

The Model of Change: A Way to Understand the *How* and *Why* of Change

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Developing sustainable solutions within the energy sector requires a holistic, interdisciplinary approach. Interdisciplinary partnerships need common frameworks that enable dialogue and knowledge exchange between different perspectives. In this paper we present 'The Model of Change' as a framework for designing and evaluating different efforts in innovation projects. By insisting that effects of solutions have to be understood as a complex interplay of context, preconditions, perception, and interaction, The Model of Change becomes a tool to help us bring nuance to the simplistic cause-effect view that often dominates energy research. This type of contextual knowledge is essential to reproduce successes, improve failures and develop sustainable solutions that work.

INTRODUCTION

In this paper we share our experiences using a tool we call The Model of Change. We have developed this model as part of our work in different innovation projects within the energy sector to facilitate interdisciplinary collaboration and help us frame and understand the effects of our different efforts to change people's behaviour. These projects include the EcoSense and VPP4SGR projects where we work closely together with computer scientists and engineers, performing cross-disciplinary analyses, to understand and affect energy consumption in different settings. However, we have also found that the model is applicable (maybe even more so) in contexts where the collaboration is less frequent and our role more peripheral and this is the type of case we will be focussing on in this paper by showing how we used the model in the Proactive Energy behaviour project (Proac).

The Model of Change draws attention to the complex interplay of context, preconditions, perception, and interaction that scope the possibilities we have to affect change and thus helps us develop better solutions. Our work with the model is based on *Innovative Evaluation* (Dinesen and de Wit, 2010, 2013), an evaluation approach that integrates the macro level factors (resources, activities and output) of Logical Evaluation with Pawson and Tilley's focus on how and why these factors are interpreted, transformed and acted out at the micro level in peoples' everyday lives (Pawson and Tilley 1997). It brings attention to the *mechanisms* that promote or inhibit certain types of interaction with the activities and focuses on *what* it is in the activities that make them work the way they do (*ibid*).

The Model of Change as a tool in itself does not create any effects in our collaborations: It is *what* we do with the model, *how* we do it and *with whom* that makes this model work. We start with an empirical example of *how* and *with whom* we do *what* with The Model of Change in a specific context to show how the model: a) has the potential of creating a shared framework for design and evaluation, b) enables the generation and incorporation of new insights into interdisciplinary partnerships, and thus c) broadening the scope for solutions and qualifying outcomes. In the last part of the paper we reflect upon some of the main challenges and potentials of working with this type of model.

A MODEL TO FACILITATE INTERDISCIPLINARY WORK

Working as anthropologists within the energy sector, we are often engaged in interdisciplinary projects with computer scientists and engineers who want to develop feedback systems that can provide people with better data to help them make more informed decisions, and thus use less energy.

We often see our role as anthropologists in these projects as *exploratory*, questioning assumptions, broadening the scope, and offering rich descriptions of contextual factors. Anthropological methods and theories provide a strong approach for addressing the *why* and the *how* of the world through a contextualisation of micro-level aspects of everyday life and change, offering an understanding of behaviour as something contextual, shaped by people's concrete (sensory) engagements in the world (Ingold 2000, Howes 2004, Pink 2012). Our more technically skilled project partners mostly occupy a more *solution-oriented* role, finding the right solution for the problem and making it work.

Collaboration across these different roles or perspectives in projects can be quite challenging, because the different roles have diverse objectives and methods (Bauer 1990). Project team members have different ways of knowing (Harris 2007, Barth 2002) and often lack tools to facilitate knowledge exchange and negotiation of meaning (Wenger 1998). As Christensen points out, applying ethnographic data in a context of technology development requires appropriation and shared analytical frameworks that enable an open and systematic exploration, discussion and evaluation of the interventions we produce (Christensen 2013).

We introduce The Model of Change as one such shared analytical framework that enables us to talk about assumptions, interventions, and effects in a meaningful way that can accommodate the different types of knowledge and perspectives that partners bring to the table and helps generate new shared understandings.

