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Using the Capability Approach to
Detect Design Opportunities

Annemarie Mink, Floris van der Marel
Vikram Parmar, Prabhu Kandachar

## authors:

Annemarie Mink
Faculty of Industrial Design Engineering
Delft University of Technology
The Netherlands
a.mink@tudelft.nl

Vikram Parmar
Faculty of Industrial Design Engineering
Delft University of Technology
The Netherlands
v.s.parmar@tudelft.nl

Floris van der Marel
Faculty of Industrial Design Engineering
Delft University of Technology
The Netherlands
fmarel@gmail.com

Prabhu Kandachar
Faculty of Industrial Design Engineering
Delft University of Technology
The Netherlands
p.v.kandachar@tudelft.nl

**Abstract:**

When developing products and services to improve the well-being of the multidimensional poor, designers need deep contextual insight. However, literature does not specify which topics to discuss or which questions to ask. We used Sen's capability approach to develop question categories and specific questions, and we selected tools to support them. This resulted in an *Opportunity Detection Kit*, which has been tested to evaluate the impact of the Philips Chulha in rural South-India. The kit stimulated the participants to think deeply about the impact of the Chulha and encouraged them to share their stories. In this way, new areas for improvement were detected. Thereby, a holistic and comprehensive picture could be drawn about participants' lives, which indicated opportunities for new product development. The integration of the capability approach and design for development therefore seems promising for the evaluation of product impact and opening up new design perspectives.

## 1   Introduction: Design for Development and the Capability Approach

Design for Development (DfD), described by Donaldson as 'product design aimed at disadvantaged or marginalized populations' to advance social, human, and economic development (2002, p.97), is considered to be truly relevant for poverty alleviation (Thomas, 2006; Kandachar & Halme, 2008). Thereby, developing countries represent a large consumer market, and insights based on designing products for these markets might be an important source of innovation that can be beneficial for all markets (Prahalad & Lieberthal, 2003; Viswanathan, Yassine, & Clarke, 2011).

The field of DfD has been growing rapidly in the last few years, although in 'haphazard ways' (Donaldson, 2009, p. 97). Literature offers 'little theoretical or practical guidelines for innovative product development' for underserved markets (Viswanathan & Sridharan, 2012, p.52).

We describe product design as 'the successful creation of tangible products or services that induce change to a new context' (Mink et al., 2014), and the targeted population as the multidimensional poor (UNDP, 2010; UNDP, 2012)[1]. When innovating

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[1]   Authors use several different names to refer to the 'poor': emerging markets, Base/Bottom of the Pyramid (BoP, defined by Prahalad (2005) as people living on less than $1,500 a year), newly industrialized economies, developing countries, the Third World, and subsistence marketplaces, among others. In this paper, we use the term 'multidimensional poor', which relates to the Multidimensional Poverty Index (MPI) as measured by the Oxford Poverty Cand Human Development Initiative (OPHI). This index is grounded in the capability approach and is used by the United Nations Development Program (UNDP). According to this index, an estimated population of 1.75 billion people worldwide experience multidimensional poverty (UNDP, 2010). The MPI 'complements money-based measures by considering multiple deprivations and their overlap' (UNDP, 2012).

for this target population, designers encounter several challenges. These challenges include more complicated information gathering than in mature markets (Castillo, Diehl, & Brezet, 2012)and difficulty in identifying people's true needs (Shahnavaz, 1989; Donaldson, 2006; Chavan & Gorney, 2008; Viswanathan & Sridharan, 2012).

