of the workshops held with 24 experts at the Design for a Billion conference at the Indian Institute of Technology in Gandhinagar, India is summarized.

General remarks

- Group 2 indicated that "things will change", which influences the themes. As example one evaluator indicated that a change in how we communicate with each other will "*impact the other systems that move around it*".

- Group 2 wonders how the ODK outcomes can be quantified

- Group 2 argued to consider facilities for good design.

- Group 3 does not understand the link between the themes and capabilities

- Group 3 indicated that different cultures have a different relationship towards the different themes. They point out that certain beliefs people hold might influence for example how people look at animals or family relationships. In the plenary discussion, group 2 also indicated that different people have different beliefs and feelings about different themes. Group 4 noted that people's preferences and problems depend on their context, and that the themes will bring about different things in different context.

- Group 2 indicated during the plenary session that what people say is not always what they do.

- One evaluator of group 3 indicated: "*you draw a lot more conclusions from a person's space than the persons can themselves tell you.*" Indicating that being present at people's homes and observe their personal space is important.

Relevance / Effectiveness

- Group 3 indicates that the themes help "*in thinking from all the levels and make more connections, indirect connections.*"

- Group 2 indicated that designers develop products and services for groups and not for individuals, and that individual feelings are very subjective and difficult to measure or to generalize. One evaluator in the plenary session argued that the eventual design can be made flexible in order to allow utilization by other communities as well.

- Within group 3 there is a discussion about the relevance of comprehensive user insight: one evaluator indicated that the relevance of the themes depend on the specific product, another argued that "*one of the things that you have to do is you also build a profile for the potential customer*". In the end the group agreed that the goal of the ODK is "*trying to get a feel of the person, not so much again like you are saying for a specific product.*" They agreed that the themes provide "*useful information*" and can "*aid the discussion*", but that "*it might not be essential for every project*".

- Group 4 perceived the ODK "*like a guidebook. […] Let's say I am a beginner designer maybe, these areas would give me questions that would specifically focus on topics*" and: "*this seems to be like a toolkit where, which you can take to the field to know these aspects of a person's life and therefore you can, sort of, decide how to enhance their capability choices. By designing choice. That is my understanding of it.*" And "*I was just thinking about something like, these are a part of 21 ways to be happy.[..] Or 21 ways to become capable of being happy. So, how can we do that through design?*" And: "*This toolkit will be used to guide people like you and me when we want to go in field and we*

want to understand some people's life they are living etcetera, etcetera. So that we are able to find an opportunity to design for them that makes them more capable."

- Seven evaluators agreed in the plenary discussion that the underlying principles and basic structure of the ODK offer useful clues and that can be used as a basis, but that it is important to contextualize certain aspects, such as the visualizations, or the exact definitions of each theme. One evaluator suggested to provide keywords for each theme and that the designers can form their own definitions. However, another evaluator argued not to leave it completely open, as it would reduce the grip the ODK offers and therefore the efficiency. One of them pointed out that designers should have the flexibility to add to the base, based on their experiences or context, three others added that designers should have the flexibility to add or remove topics and questions.

- Five evaluators argue that the ODK should not only provide a rigid structure to follow, but should allow for flexibility in order to work for a bigger group of designers. According to them, it should provide options and allow for changes.

- Group 4 perceived the ODK to be a useful conversation starter.

- Group 2 indicated that the ODK can be used as input for design, but also for marketing purposes, group 4 indicated that the ODK can be used "by anyone who aspires to know more about anything", for example a doctor and that it can also be sued as a "brainstorming tool" / idea generation tool. Group 4 also indicated that the ODK can also be used as a "synthesis tool", to categorize all the obtained information. In the plenary session evaluators indicated that the ODK could be used as a survey tool by governments, by NGOs to understand and improve the lives of communities, as a management or strategy toolkit to learn how to persuade people, for usage by policymakers and decision makers

Efficiency / Designer-friendliness

- Group 4 indicated that going through all the themes will take a very long time. In order to make a quicker assessment, one evaluator proposes to make a flowchart of the different themes which guides designers through the questions and results in not having to ask every question. Another suggestion they gave is to indicate, based on the to be developed product, which will be the most important themes to discuss and start there and to continue with the other themes if time allows.

- One evaluator noted that the ODK offers "*a base, so that, so that suppose, so that we don't miss out on important aspects of you know design, a good design. Which has been worked out earlier. So you don't need to figure out everything every time. So we have certain things figured out, then we work in some context and apply those there*".

- One evaluator in the plenary session indicated that the ODK should be more visually equipped for the designer: "*The visuals will actually generate curiosity. If I like the visuals then I read the whole thing.*"

Manual/steps/guidelines

- *Step 8: Decide on time and place.* One evaluator of group 3 indicated: "*you draw a lot more conclusions from a person's space than the persons can themselves tell you.*" Indicating that being present at people's homes and observe their personal space is important.
- *Step 16: analyse, interpret and reflect.* One evaluator of group 3 indicated that from conversations designer should identify patterns.
- *Guideline K: Dealing with sensitive questions.* Group 3 stated that "*when we go into the field there are some topics that you don't bring up, because, religion being one of them. Because it leads to uncomfortable... situations..*" Group 1 advices to be sensitive to people's emotions, group 3 suggested to ask questions in an indirect way and in different ways.
- One evaluator indicated in the plenary discussion that "*overall, it's a good base to start from, but one of the suggestions would be to look at where, the different countries and some of the specific context [..] comes in.*" She stated that things as brand consciousness or status would be big issues in India and that it might therefore be relevant to contextualize the ODK contents. Another evaluator indicated that a general base is good to have, but that there should be leverage for designers to adjust the contents towards specific contexts. For example contextualizing the pictographs.

<u>Themes</u>

General remarks

- Group 2, 3 and 4 all indicate the interrelatedness between the themes. For group 4 it was somewhat confusing that many themes relate to each other. Group 4 suggested to indicate the relations between the themes to show the designer how they link to each other. Group 2 indicated that "*everything is interdependent, nothing works individually*", but they specifically noted the connection between 'Mobility' and 'Leisure Time'. Group 3 noted the connection between 'Family' and 'Accommodation'. Group 4 connected 'Animals', 'Income' and 'Space' to 'Safety and Security'. One evaluator indicated in the plenary discussion to relate and show the connections between the themes.
- The theme 'Nuclear Family' has a specific meaning in India. Group 3 discussed the themes 'Nuclear Family' and 'Kindred Family' and ended up discussing nuclear versus joint families, or in other words, living together with close relatives such as parents and children versus living with the whole family comprising e.g., parents, children, brothers, sisters, and their children. They indicate this to be a "traditional Indian divide, which is been going on for centuries".
- Group 3 indicated that all themes are relevant, but that especially 'Dreams and Plans' will reveal a lot of information about people's aspirations, which they consider to be relevant for designers.
- One evaluator of group 3 indicated that the themes "*generalize a lot of things*".
- Overarching topics:
  - Insurance (group 3)
  - Rules & regulations (group 2, 3 and 4) Group 2 advised to take into consideration rules and regulations, as people "*can't freely do anything*". Group 4 indicated that there is not only freedom, but that there are also rights, laws, rules and regulations.

Appendix F

Remarks per theme

- 'Health'. Group 1 indicates that the theme is too long and can be split in physical and mental health.
- 'Significant Relationships'. Group 2 indicated that the definition of the theme does not match its contents, as the theme does not only cover close friends, but also acceptance and appreciation in the wider community. They indicate that the word 'significant' is misleading and not properly explained.
- 'Leisure Time'. Group 2 indicated that the theme title is confusing, as the theme content is about time other than work time, but they pointed out that work time can also be leisure time and is not necessarily time that people are not free to do what they want to do.
- 'Products & Services'. Group 2 pointed out that this theme is very broad and requires more elaboration and direction.
- 'Dreams and Plans'. Group 3 wondered if this theme is about short-term or long-term 'Dreams and Plans'.
- 'Income'. According to group 4, the definition of 'Income' should be broader, not just about income or savings, but also about wealth or resources.

Topics / questions

General remarks

- Group 1, 3 and 4 had difficulty with the focus on people's feelings, experiences and freedom in the set of 'ideal questions'. They indicated feelings to be universal (group 1), confusing (group 3), broad and misleading (group 4). Group 4 furthermore indicated that it is also about the right towards certain opportunities.
- Group 1 and 3 indicate that some of the questions might be sensitive and that it will be difficult to obtain honest answers. Group 1 noted: "*How will people react to such questions? They will not want to show weakness, so how to get honest answers?*" and group 3: "*Because I know for us when we go into the field there are some topics that you don't bring up, because, religion being one of them. Because it leads to uncomfortable... situations.*" Another evaluator of group 3 indicated poaching to be sensitive.
- Group 3 indicated that from the answers obtained, designers "*need to decide these answers to the questions are relevant..*". The answers people give need to be judged on relevance and truth.

Remarks per theme

- 'Health'. Group 1 indicate that most questions are about negative things and that bless and happiness are missing. They furthermore noted that sensitivities and emotions are attached to this theme, mainly towards reproduction.
- 'Healthcare'. Group 1 indicated that there are different segments of healthcare: formal and informal, qualified and unqualified. They argued that this theme should also be about trust and familiarity (what do people feel more comfortable to go to?) and about financial and social

restrictions, habits and fears. They furthermore indicated that in India subsidies are provided which might influence people's behaviour.

- 'Nutrition'. Group 1 indicated that food is not the only parameter, that nutritious value and variety also play a role, and that for drinks the quality of the drinks is an important parameter. They furthermore pointed out that food habits are also culturally and weather dependent and that food intake depends on the kind of work people do.

- 'Speaking Up'. Group 1 pointed out that 'Speaking Up' is always to other people, that hierarchy plays a role, that there are different levels to speak up from village level to national level and that caste and class differences play a role. They indicated that attention should be paid to the content of what people speak up about: general things or more personal things and how comfortably they do so.

- 'Politics'. Group 1 noted several influences that play a role in 'Politics', which are: being free to vote for who you want without pressure from family, community or caste, bribing, fear and incentives from political parties. They further indicate the theme to be too narrow, that small scale activities, social activities and policies should also be included.

- 'Mobility'. Group 2 indicated that 'Mobility' is a very broad term which might include physical mobility, information mobility, transportation mobility, work mobility, migration, income and income mobility. They furthermore noted that 'Mobility' is also about 'Safety & Security', sustainability, timing, choice, rules and regulations. In the plenary session they add that phones, the internet, gadgets and technology change 'Mobility'.

- 'Significant Relationships'. According to group 2, there are different types of significant relationships: social with family and within the community, professional with colleagues and inter country, via for example virtual connections via the internet. They pointed out that the nature of these different relations might differ and result in different behaviour, for example competition or cooperation. They furthermore indicated that the theme is not solely individual, as people's behaviour might change based on relationships, appreciation and acceptance. During the plenary discussion they furthermore indicated to consider the emotional bond that people have and how much they value and invest in different relationships.

- 'Leisure Time'. Group 2 connects 'Leisure Time' to people's mental and physical ability to do certain things. They indicated that the theme should be about quantity and quality of not-work time and what people desire to do, but that the term 'Leisure Time' is misleading as a counterbalance for 'Work', indicating that 'Work' is an obligation and bound by certain restrictions. In the plenary session group 2 added that for design purposes restrictions should not be emphasised.

- 'Products & Services'. Group 2 indicated that this theme is very broad and should not only be about the things owned, but also about the feelings and sentiment towards the things owned, about what people do with the things they own and about aspirations. In the plenary session they add that the theme "*needs to be worked out little more*", as it talks about ownership and attachment to products and services, but it should be made more clear and explain that it is about what kind of products people have.

- 'Spirituality'. According to group 2 the focus is too much on religion and they argued that spirituality covers more than religion. They indicated the following topics to be relevant: supreme power, being in peace, not thinking bad, having good intentions, good mental health, inner peace, happiness, not harming anyone / not doing wrong, doing something that gives calmness and peace. They furthermore stated that spirituality is part of the individual and of society. Suggestions for questions given are: *"What is spirituality to you? So, what does it mean to you?" , "How does it influence your things? "If you are spiritual, what do you do?", "What does a spiritual idea mean to you?"* and *"How do you get inner peace?".* In the plenary discussion they add that practicing religion is not the only way of experiencing spirituality, but that people have different ways to experience it; some people search for tranquillity, others do extreme things.
- 'Nuclear Family' and 'Kindred Family'. Group 3 pointed out that the feeling of being able to leave your partner is confusing and suggested to rephrase that question to: "Feeling of independence" and "Having your own individuality and choices". They indicated several important topics which should be part of the theme, which are: family pressure, hierarchy, transition, support, relationships and dynamics, sacrifices made for family, value systems, tradition, sharing and financial and resource management within the family. They furthermore argue to include celebrations and functionings. Group 3 indicated in the plenary discussion that they misunderstood what was meant by 'Kindred Family' and suggested to restructure the theme 'Family'.
- 'Accommodation'. Group 3 noted that the 'ideal questions' are confusing, especially the question about freedom to move to another house. Important topics to include, according to group 3, are the envy and guest factor both relating to status, preference, privacy, surroundings and space, affordability of the house, emotional attachment to the house and decorations inside the house. They further indicated that 'Accommodation' relates to standard of living and that 'ownership' is misleading, as a rented house can also be a person's 'own' space. In the plenary discussion group 3 indicated that neighbourhood should be included in 'Accommodation'.
- 'Dreams and Plans'. Group 3 indicated that 'Dreams and Plans' are influenced by other people's opinions and expectations, by people's value system, barriers (e.g. financial), by people's confidence and by media. They also pointed out that this theme is related to 'Education'.
- 'Animals'. Group 3 indicated the various reasons for keeping animals: as pets or for income generation, protection or a source of food. People might have different perceptions of animals based on culture and beliefs. They advised to include animal accommodation, emotional attachment to animals, reason for keeping animals, hunting and rules and regulations regarding animals.
- 'Income'. Group 4 indicated it to be important to obtain information about people's ability to access and spend income, about origin of money (from work, from ancestors), financial security and government policies and taxes.
- 'Meaningful Work'. Group 4 indicated the theme to cover everything, but that autonomy / decision making, learning things / empowerment and exploitation are also aspects of 'Work' and that a person can also inspire other people.

- 'Safety and Security'. Group 4 pointed out that 'Safety and Security' comprises a lot of things, as it can be physical (from others or from nature), cyber, financial, emotional / psychological (fear, comfort). They also indicated that "*this feeling of safety [..] is always in relation to something, it is not just being*" and that it is also not restricted to the living area, but to any place people go. Aspects that can be added, according to group 4, are: being worried or tensed about unknown factors that might happen, knowing that someone is there for you, and insecurity about consequences of actions. In the plenary discussion group 4 indicated that virtual safety and security is also relevant to consider.

- 'Nature'. Group 4 argued that 'Nature' is not about ownership, but about access and feeling with / attachment to nature and that nature can also be something that people want to avoid, especially in relation to 'Safety and Security'. They advised to include rules and regulations, consciousness about nature, exploitation, access and attachment to nature, happiness and relaxing. The group distinguished between 'private space' such as gardens and shared nature / environment.

- 'Land'. Group 4 suggested the following aspects to be included in this theme: usage and benefit from land usage, size, price, availability and usability of land, rules & regulations, rights and access, unauthorized land use, abuse of power, aspirations, privacy, security and safety. They indicated that 'Land' can be broadened to 'Space' and that it is a place for housing, but also for other purposes, such as water.

- 'Education and Information'. Group 4 indicated that education is a service and can be formal, informal or practical. They discussed the sufficiency of knowledge, access to and availability of education and required education according to people themselves. They noted that not only education, but also skills are part of the ability to gain knowledge. They furthermore indicated that incorrect information, medium of information, way of accessing information, sufficiency and adequateness of information are all important aspects of information, just as the ability to critique or question knowledge without worrying about the consequences. They furthermore indicated that independence, decision making, empowerment, safety, mental ability and financial resources are linked to this theme.

<u>Techniques & Tools</u>

According to one evaluator, visual elements or something interactive can help to bring out more feelings and thoughts of participants.

Timeline

Group 1 indicated that the timeline is understandable, but that it can be clearer and simpler. Currently there is too much in a small picture. The group indicated that the timeline is useful to understand daily routine, motivations, difficulties in daily life, lifestyle, behaviour and mindset.

Visualizations general

- Group 4 indicated that the pictographs "*will have to be very contextual*" as they "*might mean something completely different in terms of the image that you give them and [..] what it means to people.*"

- An evaluator of group 2 indicated in the plenary session that designers should be able to design their own set of pictographs for the context they work in, as: "*the visual exposure for the people in rural India supposes is entirely different from what is there in other places throughout the world and even in urban India [...]. So maybe, we have to work on some similar, eh, you know general base, plus we have to contextualize to the specific environment, because it changes a lot with people*" Three other evaluators agreed to that. One of them argued "*the perceptions they have out of it is entirely different*" In total six evaluators argued for contextualizing the pictographs, the others did not agree neither disagree.

- Four evaluators agreed in the plenary session that it might be useful to make "*a pack of possible pictographs*" which the designer can choose from, possibly together with a local partner. The others did not agree neither disagree.

Pictograph remarks per theme

- 'Health'. Group 1 had difficulty to identify themselves with the pictograph and suggest to use a body silhouette.

- 'Healthcare'. Group 1 noted that only a 'plus' would be sufficient for this pictograph and that red is an appropriate colour for this theme as "*it signifies the importance of medical attention*".

- 'Nutrition'. Group 1 pointed out that an apple is a delicacy and is not known to everyone. They argue for the pictograph to be something more universal and recognizable, such as utensils or wheat.

- 'Speaking Up'. Group 1 indicated that the pictographs communicates negative feelings as it looks like shouting. As 'Speaking Up' is always towards other people, there should be at least two people in the pictograph.

- 'Mobility'. Group 2 indicated that the pictograph shows physical movement and that it fits the theme, as it shows in a simple way what the theme is about: "*So, the basic movement of humans basically depicts the mobility. So, this is the simplest way, we could put transport, we could put buses, airplanes or whatever we can put [..] at the end of the day it is you that is moving. You are the element which has to move.*"

- 'Significant Relationships'. According to group 2, the pictograph does not represent connections, acceptance, appreciation or friendliness. They indicated the pictograph to be too simple and standard and suggested to include connection by for example holding hands and to place emphasis on one person who is connected to others. In the plenary session they furthermore indicated that the pictograph "*was little off, because it shows a linear connection between different people you know*", while connections are dynamic and people value different connections differently.

- 'Leisure Time'. Group 2 indicated that the pictograph is recognizable and therefore ok.

- 'Products & Services'. Group 2 pointed out that the pictograph is not clear and that the 'services' part is lacking.

- 'Spirituality'. According to group 2 the pictograph is ok.

- 'Nuclear Family'. Group 3 found the pictograph not representing a family .

- 'Kindred Family'. Group 3 indicated the pictograph to be unclear.
- 'Accommodation'. Group 3 had no suggestions for changes to the pictograph.
- 'Dreams and Plans'. Group 3 suggested to visualize a person lying on a bed, indicating that this person is dreaming. They discussed the difference between a 'text balloon' and a 'dream balloon' and if this difference is clear to everyone in the world.
- 'Income'. Some find the pictograph ok, others do not relate to it as money. One evaluator thought the pictograph represented a building or a cell phone.
- 'Meaningful Work'. According to group 4 the pictograph does not cover the theme, as it "looks like man at work'. Women are lacking, and the "*meaningful aspect*" is lacking.
- 'Safety and Security'. According to group 4 the pictograph is too much focused on resisting something and not on feeling comfortable and safe. They suggested to draw a circle around a family.
- 'Land'. Group 4 did not understand the pictograph.
- 'Education and Information'. Group 4 argued that knowledge and skills do not only come from books and suggest to add a computer or a screen.

Results session Delft

Below the results of the data analysis of the workshops held with 29 experts at the Design for Well-being, Agency and Justice' event Delft University of Technology in Delft, the Netherlands is summarized.

<u>General remarks</u>

- Group 5 confused 'capabilities' with capacities.
- Group 6 indicated not to see the relation between 'capabilities' and the 'themes': "*for me this is a bunch of theme you can discuss to understand people's lives, context and needs. The connection with the capability approach, I know it is there, but it is not obvious to me.*"
- Group 7 indicated to use other methods as well to obtain a full picture, as words do not cover everything. Different groups indicated other methods that would be useful:
  o Surveys for larger scale, quantitative insights (group 6)
  o Playing games with cards (group 6)
  o Group discussions (group 7, 8). Group 8: "*with the group discussion we can understand more, what they really meant about what they drew.*"
  o Observation (group 5). Group 5 stressed the importance to "*first spend a few days in the place to get to know how people live*".
- Group 6 indicated that similar methods exist:
  o IDEO toolkit, although "*the IDEO kit is, I think, based on India. Because you don't recognize someone from Africa for instance*" (group 6)
  o Contextmapping and contextual design (group 6)
- Group 7 wondered how to take out and use the obtained data for design purposes.

Appendix F

- Group 7 pointed out that potential users should continuously be involved and designers should not "*take it home and then take the decisions*". Group 5 also indicated to keep potential users involved in order to check opinions about potential product consequences and check people's perceptions about the product during development.
- Group 7 wondered how the questions have been established.
- Group 7 indicated that the focus should also be on other things than the user, for example business interest.
- Group 8 indicated that people's lives will change in time and space.
- Group 6 indicated that the ODKs usage will depend on the setting in which it is used and on the designer who is using it.

Relevance

- Group 7 indicated to like the ODK and are willing to use it.
- Group 7 pointed out that the ODK cannot point out opportunities for radical behaviour change.
- Several different target groups for applying the ODK to had been indicated:
  - Church groups (group 5)
  - elderly (group 5)
  - Stakeholder comparison (group 5)
  - Children (group 8)
  - Illiterate people (group 8)
  - students (group 7)
  - disabled people (group 7)
  - neighbourhoods (group 7)
- Several users of the ODK to had been indicated:
  - Students (group 7)
  - Social worker/ psychologist (group 8)
  - Insurance companies (group 7)
  - Public space use (group 7)
- Several purposes for using the ODK have been indicated:
  - Communication (group 6)
  - Bring about needs / values (Group 5, 6, 7, 8)
  - Analysing and changing habits (group 7)
  - Bring about new ideas (group 5)
  - Bring about opinion topics (group 8)
  - Bring about experiences (group 5, 8)
  - Bring about problems/opportunities (group 5, 6)
- Several target areas for ODK application have been indicated:
  - Use of public space (group 8)
  - Cross-cultural settings (group 8)
- Several design process phases in which the ODK would be useful have been indicated:

- o Preparation phase, to detect project goals, and to set priorities and hierarchy (group 6)
- o Evaluation / impact prediction (group 6, 7, 8)

Effectiveness

- In group 6 there was a discussion about making a categorization beforehand and not imposing a specific way of categorizing. There was no consensus reached, more an indication to think about the risks of pre-categorizing themes: that "*you will never get categories that work*" in every context.
- Group 7 wondered to what extent the more structural things, conversion factors, processes and trends will be identified by usage of the ODK.
- Group 7 wondered if the 21 themes do not make the discussion too broad and open and if all themes have to be discussed: "*I imagine that you don't have to do all the twenty-one issues. I think you have some issues that become more important than others, depending on the type of design solution that you want to*"

Efficiency / Designer-friendliness

- Group 7 indicated that discussion all themes takes a lot of time: "But*, eh, but, because you mentioned it already, got 21 cards? At the moment? Imagine you have five minutes for each, you are already talking for one and a half hour, up to two hours. How do you manage that*?"

- Group 6 indicated that it is important to enable quick replication in the country itself, in case the kit gets lost or damaged.
- Group 6 discussed the usage of the ODK in the field by designers. They agreed that the "*rules of the game*" should not be pre-defined, but flexible, so that the usage is adjustable to the setting and the researcher.
- Group 6 indicated that designers "*should also think for themselves, not just grab something and use it*"
- Group 5 suggested to "*Pick out the most meaningful card for your project (like health), as a guide, and use the rest of the cards to achieve that.*"

Manual

- Group 6 discussed what the ODK actually is, a toolkit, a tool, a design game, an interview guide, or an interview tool. They are confused what to call it. They furthermore suggest that designers should be triggered to use it and that therefore it should be clearly expressed in which ways the ODK can be used.
- Group 7 had multiple questions about the exact usage of the ODK, which are the following:
  - o "Who draws the cards, is that the locals?"
  - o "Who choose the card? The, or you present the card?" "But why did the interviewer choose the card?" , "Just one by one, this is just a sequence, this is just a tick-box, it is just to go through all this"
  - o "And is it an individual interview, or is it in a group?"

o   "The answers you make notes and?"

o   "Let me just understand the process. So, first is the, each, going through the cards, asking the questions, and then there is a daily, how.. [..] Ah, so you can link the timeline with those cards....[..] And then you build a little picture with the cards around it […] And then, eh, you prioritize"

o   "And eh, so importance. Importance in things that you need or things that you value? […] Also because it's a different thing right. You might value a lot, but you think it is not right, it is not priority."