Figure 1 shows the graphical outline of the model. It is divided into seven general categories that interweave the micro and macro levels of change. The headings are adjusted for every specific project or case in order to make it as meaningful as possible for the people working with the model. The one depicted here is the one we used in the Proac project.

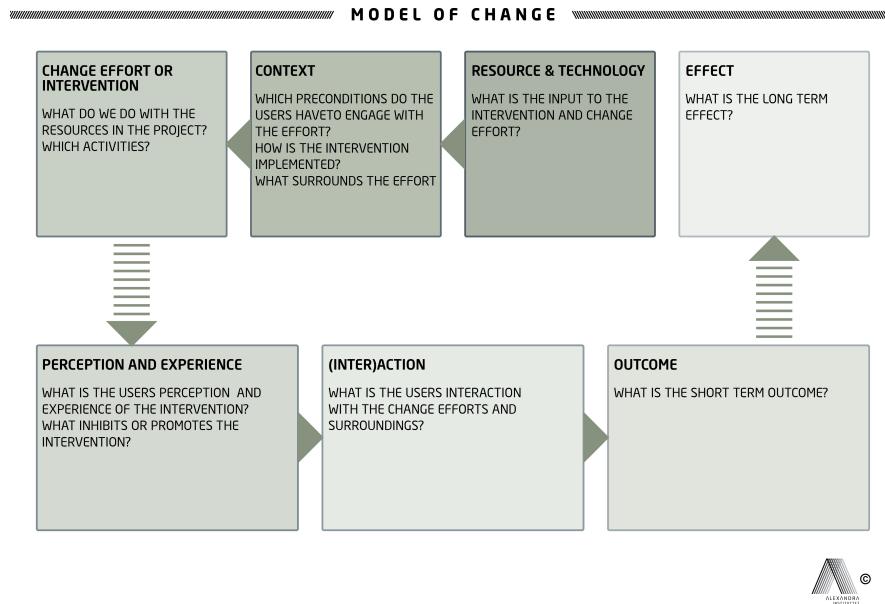


FIGURE 1. The Model of Change developed by the Alexandra Institute

Generally the model can be explained as follows:

- *Resources and technologies* include both human and non-human actors such as economical, infrastructural, and technical resources available for the intervention.
- The *Context* for the intervention is e.g. buildings and target group descriptions.
- *Change Effort or Intervention* describes the activities in the intervention; what we do with the given resources in the intervention. ‘Effort’ can also be called ‘Activities’.
- *Perception and Experience* deals with the perception, attitude and experience that a person has of the resources that are being presented or applied in a specific manner through certain efforts or activities in a specific context.
- The *Interaction* describes the (inter)action that a person may or may not have with the effort or activities.
- The *Outcome* is what we are trying to achieve, such as reduced energy consumption or a more ‘soft’ result such as satisfaction
- *Long Term Effect* can be change in legislation, societal discourse etc.

When we consider all seven categories in relation to a specific intervention, we get a complete set of assumptions about *how* and *why* change is created through an intervention. This set of underlying assumptions about what will create change is called the *change theory* (Dinesen & de Wit, 2010, 2013). The Model of Change is the practical tool that we have

developed, based on Dinesen and de Wits theoretical framework, to generate change theories together with partners. The change theories shape the design of solutions and evaluations in our projects. They are often not made explicit, which is problematic because different partners might have different change theories. This is why we need a framework, such as The Model of Change, that enables open negotiation and helps us build a shared understanding of what it is we are working towards and what will help us get there.

Having given a brief introduction to the challenges of interdisciplinary work and The Model of Change, we will now describe how we use The Model of Change in the specific context of the energy domain in the Proac project.

THE PROACTIVE ENERGY BEHAVIOUR PROJECT

The Proac project is a national Danish project funded by Realdania. The aim of the project is to develop and test different methods of visualising energy consumption for residents in social housings. The project started in 2013 and is expected to finish in 2015. The evaluation of the project is funded by the Danish Ministry of Housing, Urban and Rural Affairs.