Castillo et al., (2012) state that qualitative methods are effective tools to use when gathering data about the user context. IDEO (2008, p.22) also indicates that 'Qualitative methods can help unveil people's social, political, economic, and cultural opportunities and barriers in their own words'. IDEO (2008) specifies that individual interviews are critical to obtain deep insight. Several valuable design approaches and toolkits have been developed for NGOs, social enterprises, or community workers[2], most of which
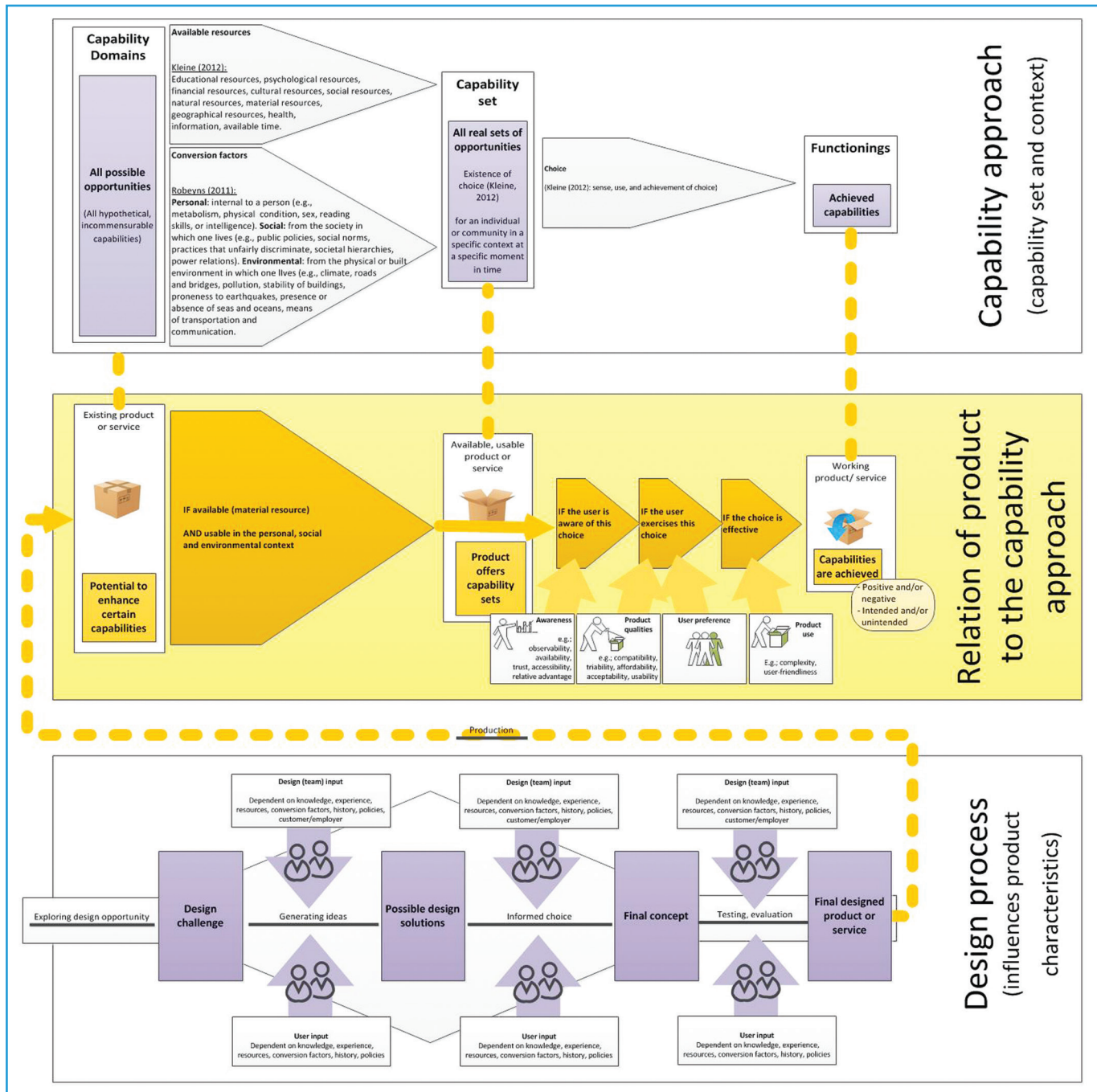


**Figure 1** Relation between the product design process and the capability approach.

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[2]  E.g. Chamber's Participatory Rural Appraisal, Simanis and Hart's BoP Protocol (2nd edition), IDEO's 'Human Centered Design' Toolkit, the 'Market Creation Toolbox' of the Danish International Business Development Department and the BoP Learning Lab, the Bootcamp Bootleg of Stanford's d.School. Frog's Collective Action Toolkit is more recently developed and not yet considered for the work presented in this paper.

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mention individual and group interviews. They provide guidelines on how to develop an interview approach (IDEO, 2008b, p. 26, 40; Larsen and Flensborg, 2011, p. 58), establish appropriate questions (D.School, 2010, p.9; IDEO, 2008a, p.9-10; 2008b, p.41; Larsen & Flensborg, 2011, p.58), and question people effectively (D.School, 2010, p.10; Freudenberger, 1999, p.74-76; IDEO, 2008a, p.8-10; 2008b, p.45-49; Larsen & Flensborg, 2011, p.58). They do not, however, specify explicitly which topics to discuss or which questions to ask. These decisions are left to the designer or the design team.

In this study, we attempt to address this issue by using Sen's Capability Approach (CA). According to Robeyns (2005), this approach takes into account all dimensions of human well-being and offers a 'broad normative framework'. The CA makes a clear distinction between what people are free to do to improve their well-being (their capabilities) and the achieved components of a person's life (their functionings). Technology and design are directly or indirectly linked to people's real opportunities (see Figure 1), as products and services have the ability to shape opportunities for the people using them. Johnstone (2007), Oosterlaken (2009), and Kleine et al., (2012) have already discussed the connection between technology, design, and the CA. However, the field of practical applications of the CA remains underdeveloped (Wagle, 2009). While attempts to practically apply the CA have been undertaken, Kleine (2010) noted that scholars have difficulty finding 'a balance between [the CA's] conceptual richness and its potential to be operationalized for development research and practice' (p.676).