- Group 7 wondered how to bring the product into the ODK interview.

Steps

- *Step 3: Localize the content, if time permits.* Different people use different vocabulary (group 5, 6 and 8). "In Spanish there are two words referring to community, this led to misunderstanding of intentions. People of the community eventually helped in how to phrase things to get the understanding right" (Group 5). Group 7 indicated to be open to local input towards the themes and topics, as important cultural impacts might otherwise be missed.

- *Step 13: Sit down and…build dialogue.* Group 5 indicated to start not with the design problem, but to start from dreams, activities, limits and barriers in people's lives. Group 8 pointed out that some participants might be shy to share things and should be triggered to open up. One evaluator indicated that he made a storyboard and that he started to discuss the storyboard with participants and noticed that "people like to speak up and make comments on what they don't like".

- *Step 16: Analyse, interpret and reflect.* Group 5 indicated that people respond differently if questions are phrased differently, or when it is a different time of the day or week.

Guidelines

- *Guideline A: Appropriate behaviour and attitude.* Be honest. About intentions and the product's possibilities (group 5). Group 7 wondered "How much do you tell [participants] about what you are actually looking into?" Group 6 indicated it to be relevant "*to discuss about the relation between the field workers, like the designers or the researchers, and the local people [..] how can we maybe, eh, facilitate them to start to talk about their life and see us maybe more as insiders and not as outsiders".*

- *Guideline F: Select a variety of participants with different characteristics for a broad range of insights.* Group 5 indicated that input should come from a "different actors at different levels". Group 7 also pointed to identifying needs at different levels. Group 5 wondered who the actual participants need to be.

- *Guideline H: Number of interviews.* Group 5 wondered how much interviews should be conducted.

- *Guideline M: Schedule more time than planned.* Group 5 indicated to expect the unexpected and group 8 also indicated that sometimes ideal situations are there, but that in the field things do not always go as desired or planned.

<u>Themes</u>

General remarks

- Group 5, 7 and 8 indicated that certain themes are interrelated. Group 5 indicated that 'Animals' and 'Spirituality' are related to 'Nature' and that 'Politics' influences multiple themes. Group 8 pointed out that 'language' also belongs to 'communication'. Group 7 pointed out that 'Nature' relates to 'Mobility', 'Leisure time', 'Meaningful Work' and 'Accommodation'

- Group 5 and 6 both indicated that not all themes are at the same level. Group 5 gave the example of 'Government' and 'Family' being at different levels that might conflict. One evaluator of group 6 indicated that in all cards "*there is something about ownership, freedom and influence*". Another evaluator agreed and indicated to see a mix of resources, capabilities, stakeholders and solutions.

- Be consistent in theme names and do not attach quality to them. "*There is an extra word: meaningful and significant. Then I think, why not everywhere, or leave it out […] Consistency is I think also important*" (group 7). Group 7 indicated that the words 'meaningful' and 'significant' attach a quality to the theme, which might result in leaving things out. Group 6 also wondered why 'significant' and 'meaningful' are used and indicated that these additions can be misinterpreted and lead to incomplete answering. Group 5 indicated that 'meaningful' is "kind of normative".

- All four Delft groups indicated missing topics which are overarching. These are the following:
  - Tradition, rituals, belief, culture (group 5, 7, 8)
  - Habits (group 7)
  - Values (group 7)
  - Emotional attachments (group 5)
  - Cultural attachments (group 5)
  - Cultural values (group 5)
  - Financial feasibility (group 5)
  - Behaviour (group 5)
  - Preferences (group 5)
  - Perception (group 5, 6)
  - Gender issues (group 6, 7)
  - Women rights and position (group 6)
  - Justice (group 6)
  - Connectivity (group 6), communication and interaction (group 8)
  - Misunderstanding and stigmatisation (group 8)
  - Time, perception of time (group 6, 8)
  - Ownership (group 6)
  - Freedom (group 6)

- o Influence (group 6)
- o Feelings about life (group 8)
- o Happiness (group 8)
- o Satisfaction (group 8)
- o Privacy (group 8)
- Several groups indicated themes missing:
  - o Access to water (group 6, 8)
  - o Energy, energy access (group 6, 8)

Remarks per theme

- 'Accommodation'. "*Accommodation I find a difficult word. I would say housing if I would discuss it*" (group 6)
- 'Education and Information'. Group 5 indicated that 'Education and Skills' is a better name for this theme. Group 8 indicated that Education and Information are connected, but different themes.
- 'Income'. Group 5 pointed out that it is important to obtain an indication about people's financial situation and possibilities and that their financial situation affects people's behaviour. Group 6 pointed out to maybe change the theme name to indicate that it is also about savings and spending.
- 'Politics'. Group 7 argued to broaden the topic of 'Politics' to 'Participation', including local up to national participation. Group 8 argued to broaden 'Politics' to 'Society and Participation'.
- 'Nuclear Family'. Group 7 pointed out that the term 'nuclear' can be misunderstood.
- 'Health' and 'Healthcare'. Group 6 suggested to make a distinction between physical and mental health. Group 5 wondered what the difference between 'Health' and 'Healthcare' is.
- 'Leisure Time'. Group 8 pointed out that 'leisure' is a misleading term. They suggested to use 'Hobby' or 'Spare Time'.
- 'Nutrition'. Group 6 indicated that 'nutrition' does not cover the theme content, as water, for example, is not nutritious.

Topics / questions

General remarks

- Group 7 indicates that not only the themes should be discussed and people's value, but that designers need to "*engage in a discussion on the reasons why [people] are living the way [they live]*". It is important to go beyond what people value and open up "*a discussion about different variables of well-being*".
- Group 7 pointed out that in a "*two hours interview you cannot get information about [..] delicate issues*".

Remarks per theme

- 'Introduction'. Group 8 argued to include participants' race and knowledge of languages.

- 'Health'. Group 8 pointed out that human mortality and vulnerability are also part of health, as well as 'body energy'.

- 'Speaking Up'. Group 8 indicated that 'Speaking Up' is relevant to consider within the themes 'Politics', 'Family' and 'Significant Relationships'.

- 'Politics'. Group 5 indicated that communal organizations should be considered more, group 7 indicated that migration policies, neighbourhood development and misbehaviour and forgery are not given attention and more focus should be on participation. Group 6 pointed out that government, transparency, corruption, good governance, justice, speaking up, position and power of people, and participation in local communities or politics should be included and group 8 indicated that having a voice is very relevant in this theme and that people's place in society is also relevant.

- 'Mobility'. Group 8 pointed out to include 'physical infrastructure' as this is part of the ability to move around.

- 'Significant Relationships'. Group 6 indicated that care for others is part of this theme. Group 6 and 8 indicated 'community' to be missing. Group 8 furthermore indicated that 'Speaking Up' is relevant for this theme and that misunderstanding, stigmatisation, informal relationships and weak ties should also part of this theme. Group 7 suggested to broaden the focus of this theme, to include not only community and friends, but also networks, living area and transnational relationships.

- 'Leisure Time'. Group 6 indicated that perception of time and what people do with time is relevant for this theme. Group 8 advised to extend leisure time with rituals, festivals and celebrations.

- 'Products & Services'. Group 5 indicated that it is important to identify which product characteristics people find important, and which cultural values are attached to them. They furthermore pointed out that product security might also be an issue. Group 6 and 8 pointed out that access to water and energy is lacking.

- 'Spirituality'. Group 8 indicated to include 'body energy'.

- 'Nuclear Family' and 'Kindred Family'. Group 6 indicated that romance and care for others should be part of 'Family' and group 8 noted that 'Speaking Up' is relevant for this theme.

- 'Dreams and Plans'. Group 8 suggested to put more emphasis on the person it concerns and to include goals in life, self-reflection, self-improvement, and how people perceive themselves, their body and appearance.

- 'Income'. Group 5 pointed out that willingness to pay for a certain product is important to identify, as well as people's financial possibilities. Group 6 indicated that behavioural aspects, such as savings and spending are important.

- 'Meaningful Work'. Group 6 indicated that perception of time and what people do with time is relevant for this theme.

- 'Nature'. Group 5 pointed out that environmental status, eco-system and climate can better be represented and that emotional attachment and culture is important regarding nature. Group 6 indicated that natural resources can be made more explicit.

- 'Education and Information'. Group 5 indicated that capability of conducting certain tasks are important to identify. Group 8 stressed to emphasize educational requirements and information distribution.

<u>Techniques & Tools</u>
- The groups indicated techniques that would be useful:
  - Roleplaying (group 6)
  - Using visuals (group 5, 6)
  - Mapping (group 5, 7)
  - Historical timeline (group 8)

Timeline
- Group 7 indicated that the opportunity detection will become clear in the timeline.

Mapping / drawing
- Group 6 pointed out that "*having a shared visual something that you can point at, that makes a lot of sense in interviewing*".
- Group 8 indicated that "*it has quite a lot of cons to have people draw*". But that "*most of people talk or write, because it is for somebody to draw, and if you right there say I am a designer, they feel so afraid to draw to you.*"
- Group 5, 6, and 7 indicated that children can assist in drawing, mapping, making visualizations

Visualizations general
- An evaluator of group 8 indicated that it depends on the purpose what kind of visualization should be used. The pictographs work well to "*represent a category*", but when participants need to use the visualizations in an exercise "*I wouldn't use pictographs*". Group 5 also indicated that pictographs are helpful for designers, to help them "think about what topics to address", but that new pictures should be made locally.
- Group 8 suggested to use images, but to ask for participants to complement the image with words.
- Group 6 indicates that visualizations are often interpreted literally.
- Other suggested options for visualizations are:
  - Photographs prepared beforehand (group 5 and 8)
  - Photographs made by local partners beforehand (group 5 and 8)
  - Photographs made by locals (group 5, 7, 8), which can also be children (group 7)
  - Combination of photographs with text (group 6)
  - Abstractions of / deconstructed photographs, 'weak' images (group 7, 8)
  - Local drawings prepared beforehand (group 7)
  - Drawings made by locals (group 6), which can also be children (group 6)
  - Drawings made during the interview by locals or the designer (group 5, 8)
  - Combination of drawings with text (group 8)

- o   Combination of drawings with discussion, for example via using a storyboard (group 8)
- o   Pictographs localized beforehand (group 8)
- o   Combination of pictograph with discussion about the pictograph (group 7)
- o   Typographic pictures: isotype (group 7)
- o   3-D visualizations such as models made from clay or other tools (group 6, 8)
- o   Group 5 indicated not to use only visualizations, but also to stimulate participants' other senses, such as smell and feel.

- Use pictographs. Group 7 pointed out that people have different perceptions of visualizations, but that that is not necessarily a bad thing, as discussion the visualizations "offers material for discussion". Group 5 also indicated that "multi-interpretability might be helpful, as long as it does not remain in people's heads, but they speak it out". Group 7 argued for using pictographs, as images and pictures can be full of interpretation, and that discussions about the pictograph and its representation are useful to obtain insight into people's perceptions. Group 8 indicated that contextualizing pictures with participants (who make pictures themselves) or without participants (when the designer draws the pictures) takes time, especially when drawing them is done during the interview. They furthermore noted that letting local people make photographs themselves requires for designers to stay at the same place for a longer time in order to develop pictures. Group 6 noted that it would be "*nice to have a kind of checklist*" in the ODK for making pictographs. Group 8 agreed that if visualizations are too specific, the participants are send "*a really strict message*" to the participants and in this way steer the participant to think in a specific direction.

- Localize visualizations. Group 5 suggested to bring in new pictures locally, so that the designers are more open to the input of the local people. They indicate that different cultures might not see the same thing or have the same meaning for everyone, and that certain objects can be unfamiliar to participants (e.g., not everyone sleeps in a bed or has a sofa). They acknowledge that contextualizing pictures this takes time, but that it leads to better results. They suggest to let children draw, or a local designer. Group 6 also mentioned that local children can make drawings of the themes "because then everybody will understand it". They indicated that "you can't find just one unified way to present it. In some cases it is good to have it in pen drawing, in some cases it should be pictures" and that therefore visualizations should be locally made, or even made by locals. Group 6 suggested to make a public database for people to post photos useful for different contexts and settings: "*If you want to make this a practical tool that will be used by many, many designers, you could create user-generated libraries*". Group 8 agreed that participants can often better relate to a realistic image than to a pictograph, as pictographs are too generic.

Pictograph remarks
- Group 5 wondered if the figures in the pictograph represent male or female persons.
- Group 6 indicated that the pictographs "*are very much pointed at western culture*".

- Group 6 suggested to develop four varieties for each theme with difference in gender, age and context. Another evaluator of group 6 indicated that it might be useful to have some sub-cards available if the main card does not work in order to trigger people to open up.
- Group 5 and 6 both indicated the influence of colour on people. Group 6 explained that colours might be perceived differently by different cultures and that values can be attached to them. One evaluator of group 6 advised to only include colour when it has meaning and in the case of the ODK the colours do not have specific meaning, so they should be removed. The other group members agreed. They also advised to use two colours for all pictographs.
- Group 6 suggested to use a graphic designer to make the pictographs look more professional "*unless you want to convey that you are creative and sketchy*"

Pictograph remarks per theme
- 'Health'. Group 7 indicated that the pictograph looks more like 'Spirituality'.
- 'Healthcare'. Group 5 indicated that the pictograph "looks more like emergency"
- 'Nutrition'. Group 5 indicated that the apple is too clean and nice to resemble a 'real' apple.
- 'Speaking Up'. Group 6 noted that it looks like the figure is coughing or angry.
- 'Leisure Time'. Group 5 indicated that the theme represents only males, as the figures do not wear skirts.
- 'Nuclear Family'. Group 5 indicated that the pictograph suggests two children to be the standard.
- 'Accommodation'. Group 5 indicated that the house is too smooth to resemble a 'real' house.
- 'Meaningful Work'. Group 6 indicated that the colour and pictograph direct to certain assumptions about work and refers more to men than to women.
- 'Nature'. Group 5 found 'nature' too kindly represented and suggested to include dangerous nature as well, such as wildlife.

Sorting
- Group 7 suggested to use the mapping exercise to indicate the priorities of the different themes as well.
- Group 7 suggested to prioritize based on what people value and on what people need, as those are two different things.
- Group 5 "very much appreciated" the sorting exercise and indicated that it could also be used with different stakeholders. Group 7 also indicated it to be important to detect "what people give priority to"
- Group 5 indicated that for prioritization post-its can also be used.

APPENDIX G

G. Capability Driven Design Manual

Below the manual of the Capability Driven Design approach is provided.

Capability Driven Design
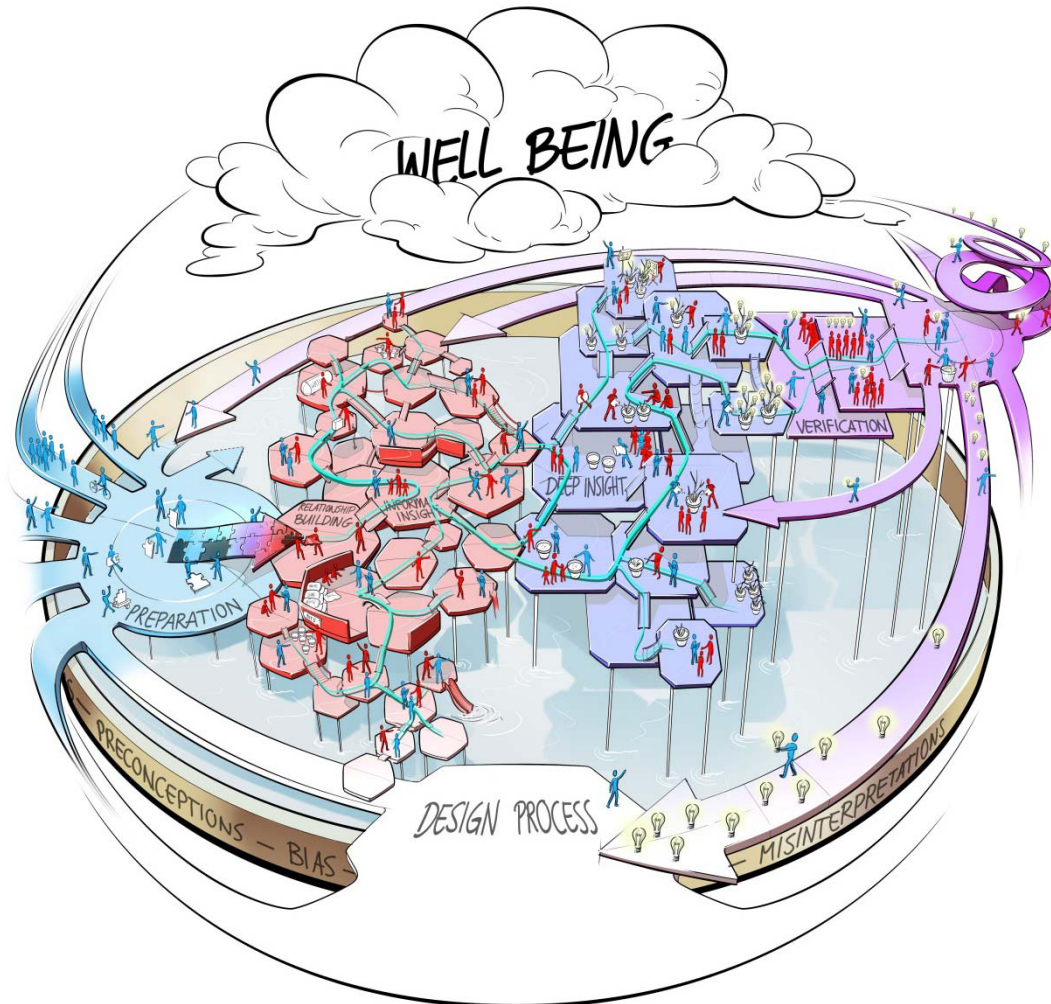
Comprehensive user insight in Design for Development projects

The Capability Driven Design (CDD) approach is created to help design teams to efficiently, rigorously and comprehensively explore the user context in Design for Development (DfD) projects. This information supports the design team in making decisions throughout the design process and provides inspiration to develop products and / or services that are better accepted by potential users as they support them in the things they want to be and do.

The Capability Driven Design Approach provides conversation topics and questions to help in getting to learn a lot about potential users and their context in a limited amount of time. It includes a step-by-step approach, several methods, techniques and tools in order to rigorously obtain comprehensive insight. Tips & tricks for conducting fieldwork are also provided.

This manual explains about Capability Driven Design and provides a thinking framework, prerequisites, guidelines, methods, a step-by-step procedure, techniques, tools, tips and tricks.

Contents

1. Introduction: Why Capability Driven Design?

Products and services partly shape and change our world, and designers can, in this way, use design to improve human well-being and address basic needs. The field of Design for Development (DfD) specifically aims at developing products and services to improve the well-being of "*disadvantaged or marginalized populations*" (Donaldson 2002). These products and services can expand the opportunities that people have to do what they want to do and to be who they want to be. Several universities, organisations, and companies and consultancies are active in the domain of DfD and several of them have developed processes, methods, techniques and tools to better address the needs of the disadvantaged and marginalised. While product designers evidently pay significant attention towards investigating the user context and integrating the users' perspective and experiences in the design process, their view is often limited to the interaction between the user and the to be designed product. Sklar and Madsen (2010) stress that to be able to truly address the needs of potential users, designers should see the world from their point of view, and should understand their motivations and aspirations. A comprehensive view of the user's world might reveal relevant aspects that, in the eyes of the designer, are not directly linked to the design assignment. For instance, the introduction of mobile phones, developed for personal use, caused privacy problems in developing regions, as family members often share a single phone (Rangaswamy and Singh 2009). Or the development of small, affordable ultrasound devices, which make healthcare more accessible in rural areas, also resulted in increased gender selection (Darnton 2010). Another example is the rejection of backscatter technology, which enables full-body scans at airports to improve safety, because of privacy problems and health concerns (Ahlers 2013) (see figures 1 to 3).

Figure 88: Mobile phone usage in India (Photo by Banerjee, AP 2014)
Figure 89: A portable ultrasound device in use (Photo by CNN 2013)
Figure 90: Backscatter full *body* scan (Photo by Scott Olson, Getty Images, 2013)

Involving users and entering into a dialogue with potential users from the start of the product design process onwards is vital to be able to address their true needs and wants and improve their well-being. Understanding potential users improves the applicability, acceptance and adoption of the designed product or service (Nakata and Weidner 2012; Parmar 2009; Wilkinson and De Angeli 2014; Robertson and Simonsen 2012; Donaldson 2009; Prahalad 2012). This understanding should go beyond the product-user interaction: a comprehensive understanding of users' lives, lifestyle, behaviour, values, habits, needs, desires and aspirations is required. By getting to know people

comprehensively, aspects can be detected that are not obviously linked to the design assignment, but turn out to be relevant. By direct engagement, less distortion and filtering of information takes place and information can be gained about attitudes and values of which the potential users are not consciously aware. Not for every design project the relevance and level of direct engagement and participation is the same, but especially in DfD projects it is important, as the lives of most product designers differ substantially from those of the marginalised and disadvantaged. The understanding will not only result in products that better fit users' needs and wants, but also results in design requirements, less frustration during decision-making, and reduces the number of design iterations.

In design projects, time and other resources are often limited. Therefore, the comprehensive insight must be obtained in a limited time. To support designers in doing so, the Capability Driven Design approach has been developed. Capability Driven Design is a designer-friendly approach to efficiently guide product designers to comprehensively explore the lives of potential users in Design for Development projects. For this systemic approach analytic guidance is derived from Sen's 'Capability Approach' (CA), and practical guidance is derived from the domains of human-centred design and rapid ethnography. The resulting approach saves preparation and execution time during fieldwork and ensures comprehensive and rigorous data collection. While existing rapid ethnographic and design manuals provide methods, techniques, tools, guidelines, tips and tricks for effectively obtaining user insights, they do not specify which topics can or should be addressed when obtaining comprehensive user insight. They leave it up to the designer to think about the type of information and the insights to be collected for each project. Moreover, ethnographic approaches are not specifically tailored to the needs of designers who are often not trained to conduct ethnographic research, and the design manuals and toolkits provide a method database, but no procedure to follow. According to Margolin (1997, p. 234), there is no "*systematic way of developing a social needs inventory to stimulate the invention of beneficial new products*". Designers in the field, trying to understand their potential users, need analytic guidance for conducting rigorous fieldwork (Button 2000) and therefore require "*efficient tools and frameworks for conducting, analyzing, and presenting user research*" (Boztepe 2007, p. 517).