The overall assumption (the change theory) in the Proac project is that the introduction of energy visualising technologies to residents in social housings will lead to reduced energy consumption. Underlying this assumption is the belief that using technology to make energy consumption visible for the residents will create more awareness, and more awareness will lead to reduced energy consumption.

Based on this change theory Proac has developed three different energy visualisation strategies that will be tested at three different social housing association sites:

1. Visualisation of energy consumption through in-house displays and web interfaces.
2. Visualisation of energy consumption through monthly reports, app, and web interfaces.
3. Visualisation of energy consumption through SMS, app, and web interfaces.

Each test site has its own partner group consisting of technology providers and a housing association. The partners in these groups are mainly solution-oriented, their role in the project being to develop new technological solutions. A project manager coordinates the technology tests across the different partner groups.

Kick-off workshop

We (the Alexandra Institute) were not part of the initial project group but were invited to join Proac by the project manager because of our background as anthropologists working with user-driven innovation in the energy sector. The project manager wanted us to advocate for the 'human perspective', which he believed to be lacking in the project. Our role in the project therefore quite naturally became one of challenging the existing solution and technology-oriented focus, with a more explorative and contextualising focus on how and why change is created.

When introducing The Model of Change, we gave a narrative about changing energy consumption through the introduction of technology, visually supported and structured by The Model of Change in the form of a PowerPoint slide like figure 1, and drawing upon a practice-oriented understanding of energy consumption (Entwistle et al 2014). Following our presentation of the practice theory and The Model of Change we used the presented insights as a frame for concept development in the workshop. Participants were divided into groups and asked to brainstorm on concepts using printed material that focussed on the contextual aspects of energy consumption such as the social, material and technological infrastructure surrounding and affecting the users and their energy consumption. Our role in the workshop was to facilitate partners in their concept development and document the results. We challenged their assumptions by asking questions about the statements they put in the different boxes of the model, and brought contextual aspects into the groups not focusing on these by themselves. The model helped us structure the discussions and made it easier for us to get the participants to also include factors they would not usually take into consideration. Following the kick off workshop the three groups developed and implemented the three solutions listed on page 4 at the three different test sites.

Change Theory Workshops

After the implementation of the three solutions we organised workshops with each partner group to facilitate an exploration and verbalisation of their assumptions about how to change energy consumption through the introduction of their specific (technological) solutions. We wanted to build something similar to what Dinesen and de Wit call a *Program Theory* (Dinesen and de Wit 2013: 66) with assumptions and hypotheses that we could use as a reference point for our findings in the field when we perform the evaluation. Before each workshop we analysed all the available case material and systematically wrote down the assumptions in it, using the Model of Change. The following is an example of our preparatory work with one of the concepts:

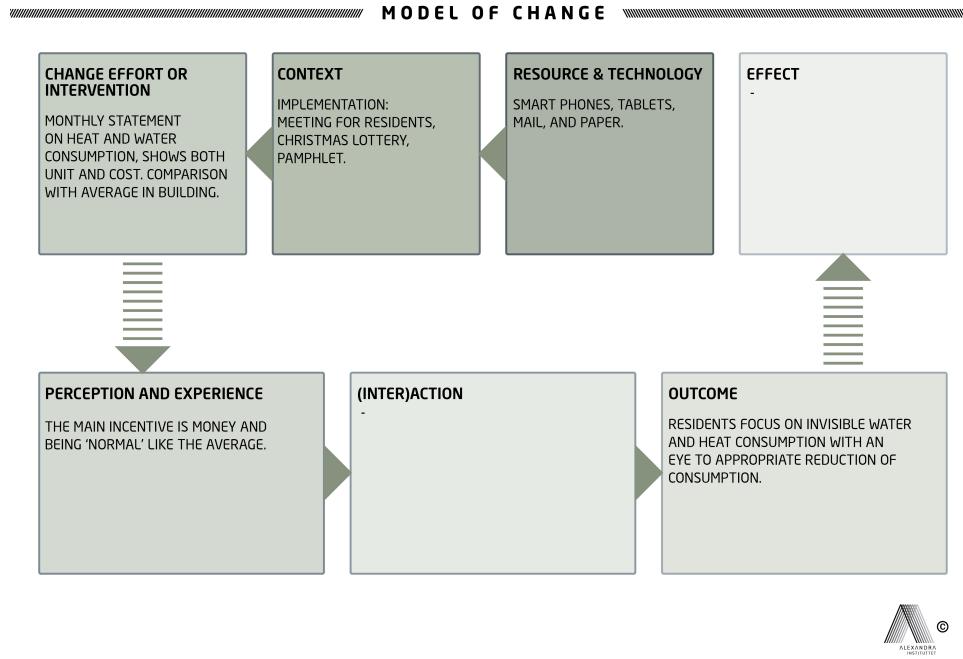


FIGURE 2. The Model of Change, filled out with assumptions from written case material

During the following workshops we encouraged the partners to fill out The Model of Change with their assumptions about the solutions that they had implemented at their test site. We wanted them to consider each category in the model as well as the correlations between categories. They started with the three 'factual' ones: Resources, Intervention and Result and then went on to the four remaining 'contextual' ones.

To avoid the same reductionist change theories as the one in Figure 2, we challenged the partners with our contextual and theoretical insights on the subject. The structure of the model made it easier for us to make the discussions concrete and enabled us to build chains of assumptions about what would work for whom under which circumstances (Dinesen and de Wit 2013). Figure 3 shows an example of such assumptions from a partner workshop. In the example we focus on the *Perception and Experience* and *Interaction* categories :

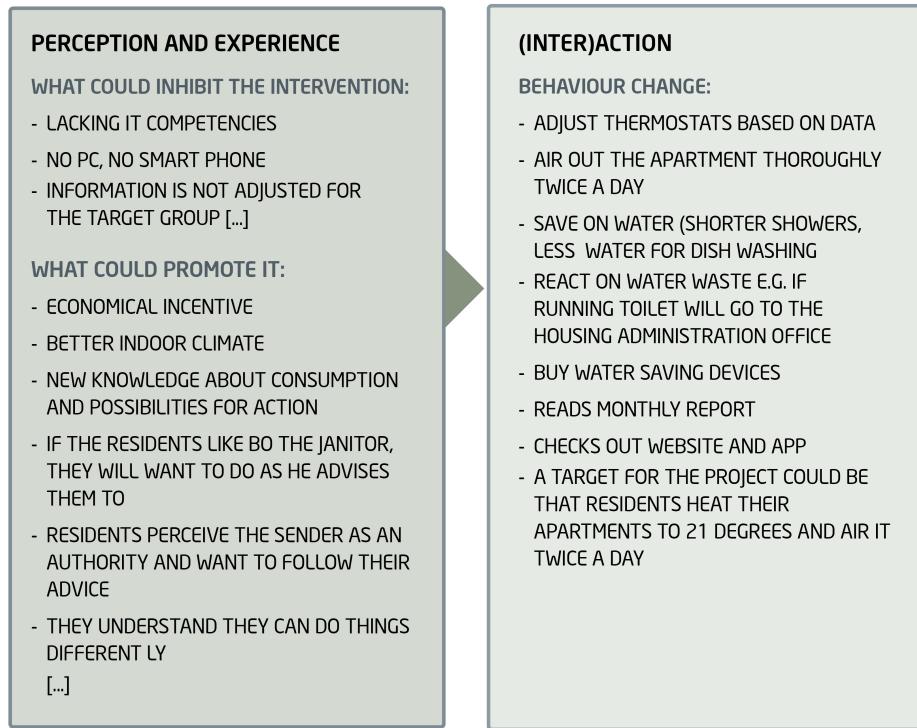


FIGURE 3. Results from change theory workshop

This hands-on experience of going through the concepts step by step to build these chains of assumptions forces the project partners to be concrete in their statements and to consider all aspects of the solution.