In this paper, we describe our attempt to integrate the CA in the field of DfD. We identified capability categories and established related questions. Next, we complemented these categories and questions with design tools, and developed them into an *Opportunity Detection Kit* (ODK). This kit is intended to generate insight into the lives of the multidimensional poor and seek opportunities for product innovation. To validate the effectiveness of this kit, we applied it to the Philips Chulha, a cooking stove specifically designed for rural India, which has been implemented in South India. By questioning people about all aspects of their lives, instead of only focusing on the product, we tried to obtain a broader picture of the impact of the Chulha. We will not describe this case study in detail in this paper, nor will we prove the ODK works better than other tools. Our focus is on generating feedback on the developed kit and on the usefulness of the perspective that the CA offers in the field of DfD.

## 2 Method: Establishing a Capability-Inspired Design Kit

To obtain deep insight 'into the behaviors, reasoning and lives of people', IDEO (2008, p.28) recommends an individual in-context interview. Larsen and Flensborg (2011) argue for a semi-structured interview. Therefore, we decided to set up a semi-structured, individual, interview in context. The CA was used to establish question categories and specific questions, and DfD toolboxes were employed to identify tools to support the interview. Because both the CA and the field of DfD have concern for human diversity, consider the individual as well as communities, advocate participatory methods, and focus on personal choice (Mink et al., 2014), we also considered human-centred design toolboxes.

### 2.1 Generating questions and question categories
We used the CA to develop question categories and specific questions. Practically applying the CA, however, is not an easy task. To begin with, the CA is a 'broad normative framework' that is radically underspecified, and in some cases needs to be supplemented with explanatory social theories (Robeyns, 2006, p.352). According to Gasper, the meaning of *capability* in Sen's approach 'diverges from everyday language' (2007, p.350). The approach includes a broad variety of dimensions that differ depending on the situation (Robeyns, 2006; Wagle, 2009; Frediani, 2010). Moreover, *capability* itself is a hypothetical concept (Gasper, 2007), which is difficult to capture (Zimmermann, 2006; Gasper, 2007; Kleine, 2011). Capabilities are limited by 'the

degree in which a person can transform a resource into a functioning' (Robeyns, 2011, p.13). Finally, they have an interdependent nature (Krishnakumar & Ballon, 2008), are incommensurable (Robeyns, 2011), change over time (Zimmermann, 2006; Wagle, 2009), and differ between people and regions (Robeyns, 2006; Wagle, 2009). We kept these characteristics in mind when developing questions and question categories.

Within the CA community, much ongoing debate has focused on the establishment of lists of capabilities. Sen deliberately refrained from the use of a standard list of capabilities (Frediani, 2010). However, Nussbaum (2000) formulated an abstract list of ten central human functional capabilities. Our focus is not on developing a list of capabilities, but rather a list of categories that can be used to detect the capabilities, functionings, and desires of target users. To develop such a list, we used what Alkire

(2007) calls 'public consensus' and 'empirical evidence': we used established lists, generated by consensus or formed through empirical analyses. For developing question categories, we used Nussbaum's list, and the lists established or mentioned by Hulme and McKay (2005), Alkire (2007), Burchardt and Vizard (2007), Martinetti and Roche (2009), and Walker, Mclean, Dison, & Peppin-Vaughan (2009).

We began by 'exploring the commonalities, differences, and relationships between the information' (IDEO, 2008, p.67). We then deleted all doubles, and started to categorize all unique items. After grouping and re-grouping, all items fitted into thirteen categories. Each category consisted of several capabilities. We tried to establish categories of related capabilities, which are 'philosophically and theoretically meaningful in relation to a life of full human dignity', and not 'over specified or derived from a particular metaphysical

#### Table 1 Capability categories extracted from literature

| Category | Related capabilities |
| --- | --- |
| Health | Feeling of sufficiently long life expectation, of not being obstructed by health limitations, of the ability to reproduce; not feeling worried, stressed, or strained; feeling of being able to visit doctor/dentist and obtain medicine, and medical care |
| Nutrition | Feeling of having sufficient food to feed yourself and your family; feeling of being able to enjoy a meal whenever needed; feeling of being able to eat sufficient meat, chicken, fish, and vegetables |
| Safety | Feeling of safety inside the house and in your living area; feeling of being discriminated or bullied |
| Education | Feeling of proper education possibilities; feeling of having sufficient knowledge; feeling of having sufficient access to knowledge |
| Meaningful work | In day-to-day activities: feeling of being able to enjoy activities; feeling of being able to use imagination and reasoning, skills and talents; feeling of being useful and appreciated |
| Leisure | Feeling of having sufficient spare time in which you can decide yourself what to do; feeling of being able to enjoy recreational activities |
| Mobility | Feeling of being able to go out of the house whenever you want to, and wherever you want to; feeling of being able to use and operate any kind of transportation which you would like |
| Partnership/family | Feeling of sufficient affection from and happiness with partner; feeling of being able to leave partner; feeling of involvement in family decision making; feeling of being appreciated by family members |
| Friends | Feeling of acceptance and appreciation within your community; feeling of being able to establish friendships and express feelings of love, grief, longing, gratitude, and anger |
| Self-determination | Feeling of being able to evaluate the way you lead your life and where you are going; feeling of living your life satisfactorily; feeling of being able to make decisions about reproduction |
| Cultural and spiritual life | Feeling of freedom to practice your religion; feeling of freedom to express political views and participate in political activities; feeling to be able to live according to cultural habits |
| Products, plants, animals | Feeling of being able to have ownership of and attachment to products, plants, animals |
| Accommodation | Feeling of a sense of ownership of the house; feeling of involvement in the choice of house; feeling free to move to another house; feeling a sense of adequateness of the house for current needs |

