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Sustainability in Danish Social Housing - The User Focus

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ABSTRACT: The idea with this multiple case study is to investigate the relation between man, sustainability and architecture. The focus is directed on the user dimension, behaviour and sustainable housing. A triangle can be set up between Architecture, Sustainability and the relationship to the User. Subsequently the project will have the interest of the mutual relations. How does the user relate to the architecture and sustainability, how is everyday life of the end-user in relation to architecture and at last, how do the user validate sustainability. The research should contribute to architects, so new knowledge can be used in upcoming architect design processes.

1 INTRODUCTION

1.1 *Ongoing PhD-research*

This ongoing PhD research project will attempt to illustrate the relation between architecture, sustainability and the relationship with users. The project focuses on sustainable social housing located in Denmark. A research project, in which multiple case studies and by interviews with different user group's experience of decision-making, living and using sustainable housing. A study of the everyday practices and valuation of the various users. How is the communication of information regarding the servicing of buildings? How is information for the end-users? Is there an understanding of all user groups around the sustainable initiatives?

This research project is interesting also to examine how resident's democracy works in relation to political decisions about sustainable approaches in settlements. Residents' democracy can reject the architect's proposal of new sustainable approach. What can we do to look more broadly at a sustainable solution?

This PhD project is also interested in the general principles of the learning and experience process between the different partners in a sustainable housing project. From the architect to manager department in the social housing association. From the facility manager department to the operation staff. Then from the operation staff to the end-user and back again to the architect. How is sustainable knowledge and experiences disseminated and taught in the specific buildings? What general lessons can be derived across all cases? In regards to the learning of the development of competence that must be done from the architect to the users. There will be addressed questions to the user groups with regard to the future. What experiences users have had with the homes they live in? Experience, as the architects can have a direct benefit in organizing future design processes.

This research project thesis is that if serving the users in the operational phase and end-users everyday practice does not take place with expected learning and appropriate behaviour in relation to the architects' intentions behind the sustainable initiatives; there can be raised

questions about how sustainable public housing is. In addition, if a resident democracy are opposed to sustainable solutions, how do the social housing association's future-proof their settlements?

The project's research question is: "Why are administrative users, operation staff, and residents relevant in relation to sustainability in Danish social housing, what will encourage and impede sustainability, and how can users narrative about their everyday life contribute with new knowledge to architects?"

The hypothesis is that if the administrative users, operations staff, and residents of Danish general housing does not have the expected consumption behavior, knowledge of, learning about, and handling of a positive valuation of the sustainable approach the architect has incorporated in its architecture, so I expect that it will be a barrier and have a negative impact in relation to the expectations for sustainability. There will be directed after qualitative empirics, which can confirm or deny the hypothesis, on the other hand, by recover specific knowledge of each settlement and derive general features across all the selected settlements.

Inspired by Elizabeth Shove's research (Shove, Watson, Hand and Ingram, 2007) on consumption among users, you can draw a triangle showing the three main points – the user (man), sustainability (theme), and architecture (artefact).

The user, the sustainability, the architect, the architecture and the everyday life is linked to ethical, political and an ideology dimension (value). So if the user has a specific position on sustainability, how will this position be true? Everyday life dealing with consumption patterns in which also the economic dimension is applicable. What everyday practice, does the user have in relation to the architecture in which he or she lives?

The research project is inspired by a multiple case study of recent sustainable building in Denmark, made by the Danish Building Research Institute at Aalborg University and the Technical University of Denmark (Jensen, Joergensen, Lauridsen, Quitzau, Clemmentsen and Elle, 2010). The study reached the following conclusion as the authors writes: "When the building project indirectly implies that residents are not very ecologically minded, this also leads to the houses not asking too much of users; residents should live a "normal" life in the houses without having to show a particular interest in environmental technology and sustainable lifestyles. The question is whether this function smoothly, and if not, what types of problems it entails and how to address them".