Having given this brief overview of *how* and *with whom* we do *what* using the Model of Change in the specific context of Proac, we will now reflect further upon the potentials and implications of using the model to rethink evaluation, generate new insights, develop new solutions and create a shared analytical framework.

RETHINKING EVALUATION WITH THE MODEL OF CHANGE

The initial assumptions about change in Proac were highly dominated by a rational-economical change theory in which people always choose to rationally and economically optimise their situation. Furthermore, as shown in Figure 2, there seems to be no reflections on what these solutions actually expect residents to do in practice with the technologies or the information they receive. These types of change theories leave very little room for

understanding energy consumption as a mediated consumption, a consequence of everyday practices, formed by many different factors that lie both within and beyond the individual in his or her societal and material context (Entwistle et al. 2014).

To us as anthropologists, the idea that people will automatically change behaviour if they receive the right information is unsettling for a number of reasons. It implies a view of human behaviour as rational and intentional that seems incompatible with the anthropological understanding of behaviour as contextual, shaped by our concrete (sensory) engagements in the world (Ingold 2000, Howes 2004, Pink 2012). Understanding behaviour and practices in relation to energy consumption and how this becomes meaningful to people in their daily lives is no simple matter. Energy consumption and the different types of behaviour or practices associated with it is a complex phenomenon. Rooted in a practice theoretical approach (Bourdieu 1977, Reckwitz, A. 2002, Warde 2005) we understand energy consumption as a mediated hidden consumption affected by a set of interrelated factors that constitute meaningful practices in people's daily lives (Gram-Hansen 2009, Shove 2010, Strengers 2011). Designing and evaluating interventions that aspire to change peoples behaviour or practices is therefore not simple either. We need to take contextual factors into account and this is what we make visible through The Model of Change.

At the Proac kick-off workshop we challenged the Logical Evaluation approach by making it *visible* to the partners that the categories in their logical evaluation approach leave them with no understanding of *how* or *why* change occurs. It only focuses on the causal relationship between *Resource*, *Change Effort* and *Outcome* (Dinesen & de Wit 2013).

We took the partners through the neglected categories one by one, illustrating each category's importance in understanding change using empirical cases from the energy domain. The technologies implemented are situated in the context of everyday practices among a group of social housing residents that are generally characterised as being less resourceful than the average population, many of them live in buildings that are old and considered insufficient by the residents. Based on The Model of Change we showed how a deep understanding of these contextual factors is vital for qualifying the solutions implemented.

RETHINKING SOLUTIONS WITH THE MODEL OF CHANGE

Challenging the partners at the kick-off workshop using The Model of Change not only resulted in a new evaluation approach. It also broadened the scope for solutions by bringing new types of knowledge into play that helped partners qualify the design of their solutions. Our first impression was that most groups had a hard time integrating the new contextual insights and we were rather disappointed with the initial results of the workshop as the groups presented them to us. As our fieldnotes indicate it seemed that our presentation and contextual tools had not had much impact:

[...] What generally characterizes the concepts developed by the participants in the kick-off workshop is that the user has to be active and act based on information provided by feedback technologies. The incentive for changing behaviour is generally economically and

environmentally based, but for some also indoor climate. [...] (Fieldnotes from workshop. Translated from Danish)

However, there were also encouraging points in the concepts that lead us to conclude that the introduction of contextual insights did help broaden the scope. One was the idea of a physical 'filling station' where kids and residents can go and fill up on knowledge as part of a social activity. Furthermore e.g. competitions, social media and strengthening of the local communities were mentioned as part of some of the technically-focused feedback concepts. Moreover, after the kick-off workshop the groups further developed their ideas and it seems that the context has been considered and incorporated in at least some of the final concepts as well.