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worldview' (Nussbaum as cited in Walker et al., 2009, p.569). We also considered Gasper's warning not to operationalize the approach to 'familiar, conservative forms that are not consistent with the approach's rationale' (2007, p.350), and IDEO's (2008) recommendation of making the interview general enough to allow for a conversation that can lead to unexpected insights, but focused enough to obtain the required information.

For each capability category, we developed a set of questions by using the sets of capability questions developed by Anand & other authors (Anand & Dolan, 2005; Anand & van Hees, 2006; Anand et al., 2008; Anand et al., 2009; Anand et al., 2011), and by brainstorming with our team. The questions were divided into *ideal* questions, representing what we are actually looking for, and *sensitizing* questions, which are the more pragmatic questions that can be used to start the conversation. The categories and their descriptions can be found in Table 1. The questions for each category can be found in Appendix A.

## 2.2 The Opportunity Detection Kit

To stimulate discussion and encourage reflection, we selected design tools to support our interview. We considered the tools described in Participatory Rural Appraisal (Chambers, 1994a; Freudenberger, 1999), the Human-Centered Design Toolkit and Field Guide (IDEO, 2008a; 2008b), the BoP Protocol 2nd Edition (Simanis & Hart, 2008), the Bootcamp Bootleg (d.School, 2010), and the Market Creation Toolbox (Larsen & Flensborg, 2011). We also included context-mapping tools, as described by (Sleeswijk Visser, Stappers, Van Der Lugt, & Sanders, 2005), as

these techniques specifically aim to reveal people's dreams for the future. We selected three tools to support the semi-structured interview without consuming a lot of time: life mapping, visualizing/drawing, and ranking.

After four pilot studies – two in the Netherlands and two in India – we established what we call the Opportunity Detection Kit (ODK). The ODK consists of:

1) an interview set-up, which describes the interview flow and provides instructions for the interviewer on how to use the ODK, how to instruct the interpreter, and how to select participants, as well as tips for conducting the interview effectively[3];
2) a timeline to map a day in the participant's life[4];
3) pictures of the interviewer that give insight into his/her life[5];
4) a set of question cards, featuring icons that symbolize each capability category, along with the related questions (both ideal and sensitizing);
5) sensitizing cards, drawing cards, drawing sheets, and a set of markers to stimulate the participants to share their dreams and hopes for the future – and thus reveal their capabilities[6];
6) an importance sheet, consisting of four categories (very important, important, a little bit important, and not important) indicated with exclamation marks, on which the participants can prioritize the different categories[7];
7) a gift for the participant[8]; and
8) a camera and voice recorder with which to document the interview.

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[3] Tips and tricks on instructing the interpreter, approaching the participants and their context, and conducting the interview were taken from the selected toolkits and included in the interview set-up.

[4] According to Chambers (1994a), d.School (2010), and Larsen and Flensborg (2011), mapping life aspects is a good way to start understanding the lives of the participants.

[5] Larsen and Flensborg (2011) advise the interviewer to share his/her own experiences.

[6] Sleeswijk Visser et al. (2005) argue the importance of letting people create something – e.g. drawings or models – in order to 'access and express their experiences'. Visualizations and drawings are also recommended by IDEO (2008) and Larsen and Flensborg (2011), as they stimulate answering and aid in collecting rich stories. Children can be asked to draw, or the participant can draw. If participants do not want to draw, the interview leader can make the drawings (IDEO, 2008).

[7] A ranking exercise asks people to prioritize, and therefore helps us to understand what people value, and how they assign this value (Larsen and Flensborg, 2011).

[8] Larsen and Flensborg (2011) advise interviewers to bring a gift as a token of appreciation.

**Figure 2** The contents of the Opportunity Detection Kit

The contents of the kit are shown in Figure 2.