Therefore, the CDD approach offers efficient frameworks, methods, tools, and systematic analytic guidance for conducting comprehensive user context research in order to help designers to obtain comprehensive user insights. These insights can be used to inspire designers to develop in a participatory manner products and services that anticipate most unintended consequences, truly contribute to people's valued beings and doings, and improve their well-being. The focus is therefore on the first phase of the design process. Figure 4 visualises the research scope and focus within the design process.
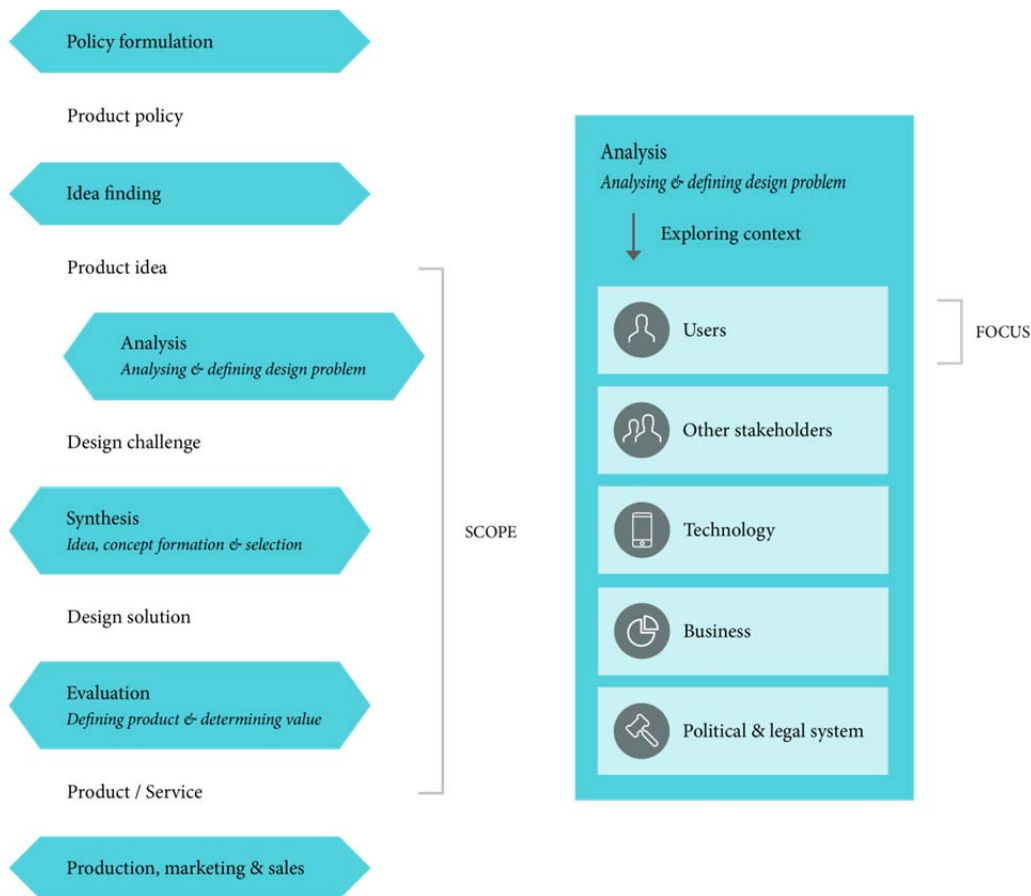
Figure 91: Design process with scope of CDD (left) and the focus of the CDD approach (right)

Outcomes

The CDD approach results in comprehensive insight in a specific group of users and their context. This insight can be used to develop products and / or services that are applicable for those users, and accepted and adopted by those users, and at the same time improve their well-being by enabling the users to do what they want to do and be who they want to be.

The outcomes of the CDD approach are only generalizable for the investigated context. Moreover, the insights obtained comprise past and current experiences, but not future experiences. It is, however, not the goal of the CDD approach to obtain statistically generalizable or future insights, the insights obtained are meant to get a feel for the lives of the potential users to better address their needs and wants now and in the future, and to take their lives, lifestyle, behaviour, norms, values, habits, desires and aspirations into consideration when developing the product and / or service, resulting in better accessibility, applicability, acceptance and adoption of the design outcome. The obtained insights are many and processing them takes time. The CDD approach propagates iterative data analysis, after each conducted activity. Being part of the CDD approach, the outcomes should be checked after being analysed and interpreted. Time needs to be planned for this analysis and checking, and also for implementing the outcomes in their projects. Immediately noting down surprising and unexpected insights and identifying patterns can link the outcomes to the design process.

2.   The Capability Driven Design Approach: Contents and Procedure

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 this manual. The full approach is presented in figure 5 below.
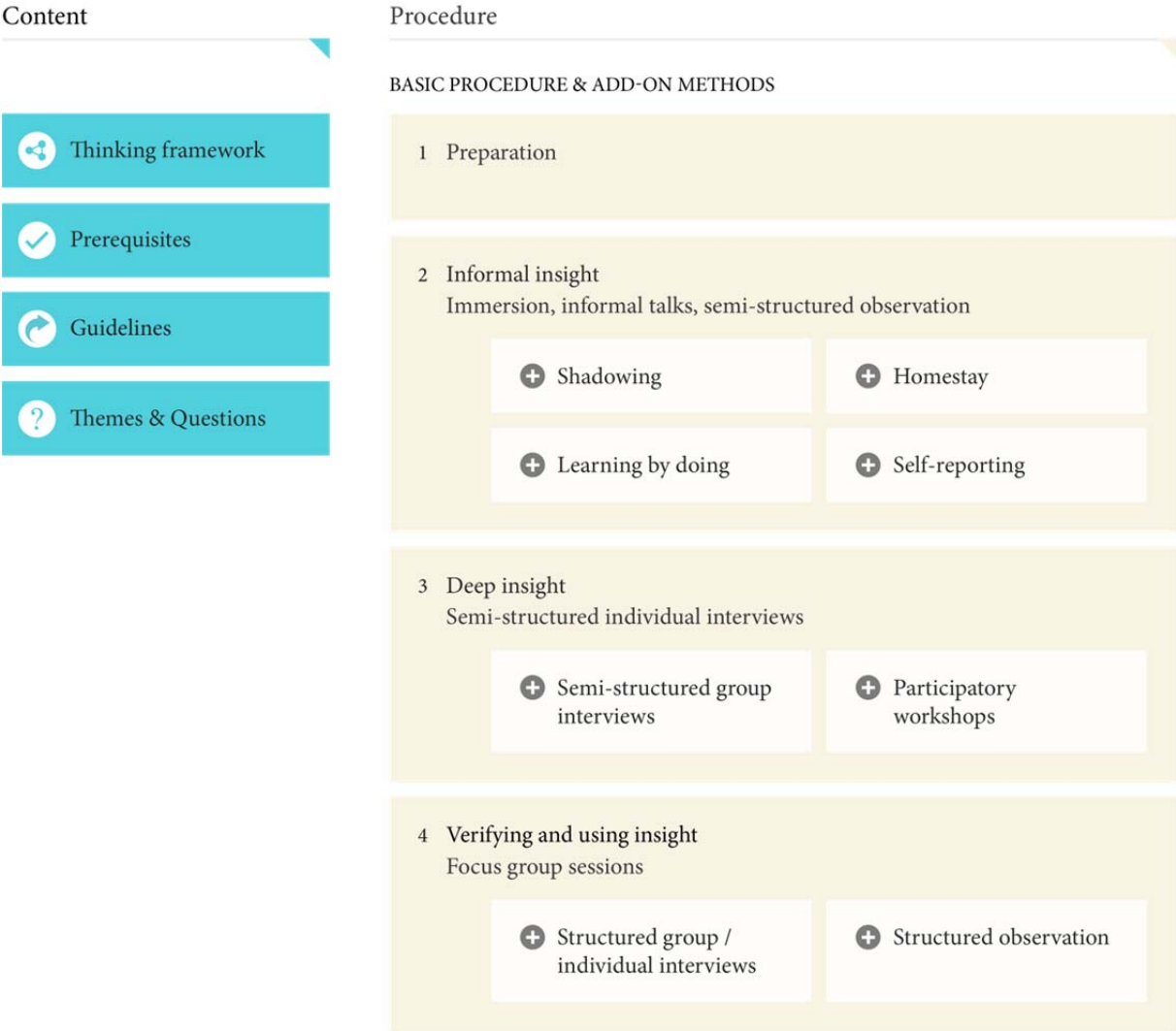
Figure 92: The Capability Driven Design approach and its two components: content (theoretical) and procedure (practical)

3.   The Contents of the Capability Driven Design approach

The CDD approach content consists of a thinking framework, prerequisites, guidelines, and a set of conversation topics (themes) and questions. All of these are explained below.

3.1   Thinking framework

The thinking framework is based on the capability approach and the design process, and is visualised and explained below. The thinking framework is a process consisting of five steps, which are numbered in figure 6 and explained below:

1. By identifying potential users' opportunity space designers can obtain comprehensive user insight. The opportunity space consists of:

    - Capabilities. These are the valuable 'beings and doings' that a person can achieve. Within the capability approach, the definition of capability differs from its use in everyday language. Gasper (2007b) explains that within the Capability Approach (CA) capabilities refer to attainable outcomes and are consequently hypothetical, while in daily language, capability is mainly used in the sense of inborn or trained potentials (skills, abilities and aptitudes). The focus in the CA is on these opportunities that enable people to do what they want to do and to be who they want to be (Robeyns 2005).

    - Functionings. When a person achieves a certain capability set, the capability set is turned into a set of functionings (Sen 1999).

    - Resources. Kleine, Light, and Montero (2012) describe eleven resources which comprise an asset portfolio that can be converted into capabilities. These can be viewed in table XX below.

    - Conversion factors. Conversion factors say something about the circumstances in which a person lives and are defined as "the degree in which a person can transform a resource into a functioning" (Robeyns 2011, p. 13). Kleine, Light, and Montero (2012) describe conversion factors as the 'opportunity structure' of a person. Robeyns (2011) divides conversion factors into three sources, which are described below.

    - Choice making behaviour. Kleine (2011) developed the 'Choice Framework' as an attempt to operationalise the CA. In this framework she describes four dimensions of choice: the existence, the sense, the use, and the achievement of choice. If different capabilities exist and people sense their availability, a person can make a choice which results in a specific outcome.

    - Preferences. Things that people like or want, more than another thing (Merriam-Webster dictionary).

    - Needs and wants. The things that people need and desire. Often used by product designers to indicate the information that needs to be obtained from the potential users.

2. The insights inform the design process, aiding in defining the problem and developing design requirements.

3. The insights are considered throughout the product development process, enabling designers to make deliberate design decisions, keeping the potential users involved.

4. To enhance people's real opportunities, product designers can develop products and services that provide users with choices they value.
5. When the choice is made to use the product and/or service, it impacts the life of its user. The new opportunity space can be evaluated and again used to inform a new design process.
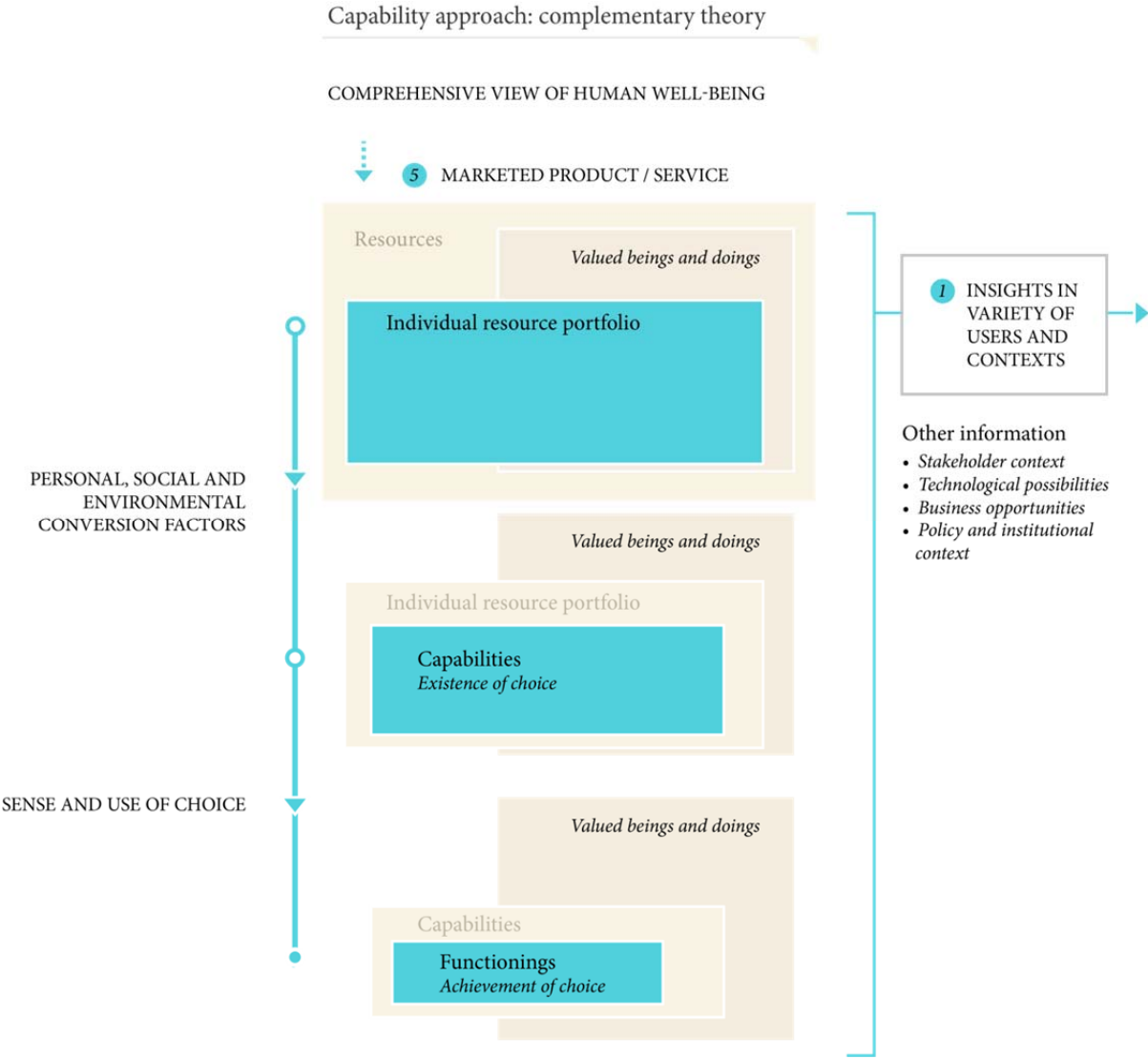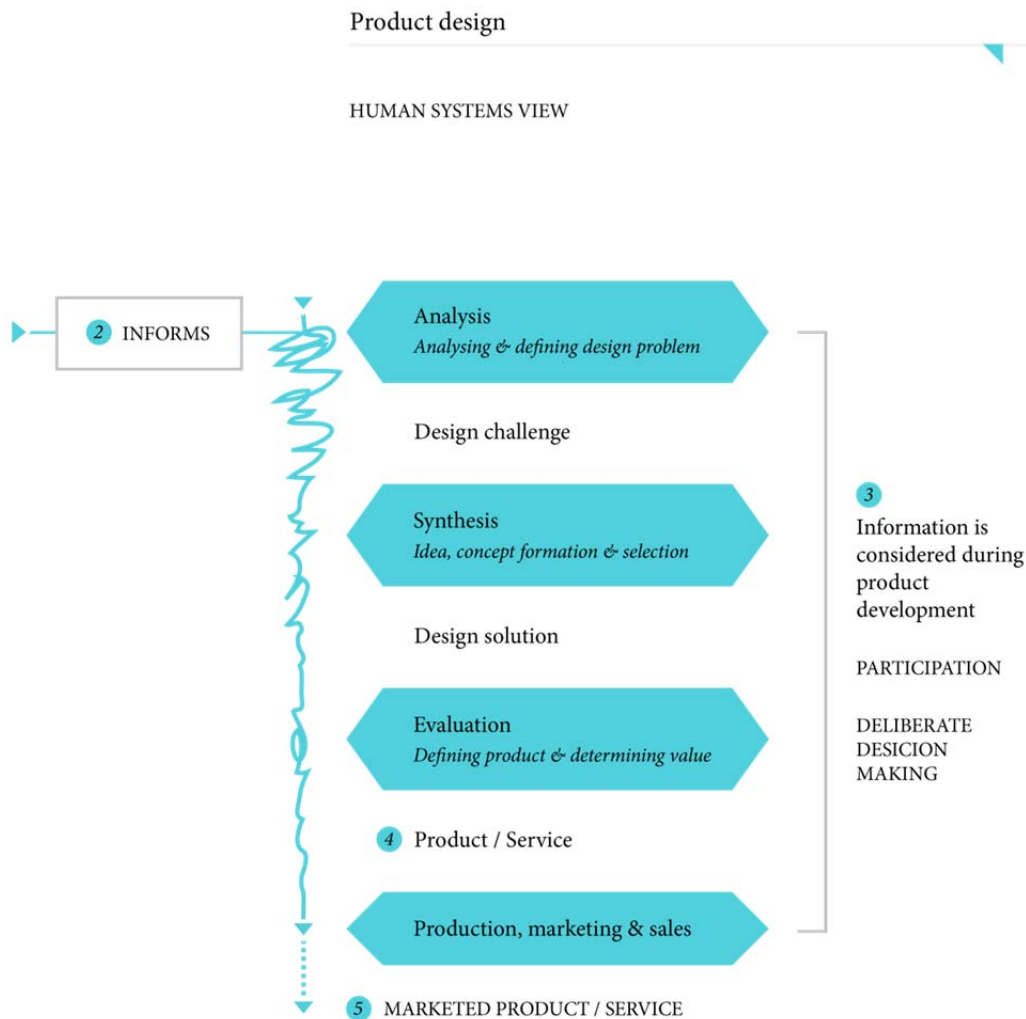
Figure 93: Capability approach based thinking framework

Process of capability enhancement

The left side of figure 6 illustrates the process of capability enhancement: of a set of <u>resources</u> (see table below), an individual has an <u>individual resource portfolio</u>. When the <u>personal, social and environmental conversion factors</u> (described below) allow resources to become real opportunities, <u>capabilities</u> arise. Some of these capabilities coincide with an individual's preferences and needs, others do not. When a person has a <u>sense of this existing choice</u>, this person can <u>use this choice</u> and transform the opportunity into a <u>functioning</u>.

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List of resources adapted from Kleine, Light, and Montero (2012, p. 47 and 56)

Resource	Description
Internal	
Health	Physical and mental health of a person.
Educational resources	Education and skills acquired through formal and informal means.
Psychological resources	May include capability to envision, self-confidence, tenacity, optimism, creativity and resilience. Spirituality or religious beliefs can strengthen or weaken them.
External	
Material resources	The material objects owned. They are also essential inputs in the production process.
Financial resources	Financial capital in all its forms (such as cash, savings, shares).
Cultural resources	The habitus a particular person lives in, objects (such as paintings, instruments and monuments which only the initiated can use or appreciate) and prestige attached to things (for example to academic titles or leadership roles).
Social resources	Network of relationships of mutual acquaintance and recognition, or in other words membership of a group (can be defined by kinship, friendship, shared ethnicity or class, or informal commonality ties).
Natural resources	Geomorphologic and climatic conditions and related aspects (such as soil quality, naturally available resources, access to water, the attractiveness of the surrounding nature).
Geographical resources	The practical implications of location and relative distances (also includes the intangible qualities of a location).
Information	Access to information and the process of filtering and transforming information into meaningful knowledge.
Self-governed time	The available time a person has.

Conversion factors

Conversion factors influence the transformation of a resource into a capability and comprise:

- *Personal conversion factors*: Factors internal to a person, such as metabolism, physical condition, gender, reading skills, or intelligence.
- *Social conversion factors*: Factors from the society in which one lives, such as public policies, social norms, practices that unfairly discriminate, societal hierarchies, or power relations related to class, gender, race, or caste.
- *Environmental conversion factors*: Factors that emerge from the physical or built environment in which a person lives. Aspects regarding geographical location are, for example; climate, pollution, the proneness to earthquakes, and the presence or absence of seas and oceans. Aspects regarding the built environment are, for example; the stability of buildings, roads, and bridges, and the means of transportation and communication.

To illustrate this transformation (see figure 7): a person might be able to own a mobile phone (individual resource), but only has the capability of distant communication when this person is allowed to use it (social conversion factor), is able to use it (personal conversion factor) and has, for example, a power supply (environmental conversion factor). Whether this person actually achieves the capability for communication depends on the awareness of the phone's ability for distant communication (sense of choice) and the availability of other valuable options (such as playing a game on the phone, or going out and enjoy time with friends) which the person might prefer over

communication through the phone (use of choice). If this person actually uses the mobile phone, this capability turns into a functioning.
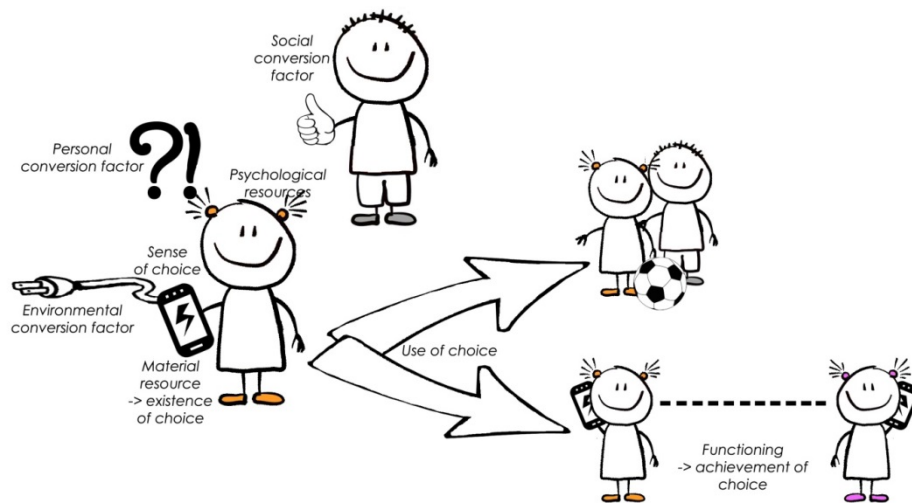
Figure 94: Process of capability transformation

Personal choice

Kleine (2011) mentions four stages of choice: the existence, the sense, the use, and the achievement of choice. If different capabilities exist and people sense their availability, a person can make a choice which results in a specific outcome. Kleine (2011, p. 123) notes that choice does not only have an instrumental role, but also intrinsic value, as '*being able to pursue one's own choices is part of being fully human.*'

The transformation of a capability into a functioning specifically depends on people's sense and use of choice. People's sense of choice relates to people's imagination and is influenced by several aspects, such as educational resources and discourses (Kleine 2010; Kleine, Light, and Montero 2012). The use of choice depends not only on people's preferences and conception of the good life, but also on people's ability to choose, which can be influenced by age and mental ability, and on outside influences, as for example social pressure (Robeyns 2005). Both the sense and use of choice can be influenced by adaptive preferences. This phenomenon is described by Sen (1999, p. 63) as "*the adjustment of people's desires and expectations to what they unambitiously see as feasible due to their deprivation.*" According to Clark (2009) adaptive preferences come into existence due to several reasons: (1) the malleability of people's aspirations and desires to the circumstances in which they live; (2) the social conditioning or cultural and religious indoctrination; and (3) the more general form of people's own limitations to make informed judgments and rational choices.

3.2   Prerequisites

There are certain prerequisites regarding Capability Driven Design that need to be followed. These comprise the following:

Appendix G

N. *Triangulate for data reliability and validity.* In order to enhance data reliability and validity designers should triangulate data. There are multiple types of triangulation:

- Discipline triangulation: involving designers from multiple disciplines to look from different perspectives and in this way reduce errors (prerequisite B);
- Investigator triangulation: conduct the research with multiple designers (varying in gender, age, colour, status, insider/outsider role) to cross-verify observations and descriptions (prerequisite C);
- Data triangulation: using different data sources (e.g., from different people, places) (prerequisite H);
- Theory and methodology triangulation: using multiple methods, for example a combination of observations with interviews and discussions (prescribed by Capability Driven Design approach)
- Tool and technique triangulation: using multiple tools and sources of confirmation, for example by asking different type of questions about the same topic, by using drawings and showing pictures (prescribed by Capability Driven Design approach)

Capability Driven Design already prescribes the use of multiple data sources, methods, tools and techniques, and prerequisites B, C and F ensure discipline, investigator and data triangulation. This prerequisite is mainly added to stress the importance of these different types of triangulation.

O. *Multidisciplinary team.* In order to enhance data reliability and validity designers should triangulate data. Capability Driven Design already prescribes the use of multiple data sources, methods, tools and techniques, to improve data reliability and validity. To further improve outcomes, designers from multiple disciplines should be included in the design team: they should have different backgrounds, skills and knowledge. This leads to a balanced perspective, access to a range of participants. Thereby, when team members conduct activities - in pairs – at the same time, the process of user context exploration is sped up.

P. *Establish local partnerships.* Local partners are required in order to adjust quickly to the local circumstances, obtain information about the potential users and community structures, get advice on activities, help figuring out what to do, be properly introduced in the community, help provide access to an unbiased selection of participants, build trust in communities, and to be properly introduced to the local people. They can also aid in selecting participants and finding translators. A community partner should be someone who understands local things and is respected by the people.

Q. *Get the team, client and translator on board.* It is important for all those involved to see the relevance of the CDD approach to ensure reliable, rigorous data collection.