In addition, the following statements from the same multiple case study in relation to the use and operation of housing: "With sustainable houses having a different design than ordinary construction; it involves these tenants having a different use of the property in relation to heating, ventilation, etc. In relation to this, it can be problematic if the residents are not aware of the functionality of the property. Therefore it can be a potential problem when the target group is so-called 'ordinary citizens' who do not necessarily have the required knowledge of any special conditions in a sustainable building. Choice of ordinary citizens as target implies a need to inform the residents, so that they can develop the expected use of the property" (Jensen, Joergensen, Lauridsen, Quitzau, Clemmentsen and Elle, 2010).

2 USER GROPUS

2.1 *User group 1*

The central administrative facilities management departments handle the overall administration of the separate estates. The facilities management departments typically consist of employees with a large amount of construction expertise to ensure professional handling of technical building installations. The staffs are typical architect, engineer, installation engineer, energy consultants, etc. These technical administrative users undertake communication and dissemination of sustainable knowledge to the operation staff. A larger public housing associations usually have these types of professionals employed as an internal building consultancy. Not all social housing associations have this kind of building expertise in-house.

They will typically enter into a business arrangement with a larger general housing unit of consulting firms.

2.2 *User group 2*

It is assumed that the operation staff can and will grasp the housing development's sustainable knowledge. It will be crucial that the operation staff have the necessary skills to serve users during the operational phase. If these skills are not present, it will be necessary to enhance skills. Many adults already in work are not necessarily interested in acquiring new learning. In particular, early school leavers have a certain reluctance "to go back to school" (Illeris, 2009).

The second aspect is whether the decentralized operation staff will. One must assume then that the key operation staff are interested in working professionally with the building operation. Alternatively, a personal valuation of the sustainability theme could affect the servicing during the operational phase. Both in the positive and negative sense, depending on the individual's values. This project will examine this user group's position on the concept of sustainability and its impact on everyday practice.

2.3 *User group 3*

This group is the so-called ordinary people living in dwellings - called end-users. They have as a starting point, not the necessary technical knowledge on sustainable construction. End-users will be depend on getting information, learning and skills to have the desired behaviour for the sustainable construction works. This must happen through the administrative and the operation staff. In the end-user group there is politically elected board members called tenants board, which is covered by the Danish law on social housing. The tenants board, has the right to accept or reject ideas and proposals which relate to the settlement. For example, it may be proposals from a sustainable renovation of a building that will affect any possible rent increase to building improvements and increased costs for the operation. This project will examine the position of the tenants board on the concept of sustainability and its impact on everyday practice.

3 THE USERS AND SUSTAINABILITY

3.1 *Sustainability and the users*

In our time, is sustainability the prevailing paradigm? The technology leading the way takes its starting point in sustainability. Sustainability, Technology and lifestyle are closely related (Gram-Hanssen, 2012). Good sustainable design can be simple and is perhaps the best option when you consider that it is ordinary people with no special skills who shall live in it. By following the process of the creation of buildings and throughout the operational phase, it will help us to understand the users. You will understand what kind of sustainable initiatives work and which ones should be improved. It is equally important to understand the users' everyday practices around energy. "The users are just as important as technology" (Bennetts and Bordass, 2007).

Technological objects ultimately release time from operational tasks in the home and give us time for other purposes. When we will buy a new kitchen we construct a new lifestyle and so construct a new everyday practice. You could say that people are reflected in the things they own (Shove, Watson, Hand and Ingram, 2007). It might also be said that when we provide new sustainable housing designs we perhaps also construct another new everyday practice?

Residents focus on the costs and rarely on the saving. If you ask the general administrative in the social housing associations in Denmark, they respond that end-users either demand or have interest in environmental efforts. End-users are interested in a cheap administration. Sustainability initiatives in building operation do increase the administrative costs. There is a dilemma, as an operation department on the one hand, is responsible for the operation and on the other hand the end-users' economic resentment. Environmentally controlled building operation is all about

hard technical knowledge and understanding of the residents housing culture and lifestyle - if one of these is missing, it would be difficult to implement (Jensen, Jensen, Elle, Hoffmann, Nielsen and Quitzau, 2008).