Before starting, the interviewer needs to identify and instruct an interpreter, and select participants. Larsen and Flensborg (2011) advise interviewers to first conduct a pilot in order to test the interview content. The interview is conducted according to a structured process. The interview starts with an introduction to the interview and the interviewer, and with obtaining consent, following Larsen and Flensborg (2011). To 'break the ice' and initiate the conversation, pictures of the interviewer's life and surroundings are shown. The actual interview starts with presenting the timeline and asking about people's daily routine, after which the questions are posed and the answers are visualized through the sensitizing and drawing cards. The interview is concluded with the ranking exercise. The participant is thanked for taking part in the interview, and receives a small gift.

The aim of the ODK is to offer designers an aid in gaining a better insight by uncovering people's capabilities, functionings, and desires. All categories should be covered at the same moment in time, and the interviewer should pay special attention in order to detect people's internal and external resources (Kleine, 2011), the personal, social, and environmental factors that influence the conversion of resource characteristics into functionings (Robeyns, 2011), and the existence, sense, use, and achievement of people's choices (Kleine, 2011).

## 3 Case Study: Detecting Product Impact and Design Opportunities

Sen (1999) specifically emphasized that both poorer economies and very rich countries have disadvantaged people who lack basic opportunities. However, the Multidimensional Poverty Index indicates that most multidimensional poor, with the greatest intensity of poverty, live in South Asia and sub-Saharan Africa (Alkire, 2011). Given this fact and the authors' experience in India, we decided to deploy the Opportunity Detection Kit (ODK) in India. We selected the Philips Chulha, an award-winning clay cooking stove, as a case. We specifically looked for a product that was designed for development and has already been implemented in the market. Right now, more than a hundred Chulhas are currently in use in South India. We used the ODK to detect the

real opportunities (capabilities) and functionings of the Chulha users, both before having the Chulha and after they started using the Chulha. We tried to validate the usefulness of the ODK by comparing the outcomes of our interviews with existing evaluations of the Chulha. We identified any change in perception of the participant towards the product during the interview, by starting the interview with product-related questions and then discussing all capability categories, before concluding by returning to product-related questions. We also used this case to identify areas for further improvement of the ODK.

From February to April 2012, the second author – at that time a master's student at TU Delft – interviewed the developers, manufacturers, and users of the Philips Chulha. In this way, he gained insight into the reasons behind the product's development and a view of the impact of the stove. After selecting an interpreter[9], the interview was discussed with him and with one of the stove installers[10]. Questions regarding affection, the possibility of choosing a partner, happiness, procreation, and life expectation were considered to be offensive or too strong a taboo to bring up. Next, a pilot was executed with five participants. As a result, some questions that were difficult to understand were simplified, and three capability categories were divided, as they turned out to be too broad. The 'health' category was divided into health and healthcare, the 'cultural life' category was divided into religion and politics,

**Table 2** Participant characteristics (number of participants in parentheses)

| Village | Profession | Chulha user(s) | Present during interview |
|---------|-----------|----------------|--------------------------|
| A (10) | Hired farm labourer (6) | Woman (5) | Individual user (2) |
| | | | User, family members in background (1) |
| | | | User and husband (1) |
| | | | User and family members (1) |
| | | Husband and wife (1) | Both users and child (1) |
| | Housewife (1) | Woman (1) | User and family members (1) |
| | Landowner (2) | Woman (2) | User and family members (2) |
| | Livestock caretaker (1) | Woman (1) | User, husband and friend (1) |
| B (3) | Hired farm labourer (1) | Husband and wife (1) | Both users and family members (1) |
| | Housewife (1) | Woman (1) | User, friends/family in background (1) |
| | Livestock caretaker (1) | Woman (1) | User and family members (1) |
| C (14) | Hired farm labourer (5) | Woman (5) | User and children (2) |
| | | | User, family members in background (2) |
| | | | User, friend in background (1) |
| | Housewife (4) | Woman (3) | User, family members in background (1) |
| | | | User and family members (1) |
| | | | User and multiple women (1) |
| | | Sister and brother (1) | Female user and multiple women (1) |
| | Landowner (3) | Woman (2) | User and children (2) |
| | | Husband and wife (1) | Male user and friend (1) |
| | Student (1) | Man (1) | User and friend (1) |
| | School cook (1) | Woman (1) | User and family members (1) |
| D (4) | Hired farm labourer (2) | Woman (1) | User, family members in background (1) |
| | | Man (1) | User and wife (1) |
| | Landowner (2) | Woman (2) | User and family members (1) |
| | | | User and husband (1) |

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9   The interpreter was an Indian PhD student from a very poor family, who executed an impact study on the same stove one year before. He was therefore familiar with the surroundings and the people.

10   The installer lives in one of the villages, is the son of the local priest, and is highly trusted by the villagers. Most people installed the stove because he advised them to.

and the 'plants, animals, and products' category was divided into three separate categories. Moreover, sensitivities in the area were pointed out, such as an ongoing conflict with the government, and hence questions about politics and accommodation could not be posed. Moreover, a local prophecy made some people unwilling to participate[11].

After the pilot, 31 interviews were conducted with Chulha users from four different villages. Present at the interview were the interviewer, the interpreter, 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 the recent local prophecy made people suspicious and unwilling. Table 2 shows somecharacteristics of the participants.