R. *Follow qualitative research and ethics training.* In order to conduct sound, rigorous research that does not invade people's private lives in an incompetent way, and which results in valuable data, designers should have a solid and broad understanding of doing good research in the field. The research should be executed in a systematic, sceptical, ethical and rigorous manner. Designers should not conduct extractive research, but ensure an interactive, participative process together with the potential end-users to their mutual benefit. Therefore designers need to follow a training

in which they are taught the right attitude, behaviour and questioning skills, and during which they practice their learned skills and techniques. Designers should also continuously examine their attitude, behaviour and questioning when conducting user context research in order to improve upon them. Capability Driven Design contains a 'training module' that designers can use to learn about doing good research in the field. In addition, a card with the most important interviewing rules will be added to the ODK toolkit. This module and card, however, do not replace practical training under guidance of an expert.

S.   *Learn the themes by heart*. In order to obtain broad insight into all aspects that comprise a person's life and context, the themes and topics are leading. The themes should therefore be learned by heart, in order to allow for quick changes in conversation topics and establishing a fluent dialogue in which participants truly open up. They also help to pay attention to a comprehensive set of aspects when observing potential users in their natural settings. It helps to study the themes and questions, to roleplay them and to pilot them in the field. The facilitator and / or note-taker can keep track of the themes and questions by using the question cards.

T.   *Plan for it.* Conducting user context research takes time, especially in developing regions where 'things do not always go as planned', and often time is needed for travel, for establishing contacts to obtain access, and for acclimatisation to the local situation. It should not be a 'side-activity'. Preparation takes time, conducting activities takes time, and data analysis and validation take time. Plan sufficient time to properly follow all the steps and to conduct rigorous user context research.

U.   *Select a variety of participants with different characteristics for a broad range of insights*. Especially a variety in gender, ethnicity, social class, age, and religion are important to include. Do not only include potential users, but obtain a broader picture to learn more about task distributions and perceptions of the broader community. Be aware not to only select participants that are easy to access, as this results in bias. It is, however, not always possible to talk to an unbiased sample of participants, as some people are truly difficult or even impossible to reach. It often depends on the community partner what is possible.

V.   *Activities should be conducted in pairs and preferably be recorded.* Capability Driven Design already prescribes the use of multiple data sources, methods, tools and techniques, to improve data reliability and validity. To further improve outcomes, each activity should be conducted with a minimum of two persons, even when the researchers are familiar to the ODK and bring recording devices. By assigning one activity facilitator and one note taker, each of them can focus on their own specific task, while interpretations, experiences and perceptions can be compared, ensuring investigator triangulation and improved data reliability. A third person can be added to take photographs or shoot video (when consent is given), but more people can overwhelm participants. Activities should preferably be recorded, to enable the note-taker to focus on behaviour, body language and the environment. When it is not possible to conduct an activity with multiple team members present, for example when a situation with solely women needs to be created and there is only one female team member, the activity should be recorded to allow for the designer to focus on the activity and the participant and to enable other team members to

listen back to the things being said. However, only when consent for recording is given by the participant.

L. *Activities should be conducted in participants' natural setting.* Potential users should be directly observed and interacted with in their natural settings in order to improve learning and understanding by building a shared language, capturing detail, gather concrete data, develop empathy and reduce bias and rationalization, filtering and distortion of information. Preferably, the design team will be in the field throughout the design project, but if that is not possible, at least at the beginning, prior to problem definition, and during prototyping, in order to obtain feedback and make adjustments to the design.

W. *Participatory, simple and enjoyable activities.* Capability Driven Design stimulates the use of a variety of techniques and tools, which can be tweaked by the designers to better fit their purpose. For the ODK interview method, techniques and tools have been selected and defined, but can still be changed. When designers develop or adjust techniques and tools, it should be kept in mind that multiple techniques and tools should be used (prerequisite A), and that activities should be simple, engaging and interactive, in order to create an enabling atmosphere in which participants feel free to express themselves. It is advised to let participants perform tasks or to let them create things, to stimulate expression of latent and tacit needs and desires.

X. *Use insights to inform the next activity.* As newly obtained information leads to new understanding, research goals and methods should be changed accordingly to obtain additional information. The research outcomes should therefore be analysed by the team after each activity to adjust the activities based on new insights.

Y. *Discuss outcomes in a larger group to improve their value.* The information, knowledge and interpretations should be shared with participants to point out misunderstanding and to improve data validity. If participants agree, they should also be shared with the community and local partners to keep stakeholders involved, enhance transparency and openness and improve data reliability.

Z. *Critical reflection on limitations.* The data obtained, the methods used, the researchers involved and the project executed all have limitations and the researchers should reflect on them and be open and honest about them. These limitations can depend on the following:
   o The facilitator's quality, skills, behaviour, bias, subjectivity and terminology used;
   o The design team's presence, characteristics, agenda and perspective;
   o The participant's character, motivation, interest, well-being, feelings, emotions, etiquette, availability of time, scepticism, distrust, suspicion, prior experiences, cultural background and values;
   o The setting of the interview, the audience present, gatekeepers present, disturbances and distractions from outside;
   o The translator's presence, biases, skills, interest in and understanding of the project;
   o The amount of distortion due to translation;
   o The presence of recording devices.

3.3   Guidelines

The following eight guidelines designers are advised to follow when using the CDD approach:

J.   *Appropriate behaviour and attitude.* All team members should follow the tips and tricks for 'appropriate behaviour and attitude'. It is important to have an open mind, to build trust, to respect participants and their time, to treat them as experts and to truly listen without beliefs, biases, and making assumptions. Be honest about goals, keep participants informed about the progress made regarding the design project, properly thank and compensate participants for their invested time and effort. See: 'tips & tricks'.

K.   *Compensation.* Compensation can and should be provided to participants for their lost time and possible transportation costs, but be aware that money does not become an incentive to participate, as this influences the interview outcomes. Money, food and gifts to bring depend on the activity and on the context. Providing a tangible gift allows the participant to show the gift to other people, but might not be appreciated everywhere. It is important to find out what the people in the area find valuable. The compensation can be decided upon in collaboration with local partners.

L.   *Appropriate questioning.* The facilitator(s) should be trained on qualitative research skills (prerequisite). In order to guide the facilitator, the tips & tricks regarding 'appropriate questioning' should be followed. See: 'tips & tricks'.

M.   *Observe, listen, and document everything.* Note down characteristics of the participant (e.g., name, gender, social class, religion, age, occupation), of the activity (e.g., type of activity, the people present, date and location, materials used), and of everything that is seen, heard, felt, smelled, tasted, and / or surprising. Observations during the interviews are a useful means to check and interpret answers, and valuable when starting and continuing the dialogue. Observe during the touchstone tour, but also observe the participant's behaviour and body language. Keep an eye on intonation. Follow the tips and tricks for 'what to pay attention to'. See: tips & tricks.

N.   *Selecting, instructing and working with a translator.* A translator forms a disconnect between you and the participant, as participants often focus on the translator. This limits the building of rapport. Translators differ in motivation, understanding and skills. Their age, gender, social class, clothing, religion and ethnicity of the translator with reference to the participant plays a role. Therefore, the tips and tricks for selecting, instructing, and working with a translator should be followed. See: 'tips & tricks'. It is not always possible to control all translator characteristics, but by building rapport with the translator, and with a proper instruction the translator can be guided to diminish his / her influence on the outcomes.

O.   *Schedule more time than planned.* Things often take more time in the field, due to, for example, dependency on other people, differences in punctuality, religious breaks, unavailability of electricity, internet access or the required materials, limited infrastructure, and limited access to stakeholders.

P.   *Be aware of your position.* Local people perceive you in a certain way. Because you are an 'outsider', you might be perceived as interesting to talk to, as a professional or expert, or you can be distrusted or not being taken seriously. It might even be dangerous to walk around and talk to

people. People might also see you as a source of help (financial or otherwise) and therefore try to convince you of their misery, or they might be embarrassed and try to hide their situation from you. Your age, gender, social class, religion, ethnicity and with reference to the participant plays a role. It is important to build rapport and behave and interact appropriately (tips & tricks). It is important to be aware of the influence of age, gender and clothing, and how these are perceived by participants, to limit its influences on the interview outcomes and to at least take this influence into consideration during data analysis and interpretation.

Q. *NEW - Influence of recordings.* Using video, voice recording and / or photography have several benefits and disadvantages. They might result in participants becoming shy or hiding information in order to not let it be recorded. On the other hand, they provide visuals and dialogue which aid the designers to analyse and interpret the data and to communicate the data to their team members. The design team can decide to secretly record observations and interviews, but should always ask permission afterwards for using these, and must realise that secret recordings can seriously damage the relationship with the potential users.

R. *NEW – Contextualising visualisations.* As the intended 'receivers' of the message displayed in the visualization vary, it is difficult to develop one universal set of visualizations suitable for every context. Therefore, contextualizing the visualisations might stimulate discussion. See: tips & tricks for developing these visualizations.

3.4 Themes and questions of Capability Driven Design

The CDD approach offers themes and topics that all need to be addressed when conducting activities, in order to obtain comprehensive user insight. These themes and topics can be viewed below.

Person	**Self-Reflection & Dreams**	**Spirituality**	**Knowledge & Skills**	**Body & Appearance**
	Self –reflection, identity, plans for the future, goals, self-improvement, habits, expectations, barriers, confidence, life satisfaction	*Religion, beliefs, rituals, functionings. Involvement of others, time spend, way of practicing, body energy, inner peace, intentions*	*Knowledge, skills, (in)formal education, training, talents, capacities, imagination, work, reasoning, literacy, languages, activities, critique availability of education,*	*Appearance, care, hygiene*
Health	**Health**	**Healthcare**	**Happiness & Worries**	**Food & Drinks**
	Physical condition, life expectation, health limitations, medicine, mortality, body energy, ability to perform activities	*Doctor, nurse, dentist, clinic, hospital, medicines, (in)formal care, trust, familiarity, beliefs, stigmas, attitude, superstition, subsidies, affordability, accessibility, connectivity*	*Worries, stress, strain, love, care, support, loneliness, happiness, bless, expression of feelings, vulnerability, uncertainty about future*	*Habits, intake, nutritional value, availability, affordability, variety, quality, cooking*
Relation-ships	**Family**	**Community**	**Social Life**	**Colleagues**
	Partner, children, parents, siblings, in-laws. Attachment, ties, love, romance, children (contraception, abortion, care, infertility), pressure, tradition, knowledge transfer, support, hierarchy, cooperation, acceptance, appreciation, competition, activities, decision making, having voice, sharing	*Friendships, ties, activities, attachment, stigmatisation, class differences, acceptance, appreciation, competition, cooperation, pressure, tradition, sharing, support, social status*	*Friends and acquaintances. Strong and weak ties, informal relations, networks / digital, attachment, acceptance, appreciation, competition, cooperation, pressure, tradition, sharing, support*	*Friends, ties, activities, attachment, acceptance, appreciation, competition, cooperation, pressure, support, exploitation, teaching / inspiring others,*
Activities	**Work & Spare Time**	**Movements**	**Participation & Organisation**	**Information & Communication**
	Paid / unpaid (e.g., household, care) activities, leisure, hobby, time perception / usage, activity type, where, with whom, working area, enjoyment, usefulness, power, learning / training, decision making, relaxing celebrations.	*Places to go, freedom to go out, ability to go out, safety to go out*	*Communal, regional, national. Social activities, involvement, participation, express opinion/ speaking up, critique, power, control, view, politics, voting, misuse/misbehaviour/forgery, corruption, justice, rules & regulations, political support*	*Phone, internet, relationships, solving problems, information distribution, mobility, correctness of information*
Living	**Housing**	**Safety & Security**	**Facilities**	**Environment**
	Type, ownership, size, choice, facilities, attachment, migration, own space, comfort, envy / judging	*In- and outside the house and area, day and night. Bullying, discrimination, physical security, emotional security, cyber security, fright*	*Energy, energy access, water, infrastructure. Accessibility, affordability, reliability*	*Nature, environmental conditions, climate, wildlife, eco-system, attachment, access, rules and regulations, relaxing, consciousness*
Posses-	**Products**	**Financial Situation**	**Natural Property**	**Animals**

sions	Household, personal, mobility, communication. Ownership, characteristics, cultural value, product security, attachment, usage, fashion/ trends	Savings, income, expenditure, possibilities, behaviour, affordability, accessibility/ control, taxes / policies, financial security	Land, plants, trees. Number, size, price, availability, rules and regulations, usability, attachment, happiness, relaxing, care, abuse, privacy	Pets, cattle for work, protection or food/drinks, acceptance, attachment, beliefs

The CDD approach also comprises 255 questions, which are example questions to start a dialogue. The questions are categorised per theme and sub-theme. For each sub-theme a set of three pictograms have been made between which designers can choose one to use in their specific context. The pictograms are in one style and in black-and-white, because in different cultures different meanings are attached to different colours. For each sub-theme a question card is made, which is meant to guide the designers during their activities, and more especially during interviews. For communication with the participant, the same pictograms can be used. The design team should choose one pictogram which fits their context best. The choice can be made together with the local partner and / or translator or based on a pilot interview. Some pictograms might still need adjustment to better fit the context of use.

The preference remains to contextualise the visualizations, but if time does not allow for it, the pictograms presented here can be used. It is, however, important to explicitly discuss the meaning of each pictogram, in order to align the dialogue. The pictograms and question cards are presented below, per sub-theme (see figures 8 and 9).

Can you describe your normal day to day activities? (Getting up, eating, working, leisure, sleeping, other)
Do you have sufficient time to do all the things you want in a day?
When do you take rest?
Which days are different?
Do you enjoy the things you do in a day?
Is there anything you would like to change?
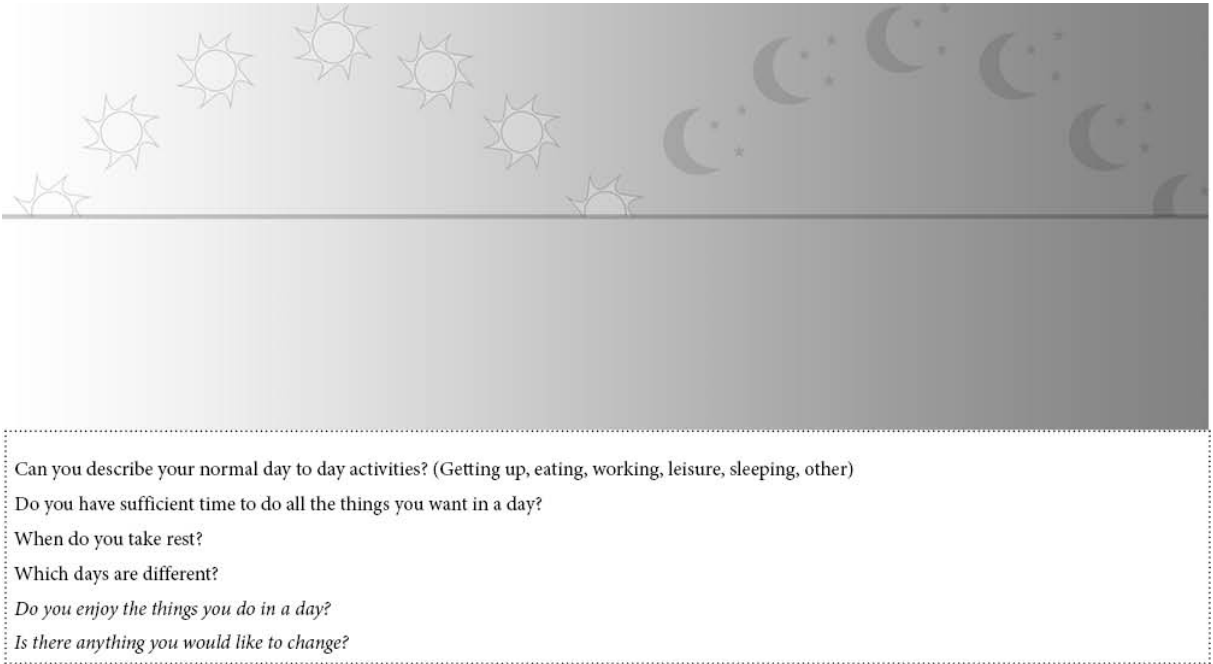
Figure 95: Timeline with questions

Pictograms and question cards
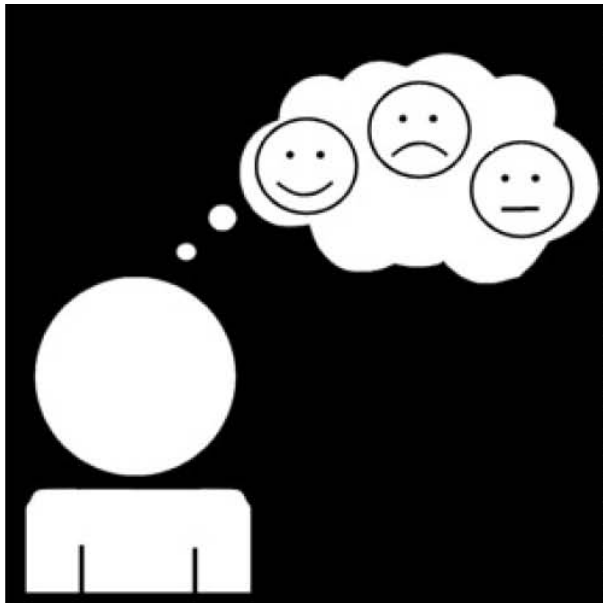
SELF REFLECTION AND DREAMS

Do you have a passion?

Are you satisfied with your life as it currently is?

What are the things you are proud of?

Do you have a plan of what you want to do or be in life?

Who do you go to for advice about your life? Who's opinion matters to you most?

What do you want to achieve in your life? What do you dream about? (can be both short-term and long-term)

Can you decide yourself what you want to do or be in life?

Are you confident?

Do you feel you can make your own decisions in life? (Decisions can be related to: accommodation, healthcare, household, family, products, nutrition, other?)

Would you like to be more involved in decision making?

If you could change anything in your life, what would you want to change?

How / why / what / who / where / when...?
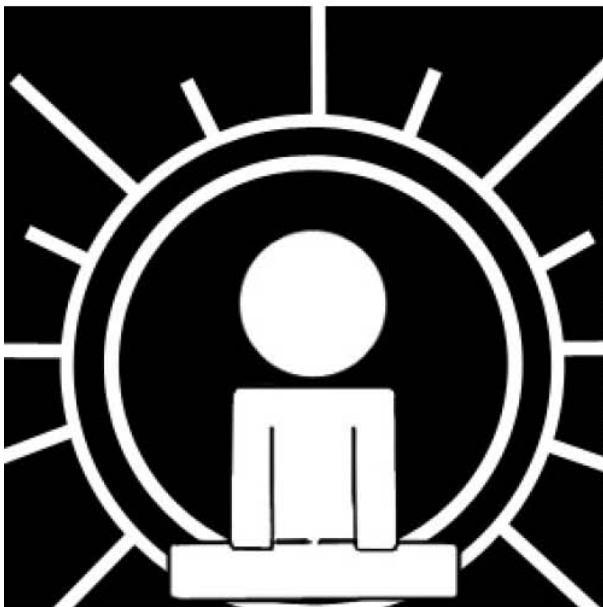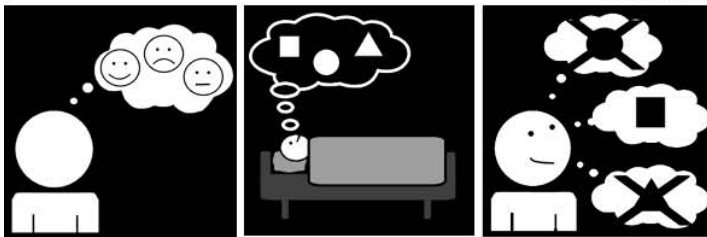
SPIRITUALITY

What does spirituality mean to you? Is it important to you?

How much time do you spend on spiritual practices? Would you like to spend more time?

What do you do when you spend time on spirituality?

Which spiritual rules do you follow? Why?

Which religion do you follow? And your family?

What do you think about other religions? Have you ever considered other religions?

How do you find inner harmony and piece?

Which things in life give you energy?

Do you believe in guilt and punishment?

How / why / what / who / where / when...?

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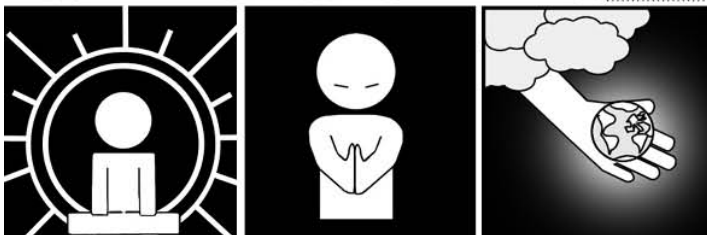
KNOWLEDGE AND SKILLS

Have you been to school, how many years? And your partner / children?

Would you have wanted to go longer back then? If yes: why didn't you?

How do you improve upon your knowledge and skills?

Did you follow any courses / trainings? Do you have diplomas?

Would you like to learn more right now (trainings, courses)? What would you like to learn?

Do your children go to school? Where is the school? What type of school is this? How do you get admitted there? What do you think of the teachers?

Which languages do you speak? Can you read and write? Can you count? Do you have a signature? Do you want or need any of these?

What are the things you are good at in you daily activities?

Do you use your skills and talents in your daily activities? Would you like to use them more?

Do you use your knowledge in your daily activities? Would you like to use it more?

Do you ever face problems you cannot solve by yourself? What kind of problems? Then what do you do?

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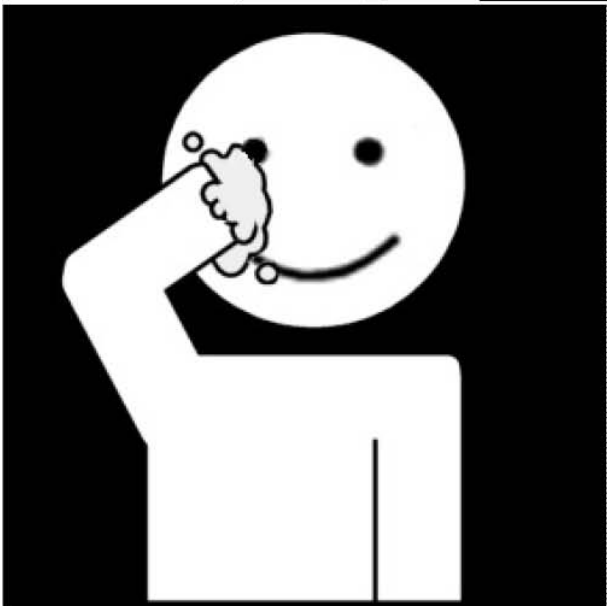
BODY AND APPEARANCE

How much time per day do you spend on personal care (washing, brushing teeth, clothing, styling)?

What kind of products do you use for personal hygiene?

When and how often do you wash your hands?

Do you like your clothing? Do you think you have sufficient clothing?

How often do you go to a barber?

Do you work out or exercise?

How confident are you about your appearance?

If applicable: Are you somehow obstructed to do your daily activities when you are menstruating? Do you have a place to change when you are menstruating?

How / why / what / who / where / when...?
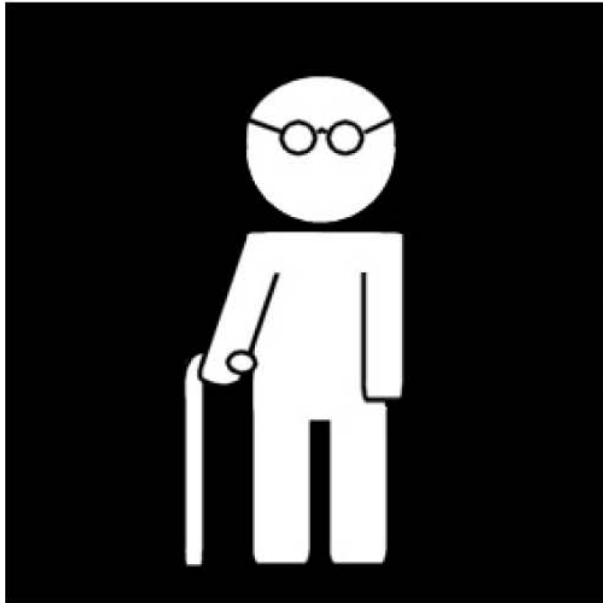
HEALTH

How is your physical condition?