3.2 *End-users participation from planning phases to operational phase*

European Directives describe the decision-making processes concerning historic buildings and efficient energy including a report for Public hearing. The UNECE Convention (The Aarhus Convention) on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, recognizes that people have the right to take part in basic decisions affecting their lives. It recognizes that the quality of these decisions can be improved through the active involvement of public concerned (UNECE, 1998). The Charter of European Cities & Towns Towards Sustainability (The Aalborg Charter) I.13 says: "We, cities and towns pledge to meet the mandate given by Agenda 21, the key document approved at the Early Summit in Rio de Janeiro, to work all sectors of our communities - citizens, businesses, interest groups - when developing our Local Agenda 21 plans" (ESCTC, 1998). In the Aalborg Commitments concerning Planning and Design tell about, that there will be work to apply the requirements for sustainable design and construction, and promote high architecture and building technologies (ESCTC, 2004).

The most recent renewals are also on the operating side, where the housing association leaves the primary management of operation and maintenance to the residents. The caretaker's function is committed and the intention of social housing association is, that the residents themselves must take ownership for the maintenance of their common buildings, common areas and common usage. Again one can ask the question whether end-users can and will contribute to the individual housing profitability? If there is no economic incentive for the end-users, is a barrier to the environment-controlled building operation (Jensen, Jensen, Elle, Hoffmann, Nielsen and Quitzau, 2008). What is the motivation and driving force for the end-user?

When end-users are not directly involved in the development of the homes there might be a risk that the residents do not even take ownership of the building. The latest renewals to counteract any possible opposition from the residents' are that the social housing association leaves the running and maintenance of the buildings to the residents. In other words, the caretaker function is removed. This PhD project examines a case where end-users themselves are responsible for the running and maintenance.

3.3 *Sustainability and the end-user*

The administration of the social housing association must ensure the learning of embedded sustainable initiatives in the settlements. The sustainable intentions of the architect, is subsequently transferred to the end-users. It is creating a joint ownership (Jensen, Joergensen, Elle and Lauridsen, 2012). The facilities management department does have an information and education commitment regarding the relevant knowledge about the use of sustainable technology to end-users. When the architect and the rest of the consultant team, in collaboration with the construction company, has transferred its completed project to the housing association tenants, it is ready for occupancy. For the development's calculated operating accounts to be met, it will often require that end-users should act in a particular manner in relation to electricity, water and heat. The consultancy team has in the project planning phase allegedly stipulated an overall repayment period of construction costs for the sustainable initiatives.

Typically, the communication and learning of this knowledge are given to the end-user through the delivery of printed resident information. From then on it is up to the individual residents themselves to familiarize themselves with the material and create their own understanding. This could be possibly followed up with special information sessions for residents. General housing associations have also started to communicate via their websites, supplemented with video giving information on procedures for the operation and maintenance

of residential buildings. It is interesting to examine, whether these presentation variants are affecting end-users' everyday practice.

Does the appropriate learning happen? Is it a learnt behaviour that the residents also use in their everyday practice? While you are using network-based communication for self-learning, it will be essential that users have a considerable motivation and willingness to engage (Illeris, 2009).

This requires that end-users can and will take the required learning of the necessary sustainability initiatives and the consequent desirability of user behaviour. It is a requirement that the end-user will receive this more or less complex information. When there is a willingness to learn, it is because the end-users desire involvement, the acquisition of new knowledge may depend on personal valuations around the sustainability theme and habits, social activity, economy and consumption in everyday practice. There are "black holes" concerning advice to end-users (Jensen, Jensen, Elle, Hoffmann, Nielsen and Quitzau, 2008). This PhD project will examine whether the end-user can and will grasp the information. In a recent study of sustainable building in Denmark, the residents indicated that they were uncertain about the proper use of their property. As Jensen, Joergensen, Lauridsen, Quitzau, Clemmentsen and Elle (2010) writes, the end-users could be in doubt over ventilation and regulation of floor heating: "Should we open the window or the door to ventilate the bedroom? Do you destroy process by airing out? What does it mean that the appliance is running?"

"The residents' behaviour affects the function and consumption in each house. Whether it just depends on knowledge can be discussed as aspects of the cases indicate that there may also be a de-selection from the residents', in relation to comply with the environmental requirements outlined in the projects" (Jensen, Joergensen, Lauridsen, Quitzau, Clemmentsen and Elle, 2010).