## 4  Results

### 4.1    Interviewing experiences

Some knowledge about the context is useful to save explanation time and to keep the conversation going (e.g. about the education and healthcare systems, and some knowledge about local language and habits). In this study, the pilot interviews took almost twice as long as the final interviews, because of the local issues that were raised. Because of the pilot, the interviewer became familiar with the area and the people, which led to adapting the ODK to the local circumstances. The pilot was also useful in getting the interviewer and interpreter acquainted with the interview flow and with their roles. The pilot led to additional instruction of the interpreter. The interviews lasted between 16 and 54 minutes, with an average of 33 minutes. This was shorter than the anticipated hour, which can partly be explained by the expunged and shortened capability categories. However, the interpreter also indicated at several interviews that the participants became impatient or felt uncomfortable. The conflict with the government and the prophecy played important roles, but sometimes people also had work pending

or personal issues (such as illness or deceased family member). In those cases, the interview was shortened.

This study revealed that it is difficult for a designer to conduct interviews in a developmental context when not being experienced in doing so. The interviewer encountered all sorts of prevalent interviewing challenges (e.g. uncomfortable or silent participants, very talkative participants, difficulty of controlling the interview due to working with an interpreter, limitations of relying on an interpreter who made up responses, rushed the interviews, and translated loosely). Thereby, the interviewer also encountered local issues (e.g. the current conflict with the government, a prophecy discouraging people from participating, cultural taboos, class differences, and the influence of the presence of curious villagers or family members during 18 of the interviews), and faced some limitations (e.g. he could only conduct the interview at different times of the day, and there was a gender difference between interviewer, interpreter, and participants). A designer is not specialized in dealing with such difficulties, and the interview outcomes are thus influenced by the skills of the interviewer. The ODK assists in conducting a semi-structured interview, but is not able to prepare a designer or design team for everything the they will encounter.

The study also pointed out that not all required information is revealed by using the ODK. The environmental impact of the stove, political and social power structures, and health statistics did not come forth by using the ODK, but by talking to other stakeholders. Using additional methods (such as group interviews, focus groups, and observation) might aid in detecting this missing information.

Using a voice recorder turned out to be essential, as the combined effort of note taking and guiding the interview would have been too much for the interviewer. A second interviewer might have been useful to discuss and interpret the outcomes

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[11]    Recently, a prophecy circulated, predicting that a close relative would suddenly die when a stranger passed your door step.

with, to pull the audience away, to assist in mapping and drawing, and to better keep track of the questions.

## 4.2 Experiences with the Opportunity Development Kit

### 4.2.1 Capability categories and questions

The capability categories concern general, incommensurable aspects, which can be applied to get to know different people in different contexts. This case did not indicate the need to merge capability categories, but rather the need to divide some categories. The 'cultural and spiritual life' category did not actually reveal many cultural specificities, and deserves further attention. Sensitive topics were expunged during this study, so no experience is generated in posing questions about procreation, affection, or choice of partner.

It turned out that some questions needed simplification. Particularly, the questions in the 'self-determination' category were sometimes difficult to understand for participants. The large number of questions and the time pressure on the interviews made the interviewer hurry, which resulted in posing less supplementary questions.

### 4.2.2 Design tools

The box containing pictures and questions generated interest and curiosity, and showing the interviewer's pictures did 'break the ice'. The timeline worked well to start the conversation and to obtain understanding about the daily lives of the participants. It also helped to identify other potential stakeholders. The mapping of the situation before and after installation of the stove was effective, but because the participants needed much help with placing the cards, it turned out to be easier if the interviewer placed them. The amount of cards appeared to be overwhelming and confusing, and the icons used were often not understood. Still the mapping exercise generated discussion and encouraged participants to tell stories. It also functioned as a validating moment, as the participant was able to see what the interviewer understood to be the answer, and aided the interviewer to keep track of the topics discussed. This turned out to be helpful, as the capability categories are connected, and therefore, when discussing one category, aspects of other categories also came up. Finally, the ranking exercise sometimes caused confusion, but after a thorough explanation of the exercise and the categories, participants were able to perform this task. Figures 3 and 4 show the design tools in use during the interviews.



**Figure 3 and 4** ODK tools in use during interviews

### 4.3 Interview outcomes

The interview made it possible to learn a lot about the lives of the participants in a short time span. When applying the ODK, we did not only try to capture real opportunities (capabilities) – we also tried to capture achieved capabilities ('functionings') and valued capabilities for the future ('desires'). It turned out that functionings were easiest to identify. We encouraged people to share capabilities and desires by letting them map and draw representations of their lives, but participants had difficulty doing so. Still, participants did share stories about issues they encountered and desires for the future.