Do you have any health problems? And your family members? Do these limitations obstruct you / your family members in your / their daily activities?

Do you or your family members take any medicine?

Where do you get your medicine? And medical devices?

Did anything change regarding your health recently?

How long do you want to live?

How do you try to prevent illnesses?

Is there anything that you require concerning your health?

How / why / what / who / where / when...?
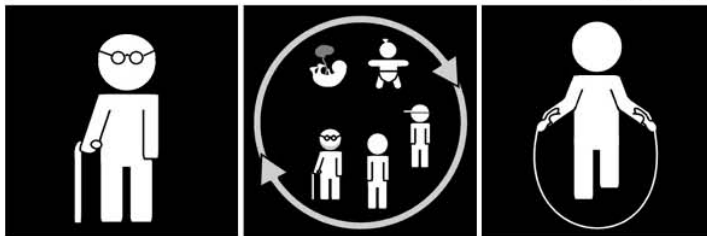
HEALTHCARE

Do you have a doctor / hospital / clinic / dentist / other medical treatment facilities?

How did you choose your doctor / hospital / clinic / dentist / other medical treatment facilities?

How far away is your doctor / hospital / clinic / dentist? Are they easy to reach?

How often do you visit the doctor / hospital / clinic / dentist? When do you visit?

How familiar are you to your doctor / hospital / clinic / dentist?

Can you and your family visit the doctor / hospital / clinic / dentist when required? Are they expensive? How do you pay for them?

Do you trust your doctor / hospital / clinic / dentist?

What type of doctor do you have (quack, homeopathic, allopathic, family doctor, other) ? Why?

Is there anything that you require regarding healthcare?

How / why / what / who / where / when...?

Appendix G

HAPPINESS & WORRIES

Are you happy? Are you hopeful? Why?

Who do you go to when you feel happy?

Who can you count on most for love, care and support?

What do you feel blessed about?

Do you find it difficult to express your feelings?

Do you worry much? Do you ever feel stressed? Do you sleep well? Why?

Do you ever feel sad or lonely? Why?

Who do you go to when you feel sad or lonely?

Who are you able to tell everything?

Have you ever felt differently about life?

What would you like to change regarding your feelings and sharing them?

How / why / what / who / where / when...?
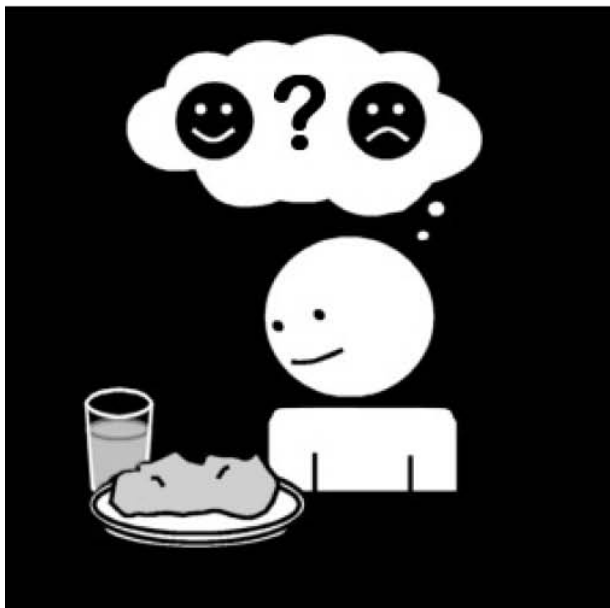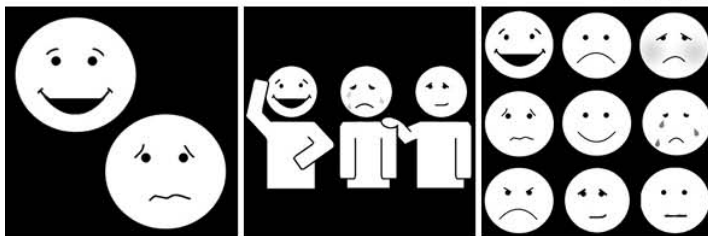
FOOD & DRINKS

Do you have a doctor / hospital / clinic / dentist / other medical treatment facilities?

How did you choose your doctor / hospital / clinic / dentist / other medical treatment facilities?

How far away is your doctor / hospital / clinic / dentist? Are they easy to reach?

How often do you visit the doctor / hospital / clinic / dentist? When do you visit?

How familiar are you to your doctor / hospital / clinic / dentist?

Can you and your family visit the doctor / hospital / clinic / dentist when required? Are they expensive? How do you pay for them?

Do you trust your doctor / hospital / clinic / dentist?

What type of doctor do you have (quack, homeopathic, allopathic, family doctor, other) ? Why?

Is there anything that you require regarding healthcare?

How / why / what / who / where / when...?

FAMILY

With whom do you live together? How much time do you spend with them? What do you do together? What do you talk about together?

If applicable: How did you and your partner get together? What do you like most about your partner? When do you spend time together with your partner? If applicable: Do you have children? Do you want to have children / more children? What do you find most important to offer your children? What do you like them to become?

Do you have parents, brothers, sisters, in-laws? Where do they live? How often do you meet them? What do you do together?

Are you happy with your family? Do you feel appreciated / accepted?

Do you have specific family traditions and / or celebrations?

In which ways do you support your family? Do you feel like you can count on your family for support?

Who makes the decisions in your family? Why? Are you able to speak up freely, express emotions and aspirations?

Do you feel you can make your own choices in life? Do you experience any family pressure?

Did anything change in your family or family relations recently?

Is there anything you would like to change in your family?

How / why / what / who / where / when...?
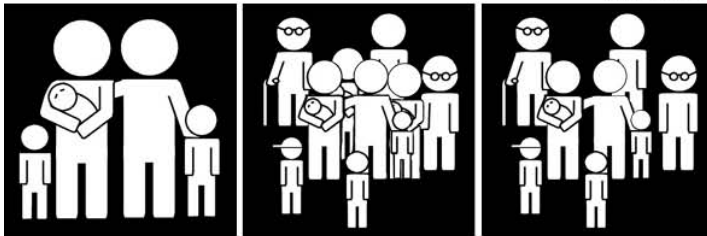
COMMUNITY

Do you know a lot of neighbours / people in your community?

Do you feel accepted in your neighbourhood / community?

When do you meet the people in your neighbourhood / community?

Do you feel you fit in your community? Are there people who do not fit in the community?

Do you belong to a specific social group?

How does your community treat outsiders?

Are you able to speak up freely within your community?

Are you able to express emotions towards your community?

Did anything change in your community in the past years?

Is there anything that you would like to change in your community?

How / why / what / who / where / when...?
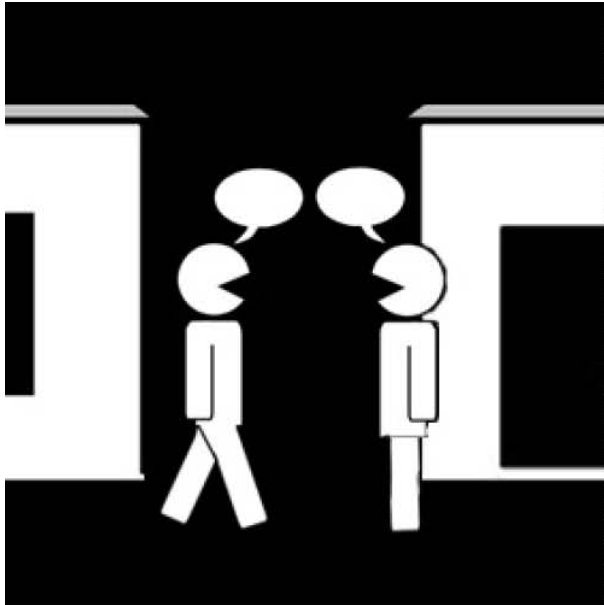
SOCIAL LIFE

Do you have friends? How and where did you get to know them? When did you get to know them?

Do you like to meet your friends? Would you like to meet them more often?

When do you meet your friends? How do you meet your friends?

What kind of things do you talk about with your friends? Do you feel like you can tell your friends everything?

What activities do you do when you meet your friends?

Do you feel like you can share your emotions and aspirations with your friends?

Did anything change in relation to your friends in the past years?

Is there anything that you would like to change in your current friendships?

How / why / what / who / where / when...?
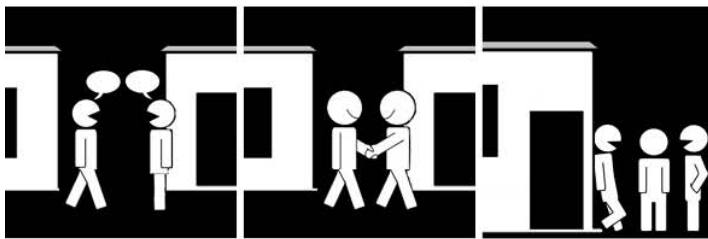
COLLEAGUES

Do you have a boss / co-workers / employees?

Do you have a good contact with them?

How long do you know them?

Do you meet your colleagues also outside working hours?

Do you feel accepted and appreciated at work?

Are you able to speak up freely at work?

Are you able to express emotions and aspirations at work?

Did anything change in relation to your colleagues in the past years?

Is there anything that you would like to change in your relationships with your colleagues?

How / why / what / who / where / when...?
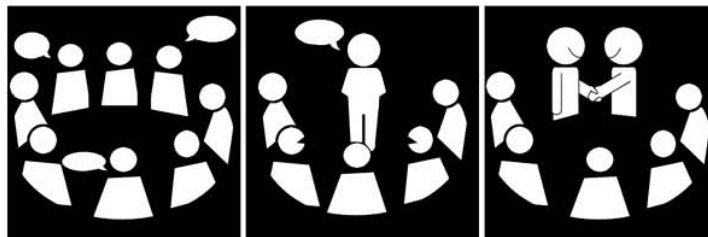
WORK & SPARE TIME

What kind of activities do you do during the day? And your family?

Where do you work? And your family? Who does the household work?

Why do you do this work / activities? Are you happy with doing them?

Where did you learn to do this work? Which training did you have? How do newcomers learn to do the work?

Which work things are you good at? Do you feel appreciated / useful?

Are there other work activities you would like to do?

How many hours do you work? Do you feel you need more work time?

How much time is free in a week? Is there time when you feel free to do nothing? What do you do when you do not work?

How many spare hours do you have in a week? Do you feel you need more free time? With whom do you enjoy spare time together?

Which festivities/parties/events do you celebrate in a year? Why? When?

What do you like best in your daily activities? And what do you dislike?

Is there anything else that you would like to do? Or like to change?

Did anything change in your job / activities in the past years?

How / why / what / who / where / when...?

MOVEMENTS

Do you go out often? Where do you go? Why do you go out?

Do you often go out of your community? Why?

Where do you travel to? (e.g. for family, work, spare time, friends, healthcare, shopping, political participation)

What is the furthest place you ever went? Why did you go there?

Which places do you go when you leave your house? What is your favourite place to go?

Are you able to go wherever you want to go? Whenever you want to go?

Is it safe to go everywhere you want to go?

Which places would you like to visit (more often)?

How / why / what / who / where / when...?
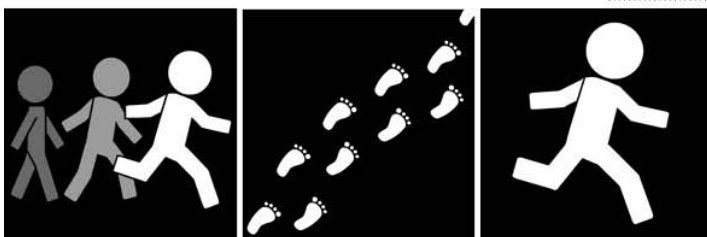
INFORMATION AND COMMUNICATION

How do you communicate with other people? Do you have a mobile phone / internet access / television?

Are you on social media? Does your phone have internet access?

How much money do you spend on mobile phone usage / internet / communication?

Are there other forms of communication which you would like to use?

What kind of communication device do you like most?

How do you search for information? Do you always find an answer? (Information quest can be related to: health(care), transportation, education, nutrition, products, animals, politics, religion, other themes)

Do you feel you have sufficient access to information? Is the obtained information usable?

Is there a need for you to find more or different information?

Are there more ways for you to gather information that would be convenient?

What has changed in the past years regarding communication and information?

How / why / what / who / where / when...?
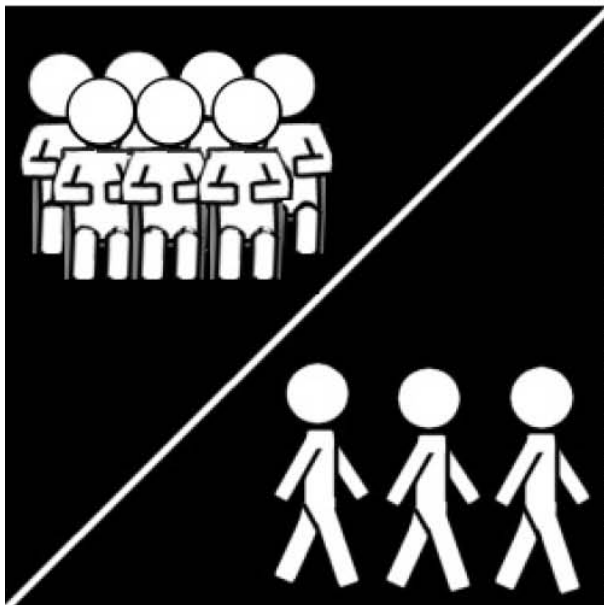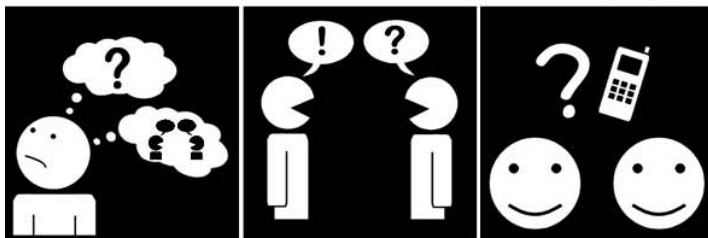
PARTICIPATION & ORGANISATION

Do you vote? How do you vote? Why do you vote?

Are you involved in politics? Would you like to participate (more) in political activities?

Are you involved in social activities on a communal / regional / national level?

Do you feel the government provides sufficient support?

Have you ever met public officials?

Do you feel there is any corruption or misbehaviour in your community / region / country?

Are there many rules & regulations that you have to stick to?

How is the political situation in your community / region / country? Did anything change in the past years?

What would you like to change regarding the current political situation in your community / region / country?

Do you feel free to participate in political activities? Do you feel free to express your views and opinions in public? Also when they express critique?

How / why / what / who / where / when...?
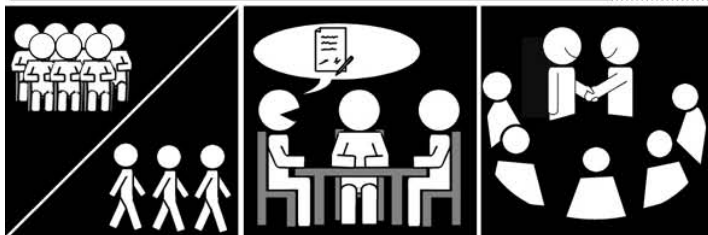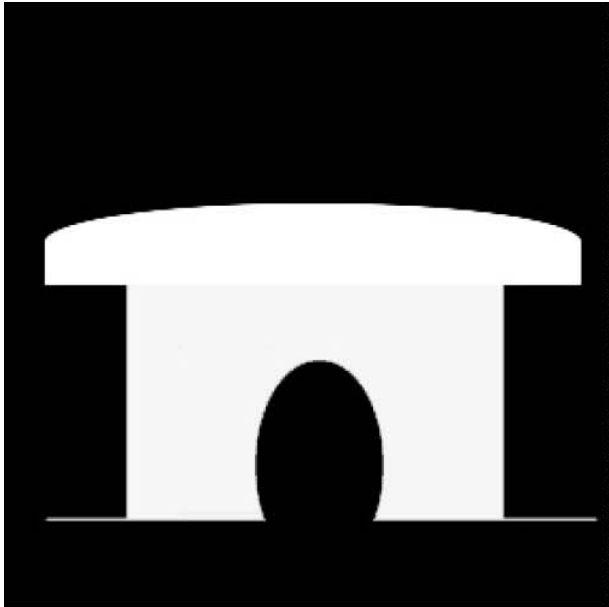
HOUSING

What type of house do you have (roof, walls, rooms)?

When do you clean your house?

When did you start living here? Why did you choose to live here?

How did you acquire the house (rented, bought, build)? How did / do you pay for this home?

Do you feel that your house is your own space? Do you feel comfortable in your house?

Do you like to invite guests to your house? Why?

What have you changed in the house since you started living here?

Do you feel your accommodation is adequate for your current needs?

Do you have a bathroom / toilet? Where do you go when nature calls?

Is there anything that you would like to change in your current house?

Do you feel you were involved in choosing your house?

Do you think you will live here the rest of your life? Why? Are you free to move?

Are there any other houses/places that you would like to live? Why?

How / why / what / who / where / when...?
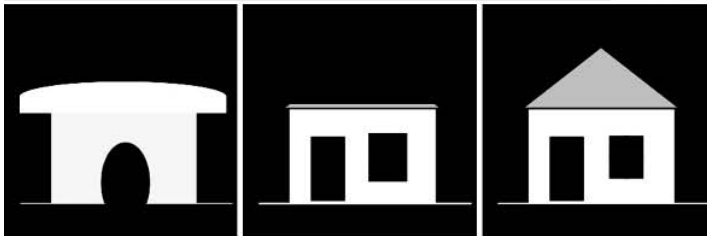
SAFETY & SECURITY

Do you feel safe and secure in the area you live in? And outside that area?

Do you feel safe to go outside in day-time and night-time? And your family?

Are there any quarrels / fights / crime / conflicts in your surroundings? How often?

Who solves the conflicts in your surroundings?

Do you think people are discriminated or bullied in the area you live in?

Do you ever feel discriminated or bullied?

Do you ever feel scared? What are you afraid of?

Do you ever feel insecure or unsafe?

Has your feeling of safety and security changed in the past years?

Is there anything you would like to change to feel more safe/secure?

How / why / what / who / where / when...?

FACILITIES

Do you have light, electricity, gas?

What type of energy sources do you use? And what for do you use them?

How much money do you spend on energy?

Would you like to use other energy sources? Which ones?

How do you cook?

Where do you get potable / drinking water?

Where do you get water for cooking / cleaning?

Which modes of transportation do you have access to (private / public)? Which ones do you use / have you used?

Would you like to use any other types of transportation?

What is your favourite type of transportation?

Are there any other services / facilities that you have or use?

Did anything change in the past years regarding your access to energy, water or infrastructure?

Are there any services that you would like to have? Why?

How / why / what / who / where / when…?
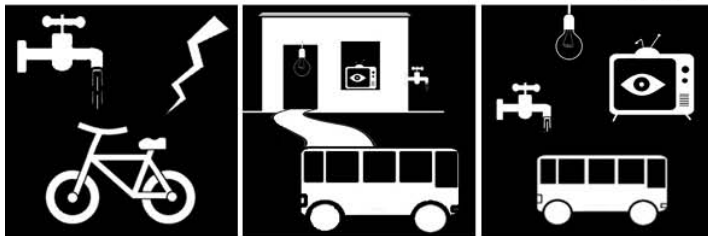
ENVIRONMENT

How important is your natural environment to you?

Do you ever visit public spaces? What do you do there? How often do you go?

Are there any rules and regulations regarding the use of environment that you are aware of?

Which resources does your environment provide you with?

Where do you dispose waste?

How is the climate / weather in your surroundings?

Are there any dangers from nature in your surroundings? Is there wildlife around?

Is the area you live in clean or polluted?

How / why / what / who / where / when…?
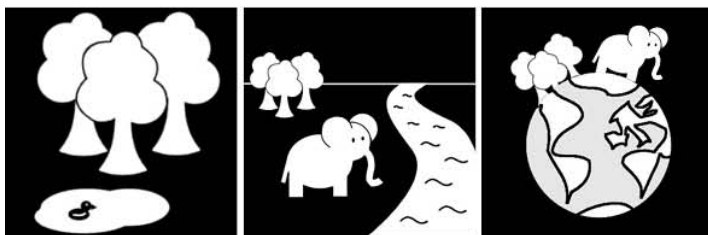
PRODUCTS

What kind of personal / household / transportation / work related products do you have? Are there any other products that you have or use?

Where do you use them for?

Which product(s) do you like most? Why?

Which product(s) do you like least? Why?

Who makes the buying decisions?

Do you follow product trends? How do you stay up to date?

Do you feel you can buy everything you want?

Did anything change recently in products that you had or have?

Are there any products that you would like to have? Why?

How / why / what / who / where / when...?

FINANCIAL SITUATION

How much money do you earn in a day / week / year?

Is this amount sufficient for your family?

Are you able to save money? What are you saving for?

Do you have loans? Why did you take a loan?

What do you spend money on? Who is responsible for the expenses?

Do you find it difficult to choose between options to spend your money on?

Do you feel your current income is adequate for your current needs? How much money would be enough for you and your family?

Which things would you like / want / need to buy?

Did anything recently change in your financial situation?

How / why / what / who / where / when...?
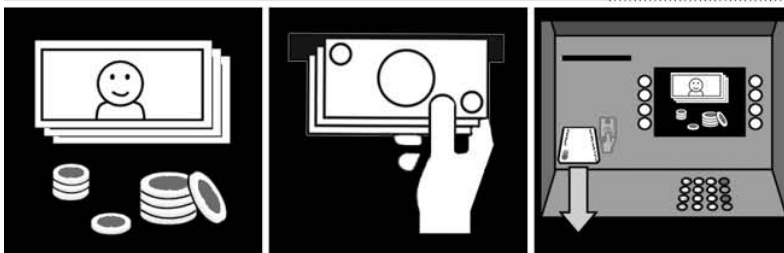
NATURAL PROPERTY

Do you own any land? How much? Where is the land?

What type of land do you have? What do you use it for? Which benefits do you get from your land?

When did you get this land? How? How did you pay for this land?

Do you feel your current land is adequate for your current needs?

Do you like plants and trees?

Do you own any plants or trees? How much? Where are they? Where do you use them for?

Do you have any plants or trees in your surroundings?

When did you get these plants or trees?

Do you want to own (more) land, plants or trees?
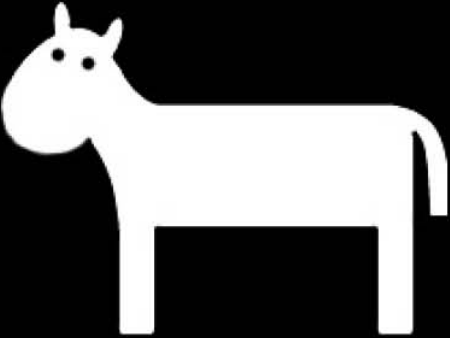
Did your possession of land / plants / trees change in the past years?

How / why / what / who / where / when...?

ANIMALS

Do you like animals?

Do you own any animals? Where do you use them for (pets, cattle, protection, food & drinks)?

When did you get these animals? How did you pay for them?
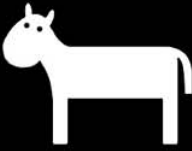
Where are your animals living? Do you have sufficient food for your animals?

What is your favourite animal?

Do you want to own (more) animals?

Did your possession of animals change in the past years?