3.4 *Sustainability from the administrative user to the operation staff*

Administrators emphasize the ongoing dialogue with the operating staff as very important for environmental performance. Organizing and anchorage is in general very closely connected to the building of resources and knowledge of environmental and resource conditions in a property. Further training of operating personnel is needed. Management refuses to even out the missing skills. In addition to the possible lack of knowledge of operating staff does not constitute a barrier to implementation of environment-controlled building operation. It is necessary to empower the caretaker better to engage in dialogue with the residents (Jensen, Jensen, Elle, Hoffmann, Nielsen and Quitzau, 2008).

3.5 *User behaviour and overall economy*

The relationship between the operating costs and the building construction are essential for the social housing associations. In this context it is interesting to examine the residents, caretakers and administrative operating everyday practice. Their everyday practice and attitude for universal sustainable buildings will have an impact on a profitable overall economy. The social housing associations must ensure a quality building at a reasonable cost, because they subsequently bear the additional operating and maintenance costs arising from any lack of quality.

In order to improve the quality of in the sector of the social housing association, the introduced a requirement for assessments of building the overall economy. By planning and project assessed the total construction costs relative to operating costs. In addition to the environmental and societal benefits, total economic assessments will be a key parameter in the municipalities own assessment of whether a construction project should be implemented.

Quality of construction is a parameter to be assessed and the second is the user's handling of the operation. Several environmental analyses examine energy consumption, water use and use of other natural resources, but not the experiences of maintenance (Shove, 2003).

The total economic considerations constitute a competitive advantage by public architectural competitions and tenders. The award criteria with total economy in focus mean that the bidders

are forced to deal with the economic profitability throughout the Lifecycle of the building. The weighting of this ratio gets larger and larger influence on the winning projects. But if there is so much focus on the economic viability, it would also be interesting to investigate whether the user also has the same focus. The Ministry of Social Affairs earmarked in 2011 funding to projects planning energy savings in relation to the user behaviour and the overall economy (ESCO model).

This research project will follow a pilot project in partnership with housing association KAB and Energy Fund. In this study, the project establishes three new townhouses with separate energy measurement devices in individual homes. A reference building and two measuring buildings. The advisors involved will examine building's energy consumption and the individual end-user energy consumption. In addition, how consumption is broken down, by month, etc. The idea is also that the measurements must be collected and sent to the server and displayed in the display in each home.

Several parameters can be crucial for the sustainable initiatives now for making accommodation in general, and also social housing associations sustainable. There is a tendency that the larger the income a family has, the more consumption they will have. However, it is the single person living alone who puts a bomb under sustainability. Power consumption is greatest on average, with fewer people living in the dwelling. Consumption is influenced by residents 'learning habits and residents' comfort practices. The fact that you live with others is not necessarily sustainable (Gram-Hanssen 2012). Furthermore, the fact that there is an increased number of electronic devices in each home in Denmark should be considered (Gram-Hanssen 2013). The complexities of changes in practice seemingly in a way that moves by the established theories about consumption and technology (Shove, 2003).

3.6 *Visibility of sustainable iniatives for the user*

User motivation can be a value judgment, political or as a penalty or reward bracket (Thurén, 1994). The reward could be an economic incentive by reducing consumption. So that consumption in the home can be seen directly by residents - electricity, heat or water meters. Not just the meters located in the cupboards or under the sink, but the digital meters in a more "natural eye level" e.g. consumption could integrate on water fixtures with a direct visualization of consumption translated into costs. The rewards could also be at a visibility of consumption on the individual's behalf to supply firms. The penalty will of course be a larger bill if increased consumption. The Housing Association may assume that most end-users adjust their behaviour appropriately, but it would be interesting to identify if the users "adapt" their behaviour and consume appropriately.

There is also the aspect that deals with end-users receiving the necessary information. This requires specific skills and competencies; otherwise there is a risk that the housing association will not achieve the intended effect. The residents of public housing estates have different educational, cultural, linguistic and social backgrounds. This requires that the information be designed so that it meets these diverse criteria. A provision must be made that takes into account that it is from the non-skilled to highly educated people who should be able to understand the message. Also, it should be translated into the relevant languages which are spoken in buildings, etc. One can imagine that if the social housing associations administrative departments do not consider all these factors in the communication, then the messages may be received differently than expected.