### 4.3.1 Detecting Chulha impact and possible improvements

When starting to question the villagers about change induced by the Chulha, most of the time the answer was 'nothing'. However, when consequently posing the capability questions, changes were revealed. The Opportunity Detection Kit (ODK) provided the interviewer a way to let the participants think deeply about their lives before and after installation of the Chulha, and encouraged them to communicate their experiences. The participants often started sharing stories, which also revealed underlying reasons for their choices and behaviour. However, in this case, not much has changed for the Chulha users. We discovered that some participants are now able to spend more time with family or friends because of less time spent on cooking and firewood collection, and that some are preparing different types of food on this new stove. For one installer, power relations in his life changed, as he became a respected entrepreneur.

When questioning the villagers about changes they want to make to the Chulha, most villagers indicated that they did not want to change anything. However, during the interview, it turned out that they do experience some problems. For instance, when discussing nutrition, we discovered that the size of the potholes is too big to fit their old vessels, and that rain sometimes enters the house via the chimney. When discussing safety and leisure, it became clear that the fuel compartment is bigger than required, causing some people to use more firewood than before. When discussing health, it was revealed that some people do not use the second pothole of the Chulha, and do not cover this hole when using the stove. This allows smoke to enter the house. It turned out that the stoves were sometimes implemented without proper consultation of the intended users. When examining the four dimensions of choice, people's sense of choice and use of choice have been passed by, giving the users no time to think about wanting the Chulha or not. This might influenc how they use the Chulha. However, the above mentioned problems still indicate areas for product improvement.

### 4.3.2 Detecting design opportunities

Besides evaluating the impact of the Chulha, we also tried to gain insight into the lives of the (target) user to reveal desired capabilities. While most participants had difficulty drawing and mapping their lives, they did share stories about issues they encountered (e.g. not possessing farmland, lack of electricity), and their desires for the future (e.g. a new rooftop, a television). Asking the questions, 'why', 'what for', and 'what else' turned out to be important. For example, when participants indicated a lack of money (financial resources), the interviewer questioned them about what they wanted to use this money for. In this way, additional insight into their desired capabilities was generated. One participant indicated a desire for a power connection to be able to water the trees and watch television. The underlying reasons for unfulfilled desires were not always sufficiently revealed. In the former example, the reason for not having electricity was not revealed. While there are several reasons this information was not revealed (the interviews had to be kept short, participants were not always willing to answer, and the interpreter did not translate everything properly), the detection of missing resources and conversion factors does deserve extra attention in the ODK.

During the interviews, many resources and conversion factors were revealed. However, some were better identified through discussions with other stakeholders or by consulting secondary sources; a local doctor provided health statistics, power relations were identified during conversations with the installer, and environmental conversion factors such as climate conditions and pollution could be obtained from secondary sources.

### 4.3.3 *Limitations of the outcomes*

We have to keep in mind that this application of the CA is a qualitative one; thus, it offers a deep understanding, but the outcomes are not generalizable to other situations. Moreover, this exercise of detecting people's functionings, capabilities, and desires is always a snapshot in time.

## 5 Conclusion and Further Work

This study indicates that by questioning people broadly about capability categories, a holistic and comprehensive picture about their lives can be drawn. The questions of the deployed Opportunity Development Kit (ODK) not only broadened the insights of the interviewer, but also made the participants more aware of their own functionings, opportunities, and aspirations. The study also indicates that the deployed kit encourages people to share stories, which aids in generating valuable user feedback and opening up new design perspectives. In this sense, merging the Capability Approach (CA) and Design for Development (DfD) toolkits to construct a semi-structured interview approach has proven to be effective in generating deep insight in people's lives.

However, it turns out that the ODK should pay more attention to resources and conversion factors. Thereby, this study pointed out that even an extensively prepared interviewer cannot anticipate all interviewing difficulties. We also have to keep in mind that the ODK is not a magic kit making all other methods and tools redundant. The designer still has to look further and apply different tools and methods in order to obtain a full picture, and, according to Chambers (1994b), to crosscheck qualitative data.

The established list of categories and questions will change as a result of this case study, and remains open to critique and modification, as it should be, according to Alkire (2007). The ODK needs continuous development and adaptation, based on experiences of using it (Larsen & Flensborg, 2011). Based on this case study, we preliminarily conclude that using the CA to detect design opportunities appears to be promising and holds the potential to add value to the field of DfD.

## Acknowledgements

# APPENDIX A – Question cards

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?

What type of house do you have?

With whom? Rooms? Roof? Light, electricity, gas?

When did you move here?

Did you build this house yourself or make any changes to this home?

How did you pay for this home?

Are there other houses/places that you would really like to live?

Do you think you will live here the rest of your life?

Do you want to change something in your house?

1

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?

Do you have a partner/children?

How did you and your partner get together?

When do you and your partner/children spend time together?

What do you like most about your partner?

Do you feel happy with your partner?

When do you see your parents?

When do you see your brothers and sisters?

And other family?

Who can you count on most?

From whom do you receive love/care/support?