How / why / what / who / where / when...?
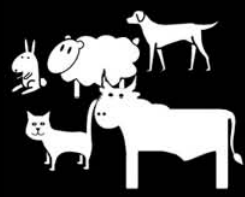
Figure 96: Pictograms and question cards

4.   Procedure of Capability Driven Design: Steps and Methods

Four steps comprise the 'basic procedure' of the CDD approach to guide product designers to obtain comprehensive user insight (see figure 10). 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.
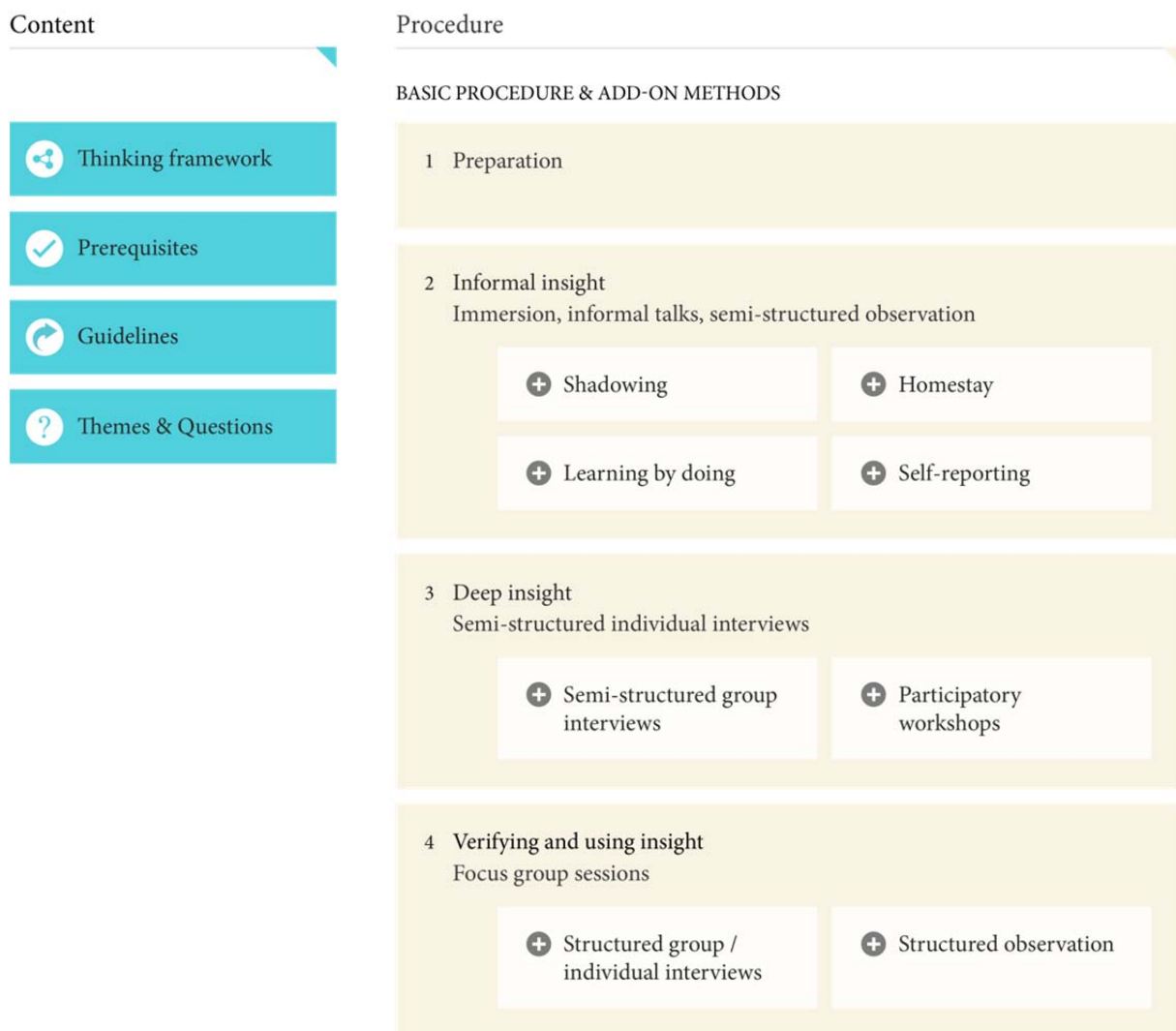
Figure 97: Basic procedure of Capability Driven Design as part of the total approach

4.1   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 11).
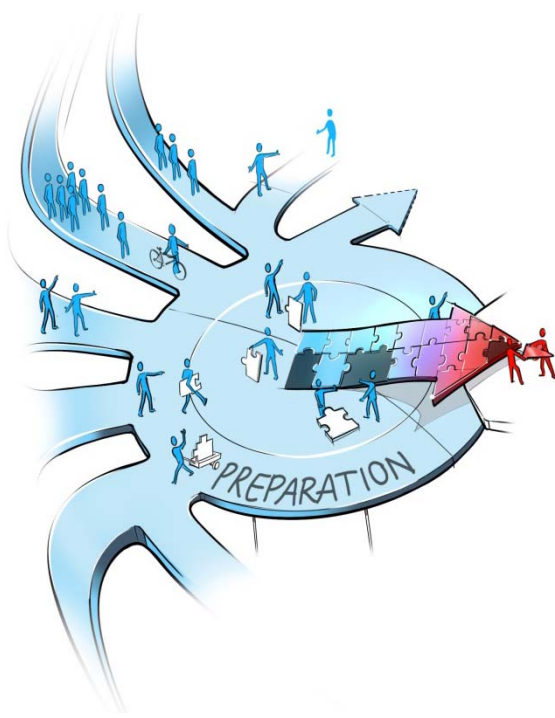
Figure 98: Visualisation of step 1: preparation

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.

4.2   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 12).
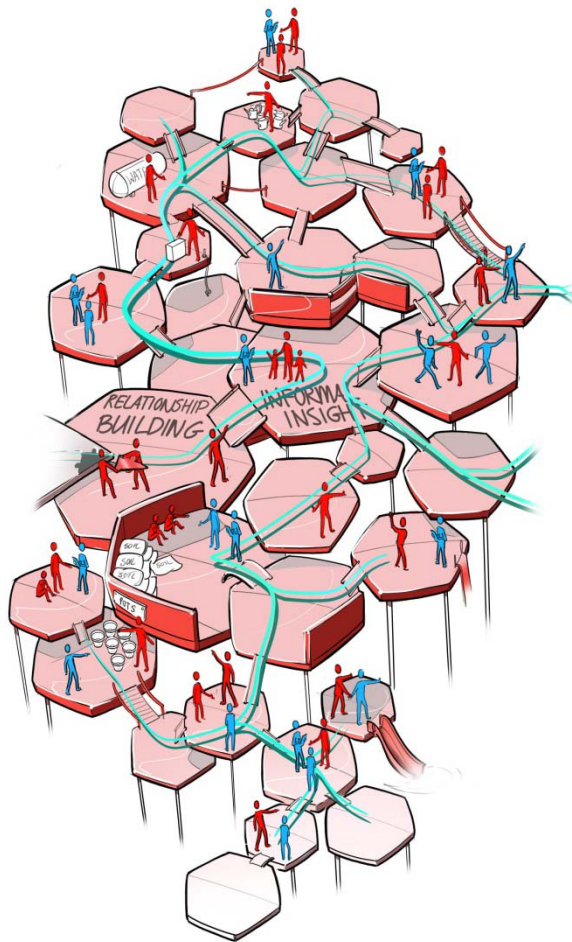
Figure 99: Visualisation of step 2: informal insight

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).

4.3   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. 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 chapter XX for an overview of the ODK (see figure 13).
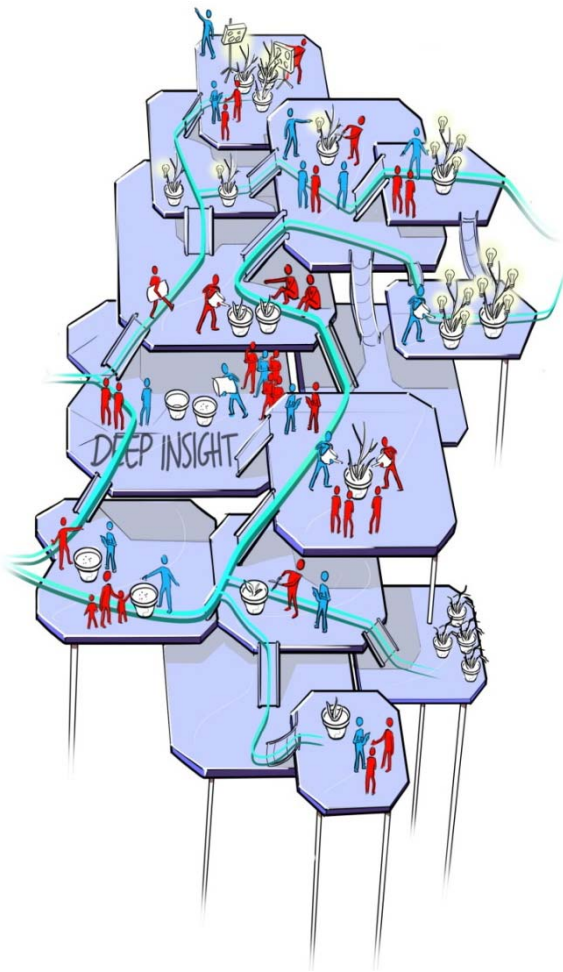
Figure 100: Visualisation of step 3: deep insight

Appendix G

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).

4.4   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 15).
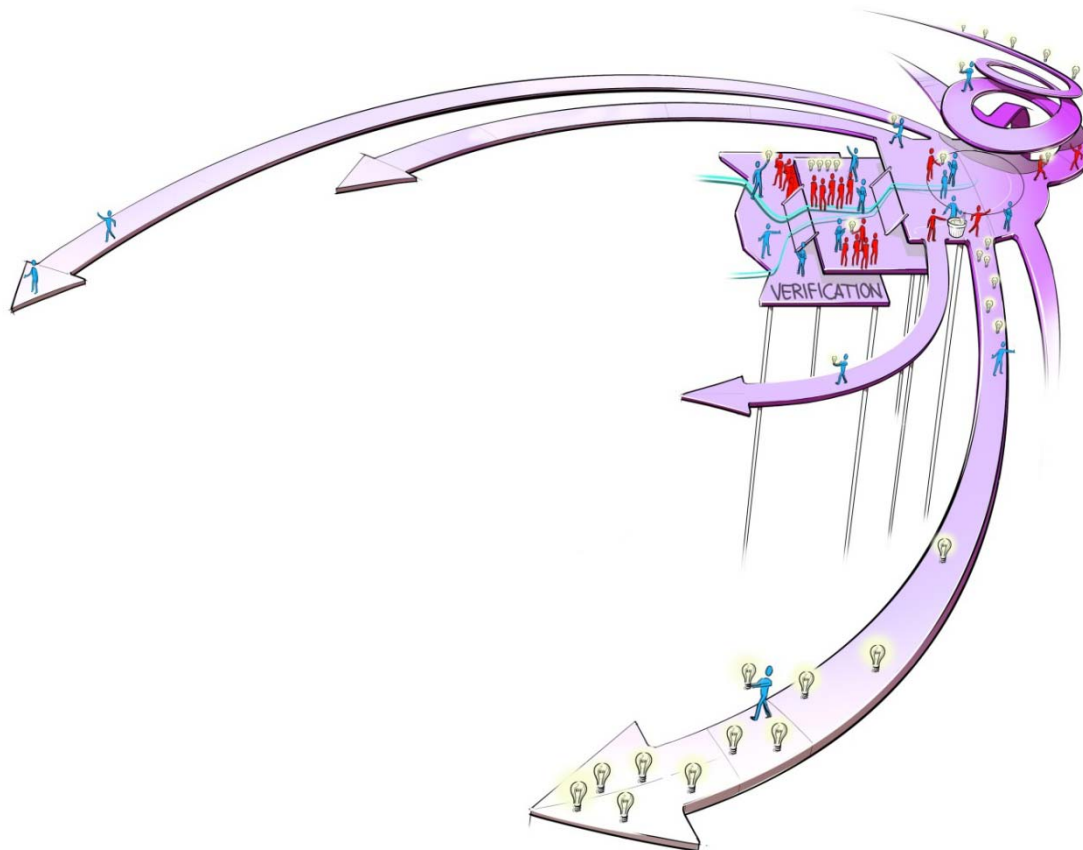
Figure 101: Visualisation of step 4: verifying and using insight

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."

o *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).

4.5   Overview of Capability Driven Design procedure

In figure 15 the steps are visualized together, and in this way form an overview of the procedure of the Capability Driven Design approach.
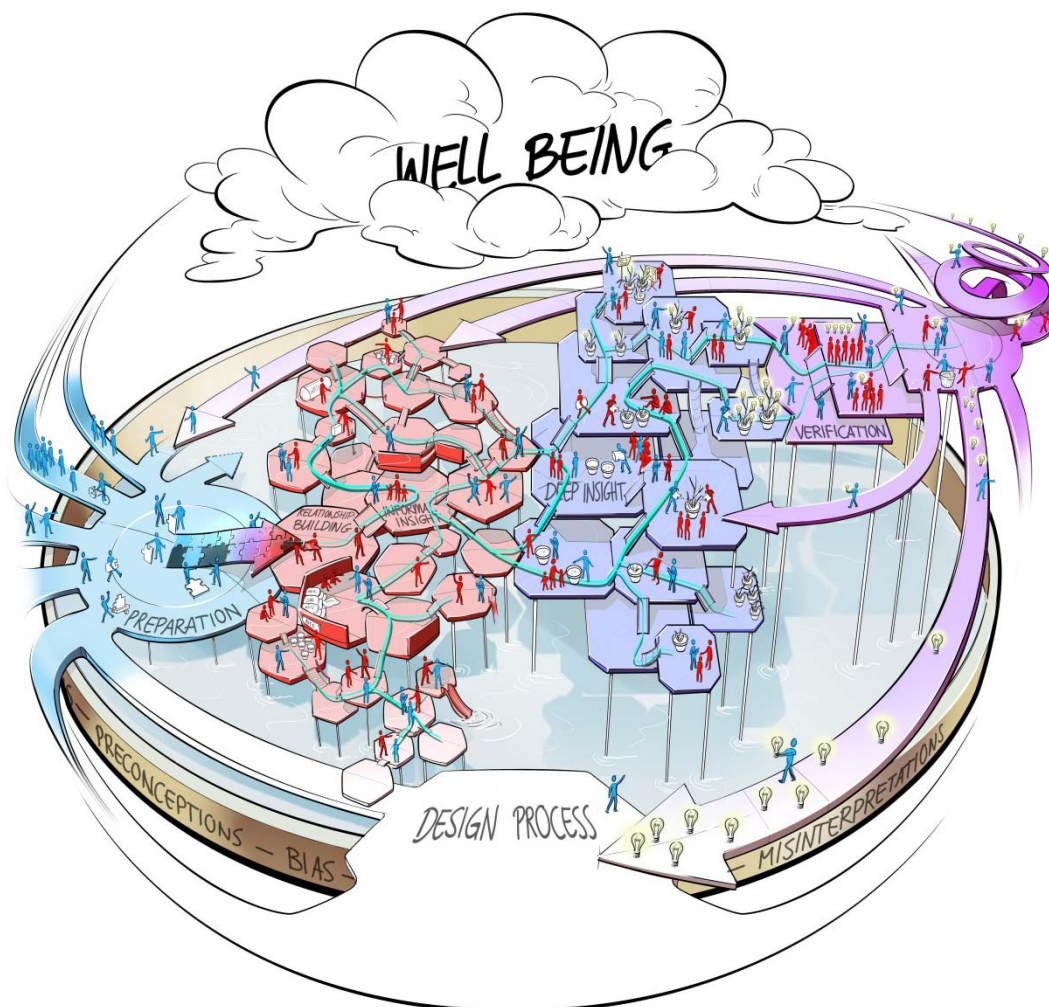
Figure 102: Overview of Capability Driven Design procedure

4.6   Tips and tricks for fieldwork

Below, tips and tricks are provided that aid designers during activities in the field. They comprise tips and tricks for 1) behaviour and attitude; 2) ethical behaviour; 3) questioning, including techniques; 4) 'what to pay attention to'; 5) selecting, instructing and working with a translator; and 6) contextualizing visualizations.

1.   Tips and tricks for behaviour and attitude

The recommendations for designers' behaviour and attitude are:

- *Minimise 'outside' hierarchy.* In order to minimise hierarchical perceptions:
  - o   Sit at the same height level as the participants;
  - o   Do not sit together if you are with more than one person;
  - o   Wear casual clothing with the same status as participants, which does not mean identical clothing
  - o   Avoid organization-branded clothing.
- *Be aware of 'inside' hierarchy.* To approach certain regions or communities, there might be an 'appropriate' way to do so. Pay attention to local hierarchy and follow the local hierarchical rules).
- *Be aware of 'inside' customs.* There might be some local customs that you should be aware of in order to fit in, e.g., taking your shoes of inside a house, sitting on the floor, not pointing with your feet towards someone. Be aware of them and behave accordingly.
- *Build rapport.* Build relationships and trust with potential users early in the process and make them appreciate the work being done. This stimulates becoming accepted and motivates collaboration, resulting in a better understanding. It takes time to win trust and build rapport and this time should be taken in order to stimulate opening up of potential participants. To fasten the process of building rapport, follow the following tips:
  - o   Be aware of potential codes of behaviour;
  - o   Explain who you are;
  - o   Seek and listen carefully;
  - o   Demonstrate commitment;
  - o   Show respect towards the people, their culture, their customs, attitudes, beliefs and their way of life;
  - o   Do not criticize, correct or judge participants, but try to understand their perceptions and underlying reasons, appreciate how people live their lives;
  - o   Show humility;
  - o   Show interest;
  - o   Be honest and transparent;
  - o   Be open and clear about intentions and do not make false promises;
  - o   Develop a collaborative dialogue;
  - o   Be ready to learn and ask to be taught. Invite and answer questions;

- o Share yourself. By sharing personal experiences an open atmosphere is created that allows for vulnerability and gossip;
- o Share information, ideas and food;
- o Accept and give gifts if appropriate;
- o Limit deliberations in your mother tongue or with the translator in a language unfamiliar to the participant.

- *Demonstrate willingness to learn.* Go into the field with the recognition that indigenous knowledge is essential. Do not act as the expert knowing what is best and do not impose theories and insights on participants, but instead be willing to admit ignorance and threat the participants as the experts who should feel that the designers are open to learn from them, that their knowledge is relevant. Gain appreciation for the people, culture, customs and the way people live their lives and do not correct them.

- *Start with an open mind.* You are an 'outsider' who probably speaks a different language and has different perceptions of meanings due to different life experiences and cultures. Try to understand the insiders' perspective, learn about the categories that local people use to describe situations and inquire about local perceptions of the meaning of important denominators. Learn to think different about the world. To avoid carrying assumptions, it is important to enter the field with an open mind, willing to learn. Put aside what you know and look with fresh eyes, think like a child. Pay attention to detail, question everything, be truly curious, do not judge, look for interesting threads and themes that come up and truly listen. Even if you think you know the answer, pretend you do not know.

- *Listen with genuine interest.* Listen actively and attentively with genuine interest, enthusiasm and curiosity, without thinking about the next question or comment.

- *Encourage answering.* Encourage answering verbally and nonverbally. Say things like 'mmmm', 'uh-huh', 'I see' or 'really?', and use body language, such as head nodding, attentive forward leaning, and smiling.

- *Mind your body language.* While body language can be used to encourage participants to share stories, it can also communicate disinterest or lack of commitment. Be aware and careful about body language and keep an appropriate amount of eye contact.

- *Pay attention to body language.* Decide how to continue an activity based upon non-verbal behaviour of the participant.

- *Stimulate storytelling.* Stories indicate how participants think about the world. Do therefore not try to make participants answer brief and concise, but encourage them to tell stories in their own way - in all its complexity.

- *Encourage sharing of details and context.* Stimulate participants to share details and context to help you to understand which experiences have been significant to them and why they have been significant.

- *Sympathize.* Even if you do not agree, it might be useful to sympathize with the participant in order to make the participant open up more.

- *Limit interruption.* Play an active role in engaging users, but do not interrupt or rush them. Listen first and then talk. Do not be afraid of silence. Give participants the time to reflect, think and respond. However, do not let pauses become awkward.
- *Mind habitual behaviour.* Behave as an apprentice, do not lapse into the role of interviewer, expert or personal friend.
- *Avoid abstract talking.* When participants start to talk in abstract terms, make them talk about actual experiences again. It might be useful to ask participants about concrete examples.
- *Make it relaxed.* The activities need to be conducted within limited time, but this does not mean that they should be rushed. Instead, interactions should be relaxed and conducted with commitment.
- *Learn from failures.* Things will not always go as anticipated. When things go wrong, learn from those failures and start building new plans based on the failed ones.

2. Tips and tricks for ethical behaviour

The recommendations for designers' ethical behaviour are:

- The participant community should be central in the research process, the research should be participatory and conducted with respect for everyone, regardless of ethnicity, culture, religion, gender, class, sexual orientation, disability etc. The first responsibility is towards the participant community: their interests should be central to the study. Do not use your power to the disadvantage of participants, act responsibly.
- Different participants should be included in the research, not only the ones who are easily accessible.
- Permission to conduct research should be obtained, follow formal requirements and procedures. Review obligations of research plans in the designers' home country and in the country under study should be checked.
- Designers should explain who they are, what the nature and goals of the research are and what the programme and purpose of the activity is.
- Objectives, expected outcomes, source of funding, methods to be employed, output usage, risks and benefits should be shared to the community prior to conducting research. Their rights and responsibilities should also be shared. Designers should be open and honest, frank and realistic about research constraints and outcomes, do not make false promises, do not raise unreasonable or unrealistic expectations.
- Informed consent should be obtained. Preferably a written statement in the local language, but if most participants are illiterate, verbal consent is more ethically appropriate. Consent should be obtained for conducting the research activity, recording the activity, and using and sharing the – anonymised – outcomes.
- Designers should be aware of the risks and dangers that the research may pose to local communities and individuals and take appropriate action to eliminate them, in order to protect the weakest in a community. Participants' privacy should be protected. Data should be secured and anonymised in order to protect identities and locations of participants. It should be ensured

that the data is protected from misuse and falling into the wrong hands. Designers should be careful to engage with organisations who might use research results against – certain members of – the participant community.

- Designers should conduct research that is sound, well-conducted and results in relevant and useful data, as it is unethical to incompetently invade participant's personal lives resulting in questionable data.

- Designers should recognise and respect people's sensitivities and rights, should not trick them into revealing dark, shameful, personal or sensitive information or feelings, should not be intrusive or too demanding. The designers interests should not be placed ahead of those of the collaborators or the participants. Designers should not mine developing societies for data and should minimise social harm (e.g., intrusion, distress, indignity, physical discomfort, personal embarrassment, psychological harm) and maximize social benefit.

- Designers should be aware of their position, their background and training, power differentials, cultural distance, and the privileged position of power to influence situations through design, as these influence the way they think, the relationships with participants and the reactivity of participants.

- Designers should appreciate varying contexts, cultures, traditions, norms, mores, values, practices, systems and structures and be open to learn without judgement.

- Designers should try to limit inequalities: they should build local partnerships and collaborate on different levels, and try to contribute in a positive way, without making false promises.

- Designers should properly thank participants and local assistants, and provide appropriate compensation for time and effort taken. The research should not result in any material gain or loss for the participants. They should avoid making excessively high rates of payments, but provide appropriate compensation to participants and local assistants. Designers should provide gifts where this is culturally appropriate or expected, but should not end up in bribery or corruption. They should avoid exploitation of local assistants by providing them a fair return. The appropriate compensation can be discussed with local stakeholders.

- Designers should judge responses, but do so carefully. They should limit misinterpretation of outcomes due to preconceptions or misunderstandings, by triangulation, sharing of data, and consult stakeholders, participants and / or participant communities. They should be open about how interpretations are established.

- Designers should critically reflect on:
  o data limitations. E.g., regarding generalizability, errors;
  o method limitations. E.g., regarding the approach and methods used and the selection of participants;
  o designer limitations. E.g., regarding their position, established relationships, way of working, documentation, handling of delegated power, personal errors and mistakes;
  o project limitations. E.g., regarding the roles of participants, distributed power and agency.

- Designers should resist pressure from funding agencies or local authorities to make the outcomes match their needs or expectations: outcomes should be transparent, genuine and honest.

- Designers should make the research outputs available locally, ideally in a language and / or form that the communities can understand and use. This enhances transparency and openness, and facilitates mutual learning. Designers should acknowledge the contribution of everyone involved.
- Designers should provide follow-up / keep the people involved in an accessible and understandable manner, without making false promises.