An example of such a re-thought solution is to combine energy visualisation technologies with the education of selected residents to be local ambassadors (usually residents who are members of the local housing association board). The ambassadors' role is to be proactive, meet residents where they are – e.g. the common laundry room – and share their knowledge about both energy reducing efforts and how to take part in the energy reduction project. This solution takes into account that the target group does not necessarily have the resources to engage in new technologies and energy reducing efforts on their own and may need more support and motivation than a financial benefit. This solution also considers how residents are part of a bigger social context and community in which some people have more 'symbolic capital' (Bourdieu 1994) and thus may act as first movers and initiators of change, while others may follow them.

Another project group re-thought their technical solution and added a practice-oriented campaign. They delivered bags of potatoes or toothbrushes outside the residents' door with the concrete advice of not leaving the tap running while cleaning the potatoes or brushing your teeth. They also delivered showerheads that consume less water. All of these efforts draw on insights regarding how the context for the implementation of the energy visualizing technology plays an important role for the residents' engagement with the technology. Furthermore, the concrete advice given to the residents shows insight into how energy consumption is the *consequence*, and not the *purpose*, of everyday practices in the home (Entwistle et al 2014).

The project manager of Proac has stated that our introduction of practice theory and The Model of Change with its focus on the micro level of context, perception and interaction has framed the rethinking of the initially technology-focused solutions in the Proac project. However, not all groups ended up with 'contextualised' solutions to the same degree as the two described above. As much as we appreciate the conclusion of the project manager, we are wary not to fall into the reductionist trap of explaining the effects of using The Model of Change in Proac (rethought solutions in the groups) by referring to our resource (the Model) alone. Other types of *resources* (such as time, money, the initial framework of the project, technology, access to different professional competencies) available to the three groups, and the *context* (e.g. earlier experiences with social scientists, organisational structures etc.) in which the model and practice theory have been applied affects the way it has been *perceived* and *operationalised* by the solution-oriented partners in the project. All these factors thus shape the solutions that they end up with. We will however

conclude, that our practice-oriented approach and use of the model have played a part and we hope to inspire further use of the model by others and research more on this use in the future.

GENERATING AND USING NEW TYPES OF INSIGHTS

When we use The Model of Change together with the partners in the change theory workshops we see how this work opens up new insights about the strengths and weaknesses of the solutions that have been implemented. Figure 3 is an example of how the project groups have several reflections on their concepts that they did not have in the written case material before using The Model of Change in the workshop (shown in Figure 2). This is partly due to the categories in the model itself, which encourage these reflections, but just as importantly we facilitate and challenge the partners when they fill out the model in the workshop thereby 'forcing' them to consider new insights and questions. By working jointly through the different boxes of the model, discussing the statements in each, it becomes clear where partners views differ. Simple as this may sound the hands-on approach makes a difference in facilitating the negotiation of a shared understanding to frame the work in these projects. The project group becomes a community of practice (at least temporarily) engaged in defining a shared understanding. This process makes the knowledge generated have a higher impact because they themselves actively engage in the formation and shaping of it.

The Change Theory workshops also turned out to play an important role in preparing the partners for a new type of contextual insight as relevant results of the evaluation. Through the workshop they themselves experienced how this contextual knowledge was essential for them to be able to explain why and how their concepts would (not) change energy consumption in social housing. Therefore, it was easier for them to understand and incorporate the types of knowledge that was generated through the field studies, showing the importance of looking beyond the individual and the technology in itself and consider contextual factors as well. We will briefly describe examples of these insights and the attention they have been given so far in the project.

Findings from our qualitative studies in the project point out that the state of the building that the residents live in (their material context) is key to their perception of and engagement in energy reducing initiatives, just as it has an important influence on their current energy consumption. When the building is perceived as being in a poor condition (e.g. difficult to heat), the residents have different coping strategies that affect their energy consumption in a negative way. Additionally, they do not see how or why they should engage in any energy saving efforts, because they feel that they are already doing what they can within the limited scope of possibilities they have in that particular building.

