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Design Med Omtanke: participation and sustainability in the design of public sector buildings.

Abstract: *This paper discusses a participatory design approach developed by Design med Omtanke in Västra Götaland, Sweden that has been successfully used for public sector building projects. The approach uses participatory design techniques alongside sustainable design, to design public spaces that meet stakeholder requirements, using sustainable products and materials. The paper reviews participatory design literature and positions the work described in relation to this. The context of the work is discussed and examples show the scalability of the approach. The conclusion is that the approach described can overcome problems frequently experienced by novice clients and can successfully be used to achieve sustainability objectives in a wide range of settings.*

Keywords: design process, user participation, built environment, environmental design, participatory design,

Whilst there is much written about participatory design (PD), the use of PD to achieve sustainability targets has not been widely addressed in the academic literature outside the context of urban planning (Mitlin 1995; Toker 2007). This article presents a descriptive account of an approach to the design of public sector buildings that combines participatory design techniques alongside sustainable design to achieve integrated, holistic design outcomes. The research presented addresses the question of how designers might be enabled to assimilate and articulate user requirements whilst educating users about sustainable solutions. Also addressed is the question of how to communicate design possibilities in an accessible way, as discussed by Luck in the context of building design. (Luck, Haenlein et al. 2001; Luck 2003; Luck 2007). In 2000 Bob Fowles wrote:

"When architects incorporate user and community participation in the design and development process, whilst at the same time embracing an ecological agenda, there evolves a strengthening of social sustainability as well as increasing sustainability in the physical environment." (Fowles 2000)

The approach discussed bears out this contention and offers a process that has the potential for widespread adoption and use.

Public participation in design has long been discussed and debated in Design Journals. In 1971 Design Participation was the topic of the Design Research Society Conference (Cross 1972; Stringer 1972) presented a paper setting out a rationale for participation, calling for radical redefinition of design and planning, whilst Matchett (1972 (Matchett 1972)) set out agendas and a process for multi-stakeholder team involvement in the design process. In the very first issue of Design Studies Johnson (Johnson 1979) took up this debate and set out the 'myths of participation in design' arguing that participatory design (PD) is fundamentally political and describing a project in Glasgow in which tenants participated in the redesign of tenement courtyards. Johnson's contention was

that participatory design demands that designers become sympathetic educators in their engagement with the user group.

The view of designer as facilitator in design projects with lay users is echoed by many writers (Oberdorfer 1988; Sanoff 1990; Foque 1995). A number of issues around participatory design are discussed and resolved, at least in part, in the academic literature. Key concerns include the potential negation or limitation of the designer's expertise and creativity; lack of design language and understanding from participants (Lawrence 1982; Luck 2003; Luck 2007); limitations on the scope of participants' input and influence on the design (Lawrence 1982; Wulz 1986; Reich 1996); competing perspectives from different stakeholders (Kernohan 1981; Lawrence 1982); the need for designers to develop new capacities to enable them to "respond to the complex nature of the relationships between people and the built environment"(Lawrence 1982).

Sanoff proposes playful, visually rich techniques and methods to engage users and describes a number of community projects in which these methods have been successfully used. Other design practitioners record similar experiences and the use of workshops at the earliest stages of a design project can be seen as a common approach (Sanoff 1981; Oberdorfer 1988; Sanoff 1990; Sanoff 2000; Teymur 2002; Sanoff 2007). Thackara (Thackara 2007) describes the use of visual communication and workshops for DOTT 07 where a co-design process was used to redesign public services in the north-east of England and the designer's role was to facilitate collaborative activity. This project, funded by the Design Council and regional development agency is indicative of the way in which participatory design has moved, from alternative counter-culture to the acceptable and publicly funded mainstream(Toker 2007). However, the caveat is that in the public sector, participation is more commonly found at the lower levels of Wulz's hierarchy (Fig 1), with co-decision and self-decision remaining relatively rare forms of public participation (Wulz 1986).

Fig. 1 Summary of Wulz (86), levels of participation showing decision making and participants.

In the approach discussed, user participation has the characteristics of co-design (King 1989) with users involved in visualisation and decision making throughout the design process. Crucial to the approach is the role of an independent facilitator who adopts the role of sustainability champion. This coupled with the expertise of the design team and knowledge of empathic, user-centred, design (Leonard 1997; Norman 2002) inclusive design (Preiser 2001; Clarkson 2003; Langdon 2008) and design for sustainability, (Dewberry 1996; Thorpe 2007) leads to successful interpretation and realisation of the user and client needs.