3. Tips and tricks for questioning

The recommendations for questioning are:

- *Pose questions that are*:
  - o Neutral. Avoid steering participants' answers by implying a right or wrong answer, do not lead them towards an expected answer and avoid blaming questions which suggest the participant is wrong or at fault. Such oriented questions introduce bias;
  - o Specific. Avoid using the word 'usually', but make questions more specific by asking about a specific instance or occurrence;
  - o Naïve. Pretend you do not know to hear how people narrate things themselves. Do not be afraid posing 'dumb' questions, as the answers might be surprising;
  - o Open-ended. To stimulate conversation and stories, questions should elicit answers that require more than one word. Open-ended questions often start with 'what?', 'when?', 'where?', 'who?', 'how?', and 'why?'. Why-questions make brings about reasons, intentions, and motivations, but often result in more abstract answering. 'How'-questions stimulate straightforward storytelling.
  - o Simple, short and to the point;
- *Avoid questions that are*:
  - o Insensitive;
  - o Offensive;
  - o Ambiguous;
  - o Biased. Questions with built-in assumptions are not always corrected by participants, who might answer the question to please you;
  - o Leading, blaming, or oriented;
  - o Abstract, consider to explain them through a story;
  - o Multiple questions in one;
  - o Hypothetical;
- *Mind terminology.* Properly word and ask questions:
  - o Avoid jargon and tricky language;
  - o Avoid vague language that makes no sense to the participants;
  - o Avoid terminology with multiple meanings attached to them that might different things to different participants;
  - o Use local indicators and terminology;

- *Start with easy questions that are important to them.* Start with themes and questions that the participants find important. For example, if family is important to them, ask them about their family members and how they are doing first, before diving into the other themes.

- *Pose follow-up questions.* Probe into issues before continuing with the next topic. To improve understanding of how the participants view the world, it is useful to ask them why they say or do things;

- *Pose questions that stimulate description, discussion and depth.* Ask participants to tell more about a certain topic, echo answers in a question format, or retell answers or stories in order to stimulate further explanation and to elicit additional information;

- *Mix questions with discussions.*

- *Pose verifying questions.* Pose different types of questions about the same topic to verify participants' answers. Summarize answers to check understanding. Pay attention to and check inconsistencies and discrepancies, as they may hide interesting information. Admit confusion and ask for clarification;

- *Verify interpretations.* To avoid misinterpretation, check your interpretations of answers or observations by sharing them during the interview. Checking interpretations is not only useful for verification, but might also provide participants a starting point for providing additional insight;

- *Do not suggest answers.* Let the participants come up with answers themselves.

Questioning techniques

The following questioning techniques can be considered during interviewing to aid the designer to obtain deeper insight into the behaviour and reasoning of the participant and to provide information about aspirations and desires. These techniques are not obligatory to follow and are therefore not explicitly part of the ODK, but they can be useful to consider.

These questioning techniques are:

- *The 'five why's'.* This technique means asking why five times in a row to probe deeper and detect underlying reasons for behaviour and attitudes.

- *'Directed storytelling'.* This technique means guiding the participant to tell a story about a certain topic with help from additional questions such as 'who?', 'what?', 'when?' 'where?' and 'how?'.

- *'Guided speculation'.* This technique means asking questions about hopes and fears for the future

- *'What-if-scenarios'.* This technique means putting forward scenarios or storylines for the participant to complete.

- *'Sacrificial concepts'.* If a question is abstract it can help to change the question to a concrete scenario with two options. For deeper insight the variables of the options can be changed.

- *'Talking diaries'.* Asking participants to describe important past events in their lives like reading from a diary.

- *'Thinking aloud'.* Asking participants to tell what they are doing and/or thinking when they are performing a specific task. This technique can, for example, be used during the scoring exercise.

4. Tips and tricks for 'What to pay attention to'

Basically, learn everything there is to know. Relevant knowledge is not only with the participants, it is also present in the context. Try to understand the details of people's lives and practices and detect patterns and structure. Specific things to pay attention to are:

- Everything that is seen. Observations during the interviews are useful means to check and interpret answers and helpful to start and continue dialogue. Observe during the touchstone tour, but also observe the participant's behaviour and body language.
  - o Things that are physically present
  - o Objects participants care about
  - o Body language
  - o Factual behaviour and things that change behaviour
  - o Interactions with the environment
  - o Adaptations and work-arounds
- Everything that is heard
  - o Language, vocabulary, words and categories
  - o Expressions
  - o Motivations
  - o Perceptions
  - o Issues, difficulties or obstacles
  - o Interactions
  - o Social actors
  - o Unarticulated needs
  - o Events and circumstances that shape experiences
  - o Prior experiences, current experiences and how those are perceived and conceptualized
  - o Intonation
- Everything that is felt
  - o Emotions, moments or things that participant react upon emotionally
  - o Feelings
- Everything that is smelled
- Everything that is tasted
- Anything surprising: that changes assumptions or seems irrational
- Observable and explicit needs, but also tacit needs – which cannot be expressed verbally, and latent needs- which are subconscious. These can be detected by exercises where participants create or perform tasks.

5. Tips and tricks for selecting, instructing and working with a translator

The recommendations for questioning are:

- Tips and tricks for selecting a translator: The translator should be selected based on his knowledge of the area, of the local language and of English. The translator should have sufficient time, be sufficiently educated or skilled to translate and should not have a stake in the research, but be

interested in it. The translator's position and gender should preferably match the gender of the potential participant, it might therefore be wise to select both a male and a female translator. When the translator is familiar to the participants, but does not have a stake in the interview, it is easier for participants to open up. It is best to use one and the same translator for every interview, as this reduces training and interview time, a translator's availability is therefore an important selection criterion. Normally, a translator is paid for his or her services.

- Tips and tricks for instructing a translator: Designers should insist that the translator properly translates the questions and the participants answers, should not be afraid to pose 'naïve' questions, should not rush the interview, should not interpret questions or answers, and should not steer the participant by providing examples or indicating desired answers by tone or body language. The translator should however try to build rapport and show empathy. Designers should stress that a proper introduction and asking for consent are required. It might be wise to have food or a drink with the translator to build rapport with this person.

- Tips and tricks for working with a translator: It is difficult to decide at whom to look. Do not forget that the participant is the one you are interviewing, not the translator! Be aware of the way you pose questions to the translator, especially if the translator directly translates everything you say.

6. Tips and tricks for contextualizing visualizations

When visualizations are contextualised, the following guidelines should be kept in mind:

- Keep the audience in mind (Hodge 2008)
- Collect and review visualizations (Pettersson 2010)
- Consider the use of words, images and graphic forms (Pettersson 2010)
- Consider the size the visualization will be displayed at (Hodge 2008)
- Consider feedback expressed by participants (Pettersson 2010)
- Use bold and large enough picture elements (Pettersson 2010)
- Use one specific style (Pettersson 2010; Hodge 2008)
- Use a limited amount of perspectives (Hodge 2008)
- Pay attention to colour and contrast (Pettersson 2010)
- Make the lay-out clear and simple (Pettersson 2010; Hodge 2008)
- Avoid unnecessary detail, keep the amount of elements limited (Pettersson 2010)
- Emphasize what is important (Pettersson 2010)
- Make the photograph represent all the topics within the theme (team F2 and G)
- The photograph for one theme should not link to another theme (Team F2)
- Use pictures regarding the aspired yet achievable situation (Team F2)
- Stay "gender neutral, country neutral and age neutral" (team F2)
- Make the photographs recognizable for the participants (Team F2)
- Be aware that visualizations are perceived differently in different regions (Team F2)
- Be aware about local preconceptions to avoid overtone (Team F2)
- Do not use too many photographs (team G)

5.   The Opportunity Detection Kit

The Opportunity Detection Kit is a toolkit that supports the designer to conduct step 3 of the CDD approach: obtaining deep insight by means of semi-structured individual interviews (see figure 16).
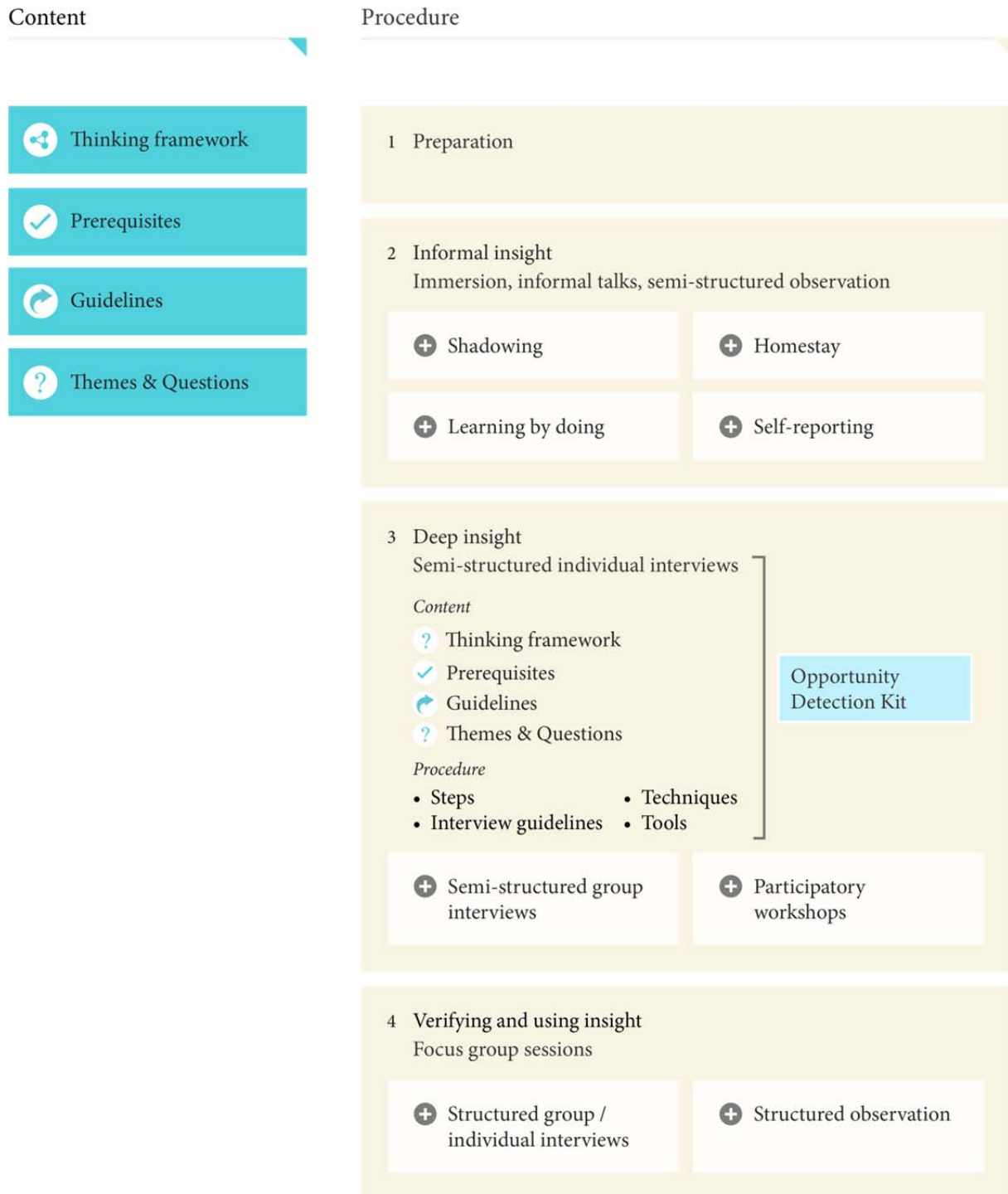
Content

Procedure

- Thinking framework
- Prerequisites
- Guidelines
- Themes & Questions

1 Preparation

2 Informal insight
   Immersion, informal talks, semi-structured observation

   - Shadowing
   - Learning by doing
   - Homestay
   - Self-reporting

3 Deep insight
   Semi-structured individual interviews

   Content
   ? Thinking framework
   ✓ Prerequisites
   ↱ Guidelines
   ? Themes & Questions

   Procedure
   - Steps
   - Interview guidelines
   - Techniques
   - Tools

   Opportunity Detection Kit

   - Semi-structured group interviews
   - Participatory workshops

4 Verifying and using insight
   Focus group sessions

   - Structured group / individual interviews
   - Structured observation

Figure 103: The Opportunity Detection kit as part of the Capability Driven Design approach

Appendix G

What is ODK? What benefits does it offer?
The ODK is a toolkit that comprises one of the essential methods within the CDD approach, semi-structured interviews, using the backbone of CDD and proposing several techniques and tools. The techniques and tools can be used during the interview to start the conversation, stimulate participants to open up, make the activity fun, simple and participatory, address all the themes, provide an overview of the conversation topics discussed and provide the design team a basis to fall back.

How to use the ODK?
During the first few interviews, all themes should be addressed, but that the facilitator should follow-up on the unexpected and on issues that the participant finds interesting. During the latter ODK interviews, after iterative data analysis of the first interviews, the facilitator can go deeper and obtain more specific insight in emotions and feelings regarding to themes that seem of most interest.

Combination with product-related questions
During the ODK interviews, 'generic' product questions can be posed. Product questions can be added when certain themes are discussed that are obviously related to the product or service to be developed. For example, when a solar charging station for mobile phones needs to be developed, questions about mobile phones ('Products'), connectivity ('Mobility', 'Significant Relationships', 'Family' or 'Services') and energy ('Services') can be posed. Example questions could be: 'Do you own a mobile phone' and 'What do you use your phone for?' and 'How do you charge your mobile phone?'. More specific questions, for example about aesthetic preferences for the charging station, are not adequate to pose during the ODK interviews, they will make the interview too long and focused on the product, while it is meant for a comprehensive insight.

5.1 Techniques and Tools of the Opportunity Detection Kit

The ODK comprises several techniques and tools: reminder cards, pictograms, question cards, drawing and mapping tools, timelines to draw on and a sorting exercise. All these techniques and tools support the designer during the semi-structured ODK interview and are explained here.
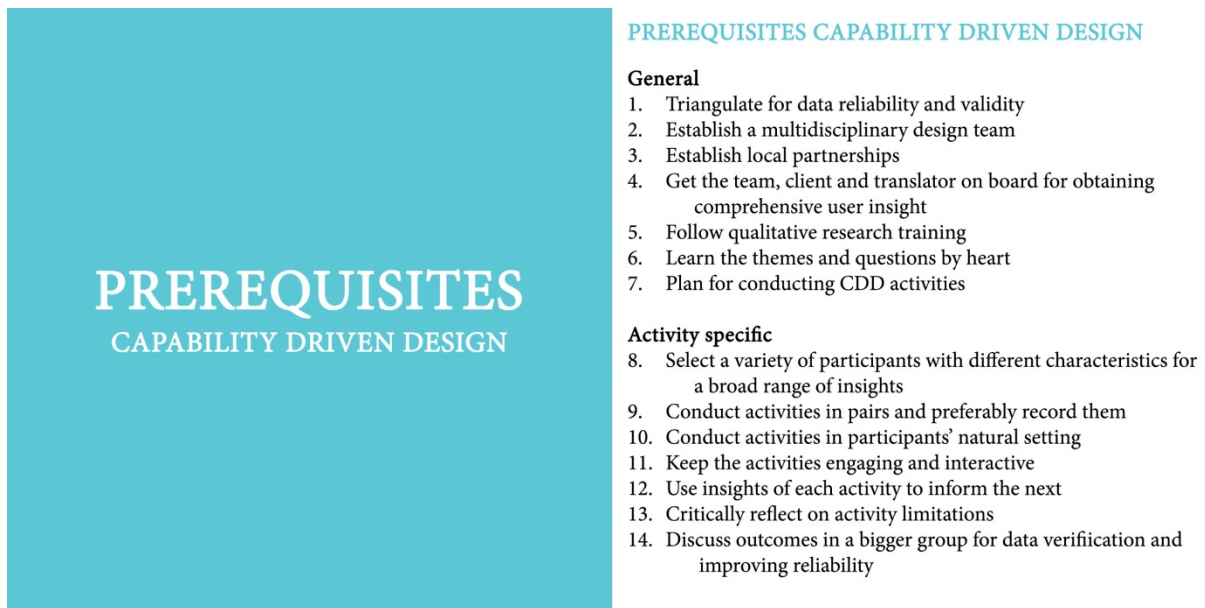
Question cards
The question cards are presented above (in figure 9). For each interview, the design team can choose one pictogram or choose to contextualise the visualisation. Then, one set of pictograms can be printed to provide visual feedback to the participant about the theme being discussed and the interview progress, and one set of pictograms can be printed with the questions on the back, to guide the facilitator. The design team should cluster the selected question cards in sets of four, to keep a better overview.

Reminder cards

To further assist the design team in following the prerequisites and steps and remembering the most important behaviour and attitude to stick to, reminder cards have been developed, which are explained below.

Prerequisite reminder card

This card shortly states the prerequisites of the CDD approach (see figure 17).

PREREQUISITES
CAPABILITY DRIVEN DESIGN

PREREQUISITES CAPABILITY DRIVEN DESIGN

General
1. Triangulate for data reliability and validity
2. Establish a multidisciplinary design team
3. Establish local partnerships
4. Get the team, client and translator on board for obtaining comprehensive user insight
5. Follow qualitative research training
6. Learn the themes and questions by heart
7. Plan for conducting CDD activities
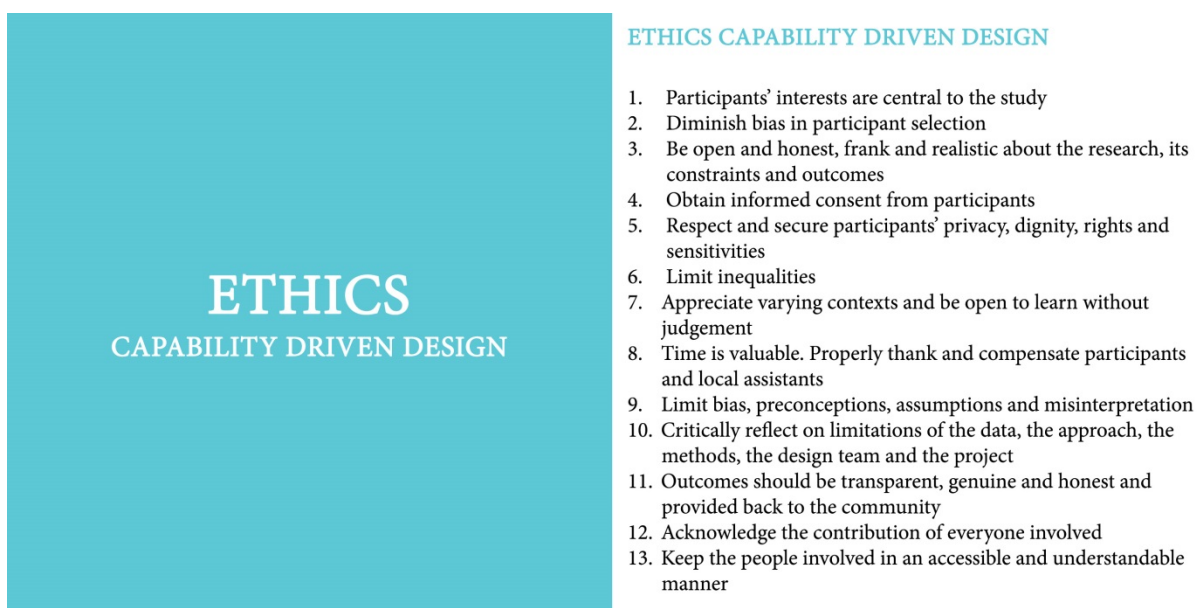
Activity specific
8. Select a variety of participants with different characteristics for a broad range of insights
9. Conduct activities in pairs and preferably record them
10. Conduct activities in participants' natural setting
11. Keep the activities engaging and interactive
12. Use insights of each activity to inform the next
13. Critically reflect on activity limitations
14. Discuss outcomes in a bigger group for data veriﬁcation and improving reliability

Figure 104: Prerequisite reminder card

Ethics reminder card: ethical guidelines for Capability Driven Design

This card shortly states the most important ethical guidelines of the CDD approach (see figure 18).

ETHICS
CAPABILITY DRIVEN DESIGN
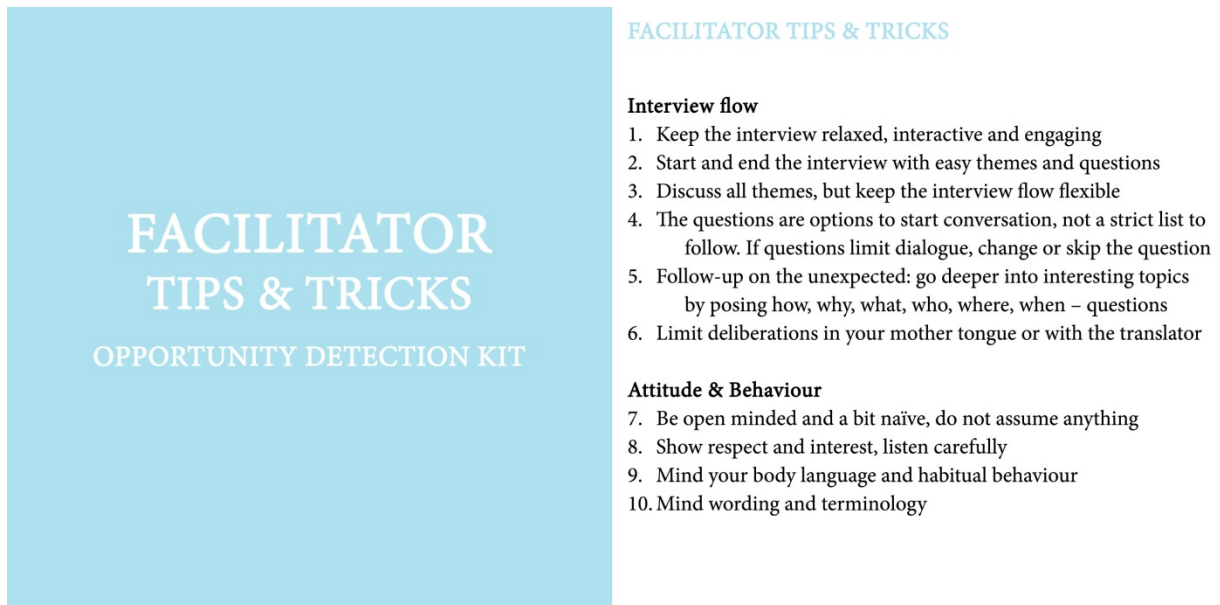
ETHICS CAPABILITY DRIVEN DESIGN

1. Participants' interests are central to the study
2. Diminish bias in participant selection
3. Be open and honest, frank and realistic about the research, its constraints and outcomes
4. Obtain informed consent from participants
5. Respect and secure participants' privacy, dignity, rights and sensitivities
6. Limit inequalities
7. Appreciate varying contexts and be open to learn without judgement
8. Time is valuable. Properly thank and compensate participants and local assistants
9. Limit bias, preconceptions, assumptions and misinterpretation
10. Critically reflect on limitations of the data, the approach, the methods, the design team and the project
11. Outcomes should be transparent, genuine and honest and provided back to the community
12. Acknowledge the contribution of everyone involved
13. Keep the people involved in an accessible and understandable manner

Figure 105: Ethics reminder card

Facilitator reminder card: tips and tricks for facilitating ODK interviews

This card comprises the most important rules towards interviewing will be placed down on a card that will be added. Designers are free to add to this card. The standard 'rules' presented on the card can be seen in figure 19.