4 RESEARCH METHODOLOGY

4.1 *Document analysis*

The architect’s documents regarding their ideas and thoughts about sustainable initiatives will be analyzed. This analysis is crucial to understand the purpose, as all user groups subsequently get diverted when they take over the project. So these architectural documents as descriptive

text, analyses, drawings, illustrations, etc. are very important. They serve a purpose for the sender, and then they may have a function for the different receivers (Groat and Wang, 2002).

Other documents such as, operation and maintenance manuals and user manuals are intended to provide guidelines for users' actions. Therefore, this kind of document is also interesting to analyze and compare in relation to users' own experiences. Do they even have knowledge that these documents exist? Do they know the importance of these documents in relation to user behaviour and consumption?

The way the analysis of the collected documents is performed depends on the research question. Document analysis can as Brinkmann and Tanggard (2010) writes, “identify trends and patterns in the material - the stability and change - happens over time".

4.2 *Interviews*

The interview has become a common way to gain knowledge about people's lives, opinions, attitudes and experiences. Brinkmann and Tanggard (2010) describe it as follows: "Life world is the world we know and meet in everyday life”. By using the qualitative research method one achieves the narrative storytelling. The narrative research approach has been chosen because the individual stories must be told to get personal experience about how to ensure better interaction between user and sustainable housing. Narratives are interesting for scientists because they are assumed to guide and organize behaviour. Narratives are dynamic and therefore susceptible. Narratives are contextual or situational related. Only by changing his story about himself, can the subject change his behaviour. The collection of user stories will focus the spotlight on the uncultivated areas of user behaviour in social housing. The qualitative data will be used in user group’s forward-looking behaviour, but the lessons learnt can also be used for project architect’s upcoming designs of future social housing projects (Brinkmann and Tanggard, 2010; Groat and Wang, 2002).

The interviews will be conducted face-to-face and as a focus group in multiple case studies. The interviews will be conducted as semi-structured with a dictaphone as a tool used to record. The semi-structured interviews is conducted with an interview guide that ensures the conversation leads to the desired topics - everyday practice in relation to architecture and ethics in relation to sustainability. It is important that the interview appears openness to new unexpected phenomena - curious and responsive. The study of the “why” and “what” should be clarified before the “how” is reached (Kvale and Brinkmann, 2009).

All interviews will be transcribed and the written text and audio recording together constitute the material to be subject to the subsequent meaningful analysis. This PhD dissertation must be disseminated to the sector of the social housing association in Denmark, user groups and especially Danish architects and other consultants. It must therefore be a reader-friendly product and will be written in Danish, so all the Danish recipients will get the most out of the research. Research papers and conference presentations during the course will be in English and Danish.

A work journal will be kept as a record of the experience obtained during the study. Transcription will be carried out. A systematic analysis should provide an overview of a large transcribed text material. Narrative statements from the three user groups, from the specific housing projects will be grouped and analyzed (Groat and Wang, 2002).

4.3 *Photo documentation*

There will be carried out an ongoing photo documentation. There will be made by the current settlements, single buildings, sustainable solutions, process with the users, user meetings, focus group interviews. If there is a wish from the users, on the possible anonymity in the context of photo documenting, this will of course be respected. There will not be taken photos without users' consent.

5 CONCLUDING

5.1 *Concluding reflexions*

The intentions of this PhD project is to create new knowledge about the interaction between the user, sustainability and social housing. There will be an open and flexible approach to the methodology for the number of participants who can be interviewed, the number of interviews and the number of the case which is currently selected. Users' narrative stories of this interaction will be collected through interviews. Data will be analyzed to provide new qualitative knowledge of each settlement, and a general knowledge across all of the cases. This general knowledge, offers a broader understanding of users' ambitions and competence in relation the importance of managing sustainable settlements. General knowledge will be for the use of the architects in the design of future sustainable housing. In addition, this knowledge contributes to the users and to the sector of the social housing association in Denmark .

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