Who do you go to first if you feel lonely/sad?

3
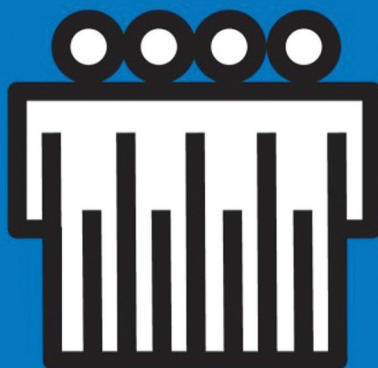
Do you feel accepted within your community?

Do you feel appreciated within your community?

Do you find it difficult to make friendships?

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

Do you know a lot of people in your community?

When do you see the people in your community?

Do you have friends?

When do you see your friends?

What kind of things do you talk about with your friends?

Do you feel like you can tell your friends everything?

>> Social status <<

5

*Using the Capability Approach to Detect Design Opportunities*

**Do you feel sufficiently attached to plants?**
Are there any plants/trees in or near your house?
Do you like them? Do you care for them?
Do you need more plants?
Do you grow plants yourself or do you want to?

**Do you feel sufficiently attached to animals?**
Do you own domestic animals?
What is your favourite animal?
Do you want (more) animals?
Do you like animals? Do you respect animals?

**Do you feel sufficiently attached to products?**
Which objects do you love to use?
Are there certain objects you need to have?
Are there certain objects you want to have?
Do you like plants? Do you respect plants?

2

**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?**

What is your diet? When do you eat?
What do you drink? Where do you get pottable water?
Do you have a stock of food in your house?
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?
Are you a vegetarian?
Do you like to eat fresh meat, chicken or fish?
Do you feel you can eat sufficient meat, chicken or fish?
Do you like to eat fresh vegetables?
Do you feel you can eat sufficient vegetables?

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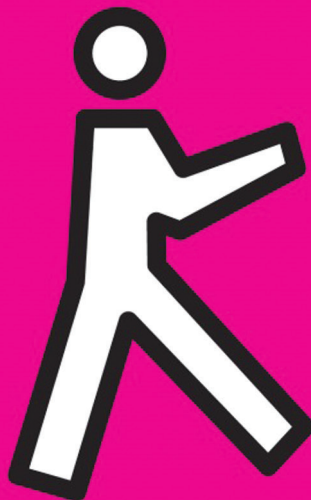
**Do you feel you can go out of the house whenever you want to?**
**Do you feel you can go wherever you want to go?**
**Do you feel prohibited from using any kinds of transportation (which you would like to use)?**
**Do you feel prohibited from personally operating any kinds of transportation (which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

Which places do you visit in your village?
Do you ever go out of the village?
Which types of transportation do you use?
What is your favourite type of transportation?
Do you have a bike/motor/car?
Which other places do you want to visit?
Do you want to have a bike/motor/car?

6

*Annemarie Mink, Floris van der Marel, Vikram Parmar, Prabhu Kandachar*

Do you feel you are properly educated?

Do you feel you have sufficient knowledge?

Do you feel you have sufficient access to information?

Have you ever been to school, how many years?

Would you have wanted to go longer back then? Do you still want this?

Where did you learn to do your work?

Did you follow any courses?

Do you have any other diplomas?

Can you read and write? Can you count? Do you have a signature?

Do you want or need any of these?

In your day-to-day life, do you often face problems you cannot solve by yourself?

What kind of problems? Then what do you do?

Do you always find an answer?

7

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?

Are you happy?

Do you have a dream of a different life?

If you could change anything in your life, what would you want to change?

Do you have a plan of what you want to do or be in life?

What do you want to achieve in your life?

Do you make your own decisions?

Do you ever consider using contraception?/Do you think people here want to use contraception?

Do you ever consider abortion?/Do you think people here want an abortion?

9

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?

Do you have free time, when you don't have to do anything?

What do you do in your free time?

What do you do when you don't work?

Do you enjoy this?

Do you need more free time?

Are there other activities you would like to do?

11

*Using the Capability Approach to Detect Design Opportunities*

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?

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

8

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?

What is your religion?
Has this always been your religion?
What about your parents?
How do you practice it?
Do you vote in government elections?
Which party do you support?
Do you fit in your community?
What are your daily rituals? Product specific,
- f.i. what is your eating ritual (where, when, how, with what)?
- f.i. what is your cooking ritual (where, when, how, with what)?
- f.i. what is your sleeping ritual (where, when, how, with what)?

10

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?

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

12

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?

Do you have a toilet? Where do you go when nature calls?

Are all your brothers and sisters still alive?

How old are your parents and are they still alive?

How old do you think you will become? Do you want to live longer?

Are you ever sick?

Can you and your family visit the doctor when you are ill?

Is your doctor far away?

Do you have any health limitations?

Do you want more children?

Do you worry much or feel stressed? Do you sleep well?

Do you feel lonely?

13

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