FACILITATOR TIPS & TRICKS

Interview flow
1. Keep the interview relaxed, interactive and engaging
2. Start and end the interview with easy themes and questions
3. Discuss all themes, but keep the interview flow flexible
4. The questions are options to start conversation, not a strict list to follow. If questions limit dialogue, change or skip the question
5. Follow-up on the unexpected: go deeper into interesting topics by posing how, why, what, who, where, when – questions
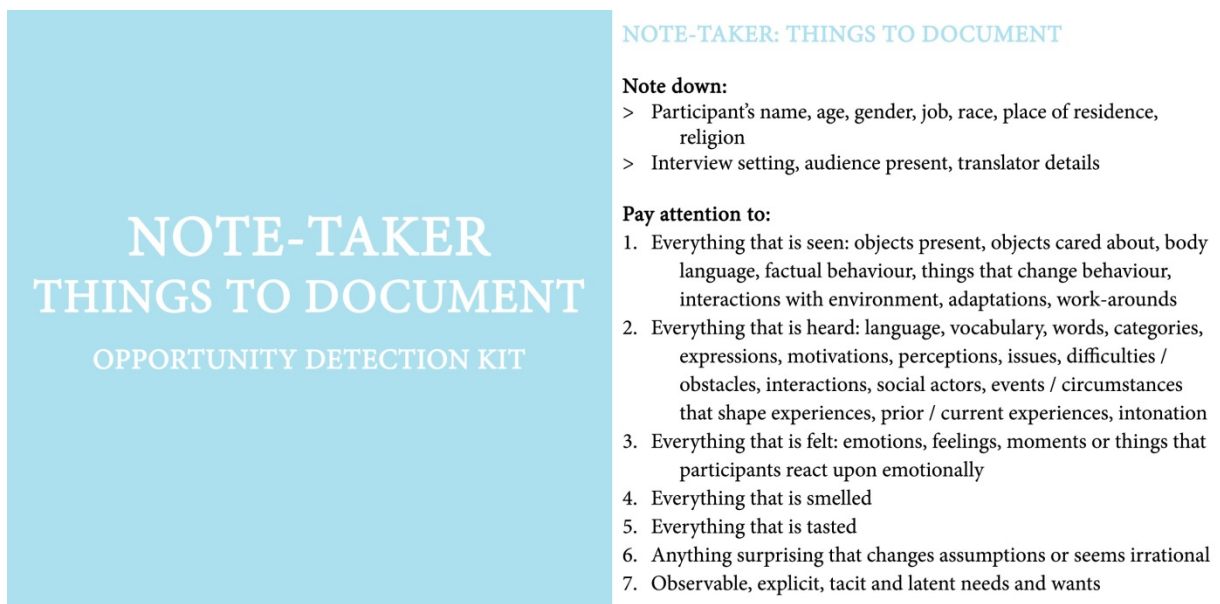6. Limit deliberations in your mother tongue or with the translator

Attitude & Behaviour
7. Be open minded and a bit naïve, do not assume anything
8. Show respect and interest, listen carefully
9. Mind your body language and habitual behaviour
10. Mind wording and terminology

Figure 106: Facilitator reminder card

Note-taker reminder card: things to pay attention to when documenting ODK interviews

This card summarizes the things the note-taker should pay attention to and document during an interview (see figure 20). Designers are free to add to this card.

NOTE-TAKER: THINGS TO DOCUMENT

Note down:
> Participant's name, age, gender, job, race, place of residence, religion
> Interview setting, audience present, translator details

Pay attention to:
1. Everything that is seen: objects present, objects cared about, body language, factual behaviour, things that change behaviour, interactions with environment, adaptations, work-arounds
2. Everything that is heard: language, vocabulary, words, categories, expressions, motivations, perceptions, issues, difficulties / obstacles, interactions, social actors, events / circumstances that shape experiences, prior / current experiences, intonation
3. Everything that is felt: emotions, feelings, moments or things that participants react upon emotionally
4. Everything that is smelled
5. Everything that is tasted
6. Anything surprising that changes assumptions or seems irrational
7. Observable, explicit, tacit and latent needs and wants

Figure 107: Note-taker reminder card

Steps reminder card: steps to follow when conducting ODK interviews
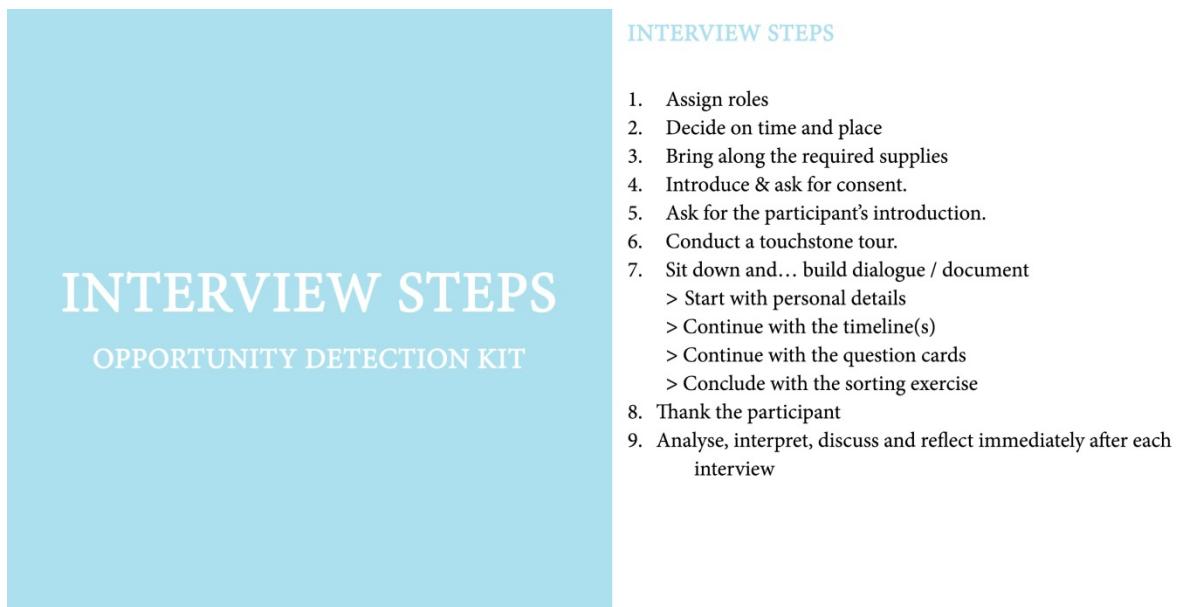A card shortly stating the interview steps of the ODK will be added (see figure 21).

INTERVIEW STEPS

OPPORTUNITY DETECTION KIT

INTERVIEW STEPS

1. Assign roles
2. Decide on time and place
3. Bring along the required supplies
4. Introduce & ask for consent.
5. Ask for the participant's introduction.
6. Conduct a touchstone tour.
7. Sit down and… build dialogue / document
    > Start with personal details
    > Continue with the timeline(s)
    > Continue with the question cards
    > Conclude with the sorting exercise
8. Thank the participant
9. Analyse, interpret, discuss and reflect immediately after each interview

Figure 108: Interview steps reminder card

Drawing / mapping on timelines and mapping sheets
The timeline as presented below in figure 22, is meant for drawing a typical day of the participant. The timeline can be used on an electronic drawing device, or can be printed and laminated to allow for drawing with erasable markers.

Figure 109: Timeline for drawing

A timeline of the year can be used additionally to learn more about participants' activities throughout the year (see figure 23). A timeline of personal history can be used to learn more about participants' personal history by going back to past experiences (see figure 24).
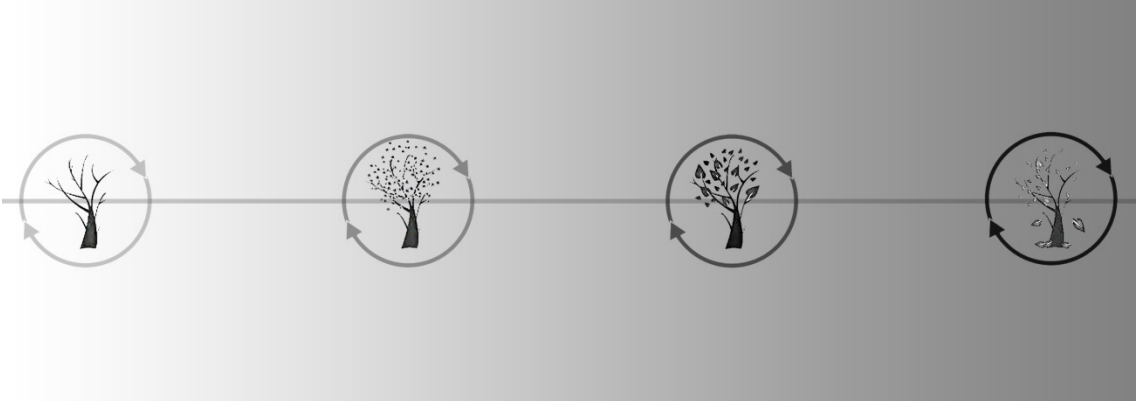
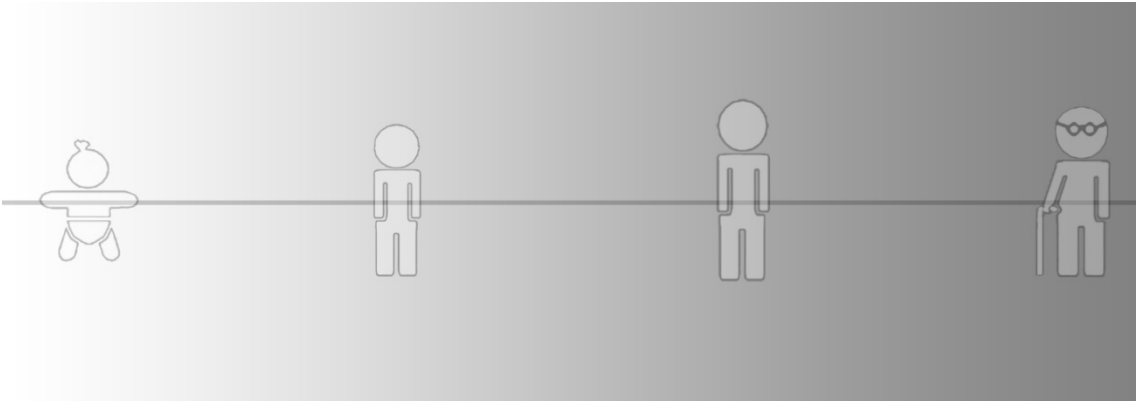*Figure 110: Timeline for activities throughout the year*

Figure 111: Timeline for personal history

Moreover, two drawing sheets are part of the ODK. One to enable mapping of participants' housing, surroundings and movement patterns, and one to map participants' appearance and social life (see figure 24 and 25).
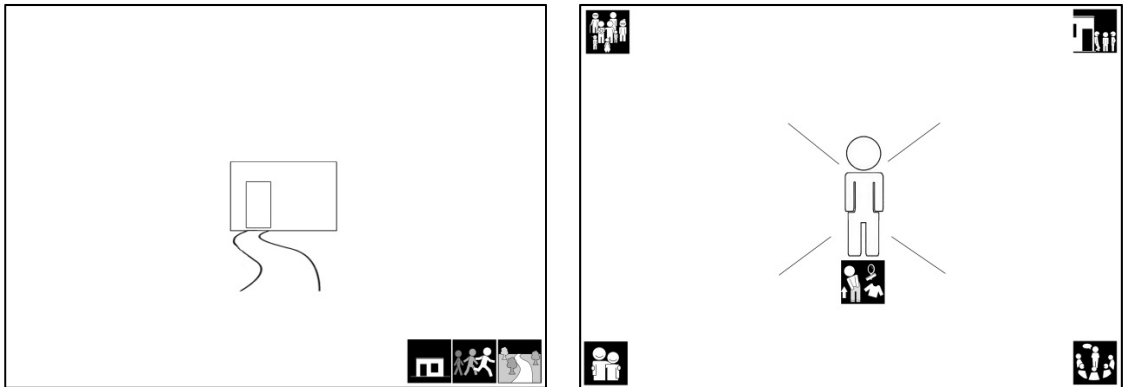

Figure 112 and 113: Mapping sheet for 'Living' and 'Movements' and Mapping sheet for 'Appearance' and 'Social Life'

Sorting

The sorting exercise is to sort how people value the different themes. Participants should indicate which sub-themes they value most in their lives. The sub-theme pictograms are available in a smaller size and can be placed on the sorting sheet. The exclamation marks indicate importance. The

participants have to sort the sorting cards in six categories from very important (six exclamation marks) to not important (represented by one exclamation mark) (see figure 26). To avoid confusion, this can be done best by providing the sorting cards one by one and let people sort them one by one.
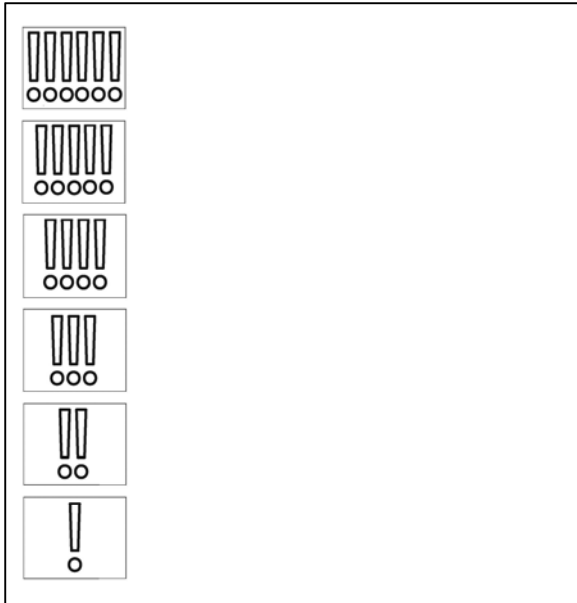

Figure 114: Sorting sheet

5.2   Opportunity Detection Kit Interview Steps

The steps that need to be executed in order to conduct semi-structured interviews are the following:

Prepare the interview

15. *Get familiar with the ODK procedure, techniques and tools.* The team members must become acquainted with the flow and structure of the interview. By being familiar to the themes and questions it is easier to switch between them, offering flexibility which improves the building of dialogue. Roleplay the interview in the team, pilot the interview and read the full manual to get the most out of the interviews.

16. *Include general product questions in the ODK.* During the ODK interviews, 'generic' product questions can be posed. Product questions can be added when certain themes are discussed that are obviously related to the product or service to be developed. For example, when a solar charging station for mobile phones needs to be developed, questions about mobile phones ('Products'), connectivity ('Mobility', 'Significant Relationships', 'Family' or 'Services') and energy ('Services') can be posed. More specific questions, for example about aesthetic preferences for the charging station, are not adequate to pose during the ODK interviews, they will make the interview too long and focused on the product, while it is meant for a comprehensive insight.

17. *Localize the content and conduct a local pilot.* Locally discuss the ODK contents beforehand. As accents, words, expressions, dialects and pronunciations might be different and words might mean different things in different regions, it is important to make sure the translator and the

participant have the same understanding of the themes and questions. To adjust wordings to local dialects and to point out sensitivities it is important to discuss the themes and topics with people familiar to the potential users and their context. To improve participants' understanding of the themes and build relationship, the pictographs can best be replaced by local visualizations. Be careful to select visualisations to which the participant can relate, but which do not steer the participant into a certain direction. Adjusting the ODK to the local context results in better dialogue and better outcomes. After adjusting the ODKs contents, a local pilot should be executed in the field. By conducting a pilot in the field, the designer becomes familiar to the ODK content and procedure. Moreover, sensitivities and terminology become even more clear. Especially when using a translator it is relevant to conduct the pilot locally, as in this way the translator also becomes familiar to the ODK content and procedure. Tips & tricks for contextualizing visualizations are provided in the manual.

18. *Carefully select and instruct a translator (if required).* Follow the tips & tricks in the manual. The translator should be thoroughly informed about the task at hand and his or her role. Share the goals of the research and explain the rules. If step 5 (conduct a local pilot) is not feasible: go through all the themes and questions before the first interview to get the translator acquainted with the interview flow and structure, the themes and key questions. It is best to use one and the same translator for every interview, as this reduces training and interview time. Moreover, when the translator is familiar to the participants, but does not have a stake in the interview, it is easier for participants to open up.

19. *Select participants.* A local partner, translators or other participants can aid in selecting participants. However, the selection criteria should be followed. As stated in prerequisite H, a variety of participants should be selected, also outside the potential user group.

Conduct the interview

20. *Assign roles.* Conduct the interview with at least two (a facilitator and a note taker / photographer) and a maximum of three designers and assign roles beforehand to clarify the purpose for each researcher. Appoint a facilitator who resembles the participant most (e.g., in gender, age social class, religion and ethnicity), when possible.

21. *Decide on time and place.* Time and place of the interview should be at convenience of the participants and preferably in their local context. Try to prevent to conduct interviews with participants who are busy and distracted (e.g. because of work, time limitations), and interviews that suffer from interruption by audience. Try to not bring employees from the client organization, as they have a stake in the research outcomes and might influence the participant's answering. Make sure there is sufficient space to use the ODK techniques and tools.

22. *Bring along the required supplies.* The materials for the activities, recording devices, a notebook and pen should be brought along to the interview. Consider to bring along pictures of yourself and your surroundings and food for the participant as well.

23. *Introduce & ask for consent.* Introduce the research, the interview, the translator and yourselves. Be honest and explain the research goals and why comprehensive user insight is required to be

able to develop a product and / or service that suits the people's needs and wants. Explain that they are the experts and that the interview is to learn from them. Giving your introduction in the local language helps to build rapport and to establish a more relaxed atmosphere. Participants should be informed about the research and its goals and about the activity. Ask for consent to record the interview, to take pictures and to use the data. Stress that participants are not obliged to participate and can withdraw from the activity at any time. Clarify how much time the interview will approximately take, based on the local pilot. It is very important to be clear about compensation to set the right expectations for participants. Communicate openness and being non-threatening, stress that there are no wrong answers and that not all questions have to be answered. Explain the participant that he or she is free to leave. Make the participants feel relevant as participants by sharing yourself, verbally or with help from pictures.

24. *Ask for the participant's introduction.* Asking participants to tell something about themselves provides an easy start and shows interest. Learn participants' names, age, place of residence, job and religion and note this down, in order to acknowledge the participant and make him or her feel relevant.

25. *Conduct a touchstone tour.* Let the participant show you around in their house or the environment where the interview is conducted. Use the show me technique: let the participants show you objects, spaces and tools. Conducting a touchstone tour results in better outcomes, as the observations made can be used to establish dialogue and to cross-check the information that participants share.

26. *Sit down and…*
    When multiple team members are present, try to not sit together and do not discuss things in your mother tongue. Also try to limit discussions in English with the translator. The participant should be the one talking.

    a. *For the facilitator: …build dialogue.*

    ➢ *Start with personal details.* Ask the participant's name, age, place of residence and religion. Share pictures that you brought from your home country. Look at the tips & tricks for appropriate behaviour and attitude to help you to build a comfortable and relaxed atmosphere.

    ➢ *Continue with the timeline.* Ask what the participants do during a day. The timeline can be combined with the visualization cards and erasable markers to create an overview of their day. Try to let participants create, if they are unwilling let the note taker create.

    ➢ *Continue with the question cards.* Use the drawing sheet, the visualization cards and the erasable markers to visualize the answers. Start with the current situation for one theme and from that point ask about changes in the past and aspirations for the future, before continuing to the next theme. When discussing a theme, explain what the pictograph/local visualization is about. Again, try to let participants create, if they are unwilling let the note taker create. There is no indicated order for discussing the themes, but start with an 'easy' theme or topic and also end with an 'easy' theme or topic (which themes are 'easy' can be found out by discussing the themes with a local partner and / or conducting a local pilot).

The questions for each theme are mere options for starting conversations than exact questions that need to be asked. However, the questions should be kept general enough to stimulate conversation, and focused enough to reveal the desired information. Questions can be left out and for each theme it is also important to ask questions in different ways, to pose questions about topics and experiences that come up during the conversation. Pose follow-up questions to follow-up on the unexpected, and on topics that the participant finds interesting. When participants have difficulty opening up, fall back to 'easy' topics or use drawings to elicit more response. When certain topics are clearly sensitive or close down the participant, switch topic. Any question affecting the dignity of participants must not be pursued. It is important to consider and respect people's privacy, and their personal space. If participants do not allow the designers to enter that personal space, that should be respected.

➢ *Conclude the conversation with the sorting exercise.* Use the sorting cards and let participants place these cards on the ranking sheet, based on their importance: not important (.), less important (!), important (!!) or very important (!!!). For each sorting card, explain what the pictograph/local visualization means. The ranking exercise works as a confirmation of the things being told during the interview and provides insight in what and how participants value.

b. *For the note-taker: …document.* Let the interview preferably be recorded by a recording device (but be aware of the possible effects of recording devices: participants becoming shy or holding back) and take notes to document anything surprising and participants' behaviour, attitude, body language and interpretations. The note-taker can also draw, and capture photographs and video. Look at the tips & tricks about 'what to pay attention to'.

27. *Thank the participant.* Thank participants for their invested time and effort and for sharing personal information. Bring a small gift, food and / or money to show appreciation and compensate for time and costs (see ODK guideline C).

28. *Analyse, interpret, discuss and reflect immediately.* Analyse and interpret the data after each interview and discuss the interview outcomes, the most striking insights and perceptions with the design team directly after each interview, before things become 'normal'. This aids to verify insights and detect design opportunities. The insights can also be discussed with the translator and the local partner(s). Reflect on the insights (see prerequisite N) with the full team and use the outcomes during the following interviews.

When using the ODK, all fourteen steps should be followed and step five to thirteen should be repeated for each interview.

5.3   Guidelines of the Opportunity Detection Kit

The presented guidelines provide support to designers for conducting ODK interviews:

H. *Start broad, then go deeper.* During the first interviews it is important to touch upon all themes and topics. After some initial interviews, some of the topics and questions can be left out in order

to deeper investigate the topics and questions that seem surprising or interesting for the design project.

I.   *Time and place of the interview.* It is useful to conduct interviews at homes to combine interviews with observation and to create a comfortable setting. However, if the home setting results in shyness, embarrassment, is too hot, or results in a lot of audience or other disturbances, it might be better to conduct the interview in a more contained space.

J.   *Flexible but focused individual conversations.* The ODK provides steps, themes and guiding questions, but there is room for flexibility and unexpected turns in order to stimulate dialogue. There is no indicated order indicated for addressing the themes. Do not ask questions from a script, and feel free to add or change questions. The interview should feel like an open-ended, dynamic conversation to make participants feel comfortable. It is important to continue dialogue regarding topics that seem to be of interest to the participant, and regarding surprising, idiosyncratic or contradictory responses or behaviour from the participant. It might be useful to hide the list of questions and to learn the key questions by heart or keep them out of sight. Do, however, exert some control over activity topics. Use the question cards and drawings to keep an overview of the themes and topics discussed and preferably start and end with 'easy' to discuss themes.

K.   *Duration of interviews.* The interview should be sufficiently long to make participants feel to make participants feel they are being heard, but should not continue too long resulting in participants becoming tired and disinterested. Follow up on answers, but also keep focus: if focus is lost, the interview can become overly long without obtaining useful information. End the interview when no questions are left, or when you feel like delaying a participant. The ODK interview is scheduled to last between 1.5 and 3 hours. The participants should be properly informed before the interview about how much time the activity will take, before they give their consent. Participants can be compensated for their time, for example by providing food or compensation for expenses, and a gift can be provided. If an interview takes longer, participants should be informed and asked for additional consent. The participants can be offered a compensation for continuing the interview. If the participant is not willing to continue longer, the interview should be concluded. When being familiar to the themes and questions, interviews can be conducted quicker. When more drawings are being made and more follow-up questions are posed, interviews become longer. Decide, based on the participant's behaviour and attitude, how to approach the interview.

L.   *Number of interviews.* The objective of the ODK interviews is to get to know people's available and valued beings and doings, and to become inspired. The amount of interviews is not fixed and it is up to the team to decide when sufficient insight is obtained. The context, the project, the participants, the translator, the variety of participants that can and should be included, and the skills of the facilitator all influence the outcomes and therefore the number of interviews required. It is not the intention to obtain statistically generalizable data, and after the first few interviews the amount of new insights will decrease. The 'quick scan' program includes at least five interviews, to be conducted in three days. However, it depends on the amount of insights if this is

sufficient or that more interviews are required. The 'extensive scan' allows for conducting more interviews in combination with other methods.

M. *Consider to use specific questioning techniques.* As mentioned under 'questioning techniques'.

N. *Dealing with sensitive questions.* Sensitivity differs per culture, so it might be that the questions you think are sensitive, are not sensitive to the participant. Your own assumptions and feelings towards questions should not be leading. Discuss the questions beforehand with a local partner to identify sensitivities. Start with more general and easy to answer questions, and later in the interview, when rapport has been build, it might be possible to pose sensitive questions and probe broader and deeper. However, be understanding and sensitive towards the feelings of participants and the potential of causing psychological harm for the participant. Try to rephrase a question when the participant is hesitant to answer it, or ignore the question if it leads to an uncomfortable situation. Sensitive questions should not be forcefully asked, just because they are in the ODK. It is not always possible to obtain answers to all questions, but that is also not required. Participants must be free to share what they want and remain comfortable. An unwillingness to answer questions also provides valuable information. It might be wise to let sensitive questions to male participants be posed by male facilitators and translators and to female participants by female facilitators and translators. Sensitivities can be pointed out beforehand by local partners and / or the translator, but the information provided by them should not be leading.

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