These key findings would not have been generated if we had not paid close attention to the context or if we had only looked at the resident's financial motivations or the qualities of the energy visualising technologies themselves. Figure 4 shows a matrix developed mainly by the project manager based on the findings described above. It shows the relationship between residents' motivation and the condition of the building they live in and underlines the importance of taking both aspects into account. It is thought as a simple guide to housing associations who want to initiate efforts to reduce energy consumption.

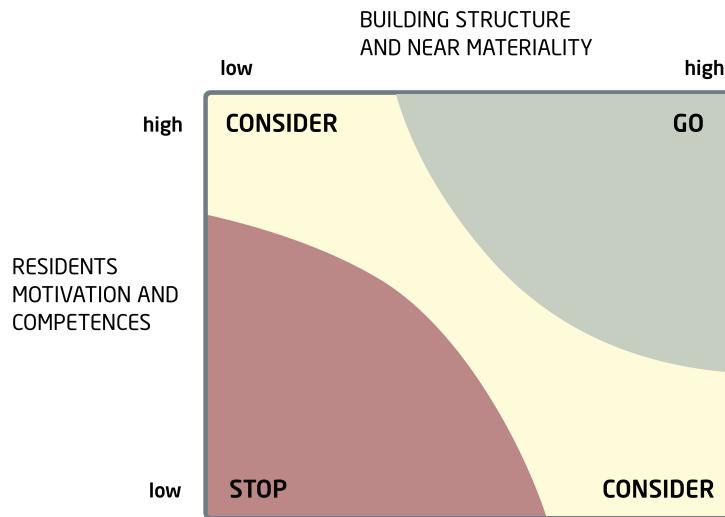


FIGURE 4: Result from evaluation in the final reporting

Focusing on both the individual human being and the context, Figure 4 is an example of a new type of evaluation result that challenges the simple assumption that has dominated the project from the beginning: technology leads to effect. Our experiences from previous similar projects shows that this simple assumption also leads to lack of interest in or ability to incorporate and *use* findings and knowledge that does not fit into the assumption.

Findings as the ones described above are therefore not always easy to ‘sell’ to our solution-oriented partners. This, however, seems not to be the case in the Proac project. We believe this has to do with the inter-disciplinary collaboration that we have engaged in using The Model of Change. This work has prepared the solution-oriented partners for a new type of evaluation result that does not only focus on the qualities and functionalities of the technologies and (lack of) effects, but also consider the context and situated perception and use/non-use of these technologies. In Proac the project manager chooses to focus on these results in his conclusive reporting and recommendations from the project [will be publicly available in Danish in the Fall 2014].

It is too early to say how these results may affect the further development of solutions at the three test sites or in other solution-oriented projects. The effects we see in Proac have been generated in a specific context of e.g. a project manager who is positive and knowledgeable towards social sciences and with whom we have had an open, pleasant and mutually curious collaboration from the beginning. This might not be the case in other interdisciplinary projects, and as such the use of The Model of Change in other collaborations may lead to quite different results.

THE MODEL AS A SHARED ANALYTICAL FRAMEWORK

Using The Model of Change to bring forward change theories was not without obstacles. Through several of the partner workshops it became clear to us that some categories were easier to relate to and agree on than others. The macro categories *Resources*, *Effort* and *Outcome* seemed to evoke a higher degree of consensus and were easier to describe for the project partners. This is not surprising as these belong to the ‘logical’ evaluation model (Funnell & Rodgers 2011), which is well known to the partners. For some partners, the micro categories such as *Perception* and *Interaction* seemed too trivial and were harder for them to describe. In some groups, the partners struggled with being specific in relation to the required *Interaction* and wrote statements such as: “*residents should heat up their home optimally*”. These statements are very imprecise and do not take into account the key point that these are exactly the kind of ‘objective’ truths that human beings interpret and perform in so many different ways in their daily lives, depending on their knowledge, personal resources and concerns, and the social and material contexts in which they are supposed to “*heat up or air out their home optimally*”.

One explanation for the lack of concreteness and precision in these statements could be that our partners have not previously considered exactly *what* they expect their users to *do* with the implemented solutions (in this case technologies and feedback). Should the user turn down the thermostats half a degree? Is that what ‘optimal heating’ means? And ‘optimal’ for whom? The Model of Change helps make this otherwise hidden/inaccessible micro level visible and supports the partners in considering and describing these categories with the help of a facilitator. This attention to the micro level does not prevent the solution-oriented partners from maintaining their initial focus on the macro level, but by enabling a ‘double focus’ we believe that we are presenting the solution-oriented partners in the project with an *appropriate disruption* (Maturana (our translation from Danish) in Dinesen & de Wit 2013:27), a disruption that is not too big to accept and incorporate.

The visual joining of the different types of data in the Model of Change helps establish a common ground for both the explorative and the more solution-oriented foci and roles in the project and makes it visible that both parties and types of data are essential in carrying out a successful evaluation of our solutions. Working with the model also revealed differences in the partners’ ideas of *what* the project was actually about and what the overall evaluation questions and success criteria were. When filling out the model, they did not all agree on exactly *what* in their solution would bring about a reduction in energy consumption. Making these differences explicit, and offering new categories to reflect on them, gave the group a chance to discuss and reach a shared understanding across the project group. In this way The Model of Change becomes a *shared analytical framework* (Christensen 2013). It enables dialogue, analysis and understanding across disciplines and roles even though we have different foci, methods and responsibilities in the project. We believe that this collaboration is essential for developing sustainable solutions.

CONCLUSION

Using models such as The Model of Change usually has both the purpose and pitfall of reducing complexities and framing projects narrowly, which may not go hand in hand with anthropological work. For us, however, using this simple graphical model continuously helps us maintain the focus of our partners on the contextual factors of change and thus enables us to actively work with exploratory change theories and evaluations in our collaborations with more solution-oriented partners. Furthermore we believe that our background as anthropologists plays an important role in *how* we use the Model of Change together with our partners and thus in understanding *why* the Model of Change works the way it does when we use it in interdisciplinary projects. For example, our practice-oriented understanding of energy consumption has played an important part in unfolding and challenging the limited change theories together with our partners. Another important feature is skilled facilitation of the model in workshops and presentations and the ability to communicate across disciplines, e.g. using cases and examples from the energy and technology domain, which the solution-oriented partners can relate to. Being anthropologists gives us the tools and interest in understanding other disciplines and applying these insights in our communication with them. Last but not least it is our experience that curiosity and interest for other disciplines are features that must be present in both ourselves and the partners we work with. All in all these are the enabling mechanisms that promote the Model of Change to work the way it does in Proak.

Together with our partners in the Proac project, we have worked actively with the Model of Change in several workshops and to sum up, the most important enabling mechanisms to a successful application of the Model of Change in such an interdisciplinary project are:

1. Facilitation and interdisciplinary communication skills
2. Domain knowledge (both empirical and theoretical)
3. Project partners who are open and curious to collaborations across disciplines

Having these three key factors present in Proac, the project group has managed to use the Model of Change to introduce a new way of evaluating, which broadens the scope of change and solutions in the project. So far we have seen the results in two of the four solutions that are currently being tested. Furthermore the Model of Change brings new types of explorative and contextual knowledge into play. We believe that we could have broadened the scope of change and solutions even further had we been part of the project from the beginning, when the project proposal was written and the initial assumption of technology leads to reduced energy consumption was formulated. However, when we use the model actively together with partners in workshops we find it enables discussions about the need to consider contextual, micro level aspects of change, and it enables us to negotiate the framing of the research within the project teams more openly and equally, moving the conversation to consider different questions, and ensuring that new types of insights are included as a resource in the design process as well as in the evaluation. As such the Model of Change becomes a shared analytical framework, which enables us to learn from our experiences in these projects and create more sustainable solutions.

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NOTES

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