1. Methodology

Nilsson and Petersen, authors of the paper, are key members of the Design Med Omtanke (DMO) team, and have developed and used the process described over the past 8 years. Holden and Eckert, academic authors, visited five exemplar DMO projects, four of which are discussed below, to interview DMO staff, designers, clients, stakeholders and a manufacturer involved with the organisation to develop an understanding of the DMO approach from different stakeholder perspectives. Interviews and group discussions were recorded on video and audio for later analysis. The academic authors also drew on descriptive and evaluative working papers and published documents to develop an understanding of the organisation and its contribution to design knowledge.

2. Context

The Design Med Omtanke (Considerate Design) project is a Swedish initiative started by Västra Götalandregionen (Västra Götaland region), beginning as collaboration between the region and SVID, the Swedish Industrial Design Foundation and HDK School of Design and Crafts. Västra Götaland has played an active role in the Environmental Conference for European Regions (ENCORE) since the 1990s and has a declared commitment to improve the sustainability of the region. The aim of the project was to stimulate economic development in the region, in particular local furniture and textile industries, through the design and use of sustainable products for the public sector. DMO initially worked directly with public sector organisations to plan and implement major interior design projects. From the needs identified in this early work the project developed to work with local manufacturers on the creation of sustainable product design.

Initially, DMO found it very difficult to source sustainable furniture and textiles products and few companies in the region were interested in developing such products. However, in 2003, DMO commenced more than 20 design projects with manufacturers interested in working on needs identified by public sector projects. Designers, stakeholders of DMO projects and manufacturing companies collaborated on the product designs. As the potential size of the public sector market was realised, more companies were happy to become involved.

In 2006 DMO undertook a large-scale procurement of products that met base line environmental criteria and also a targeted procurement of products that met eco label standards. Seen by advisers as the “toughest procurement ever done in the field of interior design”, sixty products eventually met the standards. These were published in a catalogue, the Gröna Listan (Green List) the following year. Most qualifying products were made by companies that had worked with DMO.

Listed products have to be manufactured by 'approved suppliers', typically medium sized companies who are able to meet the volume demands of large-scale procurement. Products are also required to meet the criteria for the Swan Label, the Nordic Ecolabel, Bra Miljöval (Good Environmental Choice) Swedish Ecolabel or the EU flower. Manufacturers' interest grew as Region Västra Götaland encouraged public sector purchasers to choose products from the list. By 2010 the Green List had grown to 350 products and helped many public sector organisations to easily identify and procure products meeting eco label standards.

As the DMO team carried out research to discover the needs of public sector that might be met by local industry, they found themselves steering user groups through similar steps for needs and requirements identification. Interaction with professional designers then led to the fulfillment of these identified needs. The DMO process began as a formalisation of these early, informal, activities. The process has evolved and there is now an important relationship between the individual projects, which commission designs for specific contexts and the manufacturers who, via the DMO organisation, add these commissioned items to the repertoire of sustainable products available for wider use. As a result of this approach the Green List is a growing document now used extensively in the public sector in the region with interest growing in other parts of Sweden. In 2008, of the 62 million krona (approx 6 million euros) spent on furniture by Västra Götaland region, one third of this was spent on products from the Green List. In 2009 41% of all furnishings bought in the region came from the list, with a target of 50% for 2010 (Västra_Götalandregionen 2010)

DMO staff have diverse professional backgrounds including expertise in environmental issues and the public sector; public sector and accessibility; project management, public sector and manufacturing; product design and design education. This mix of knowledge and expertise is seen by team members as very important to the success of the DMO approach.

DMO team members act as advisers to individual projects and work with architects and designers trained in the DMO process, to realise design ideas as they evolve. There is no charge to the client for the DMO team's input but the work of the architects and designers is paid for at industry rates.

The DMO process is specifically targeted at stakeholders, and does not prescribe how the architect should approach the detailed design work. The ethos of the approach is nurturing and empathic. The adviser informs assists and mediates so that users are re-assured and supported through the complexity of the building project. Evaluation (see Section 5) and interviews demonstrate that this is well achieved.

In the early years, the DMO project's work was concerned primarily with interior design, reconfiguration and refurbishment, but the scope of projects has now extended to include external spaces. This expansion of scope led to a revision of the process in 2009. To date, the DMO team, have completed more than 30

projects with a diverse range of public sector clients from the design of nurseries and primary care health centres through to the design of a communal space for a Science Park. Current projects include the redesign of a bridge, the design of external play environments and the design of specialised hospital spaces.

3. The DMO Approach

3.1. Key aspects of the DMO approach

The DMO approach brings the aims of participative design together with sustainable design to develop holistic solutions for public sector building projects that help to achieve the sustainability targets of the Västra Götaland region. The focus of the process is on eliciting a deep understanding of user needs and finding sustainable solutions to these. The model has been developed heuristically and continues to evolve as new needs and situations are identified.

Key to the success of the project is the role of the DMO adviser, who acts as facilitator from the initial contact through to the final build, shepherding the project through the stages of the process. As another part of their role, DMO advisers also work with regional manufacturers on the development of sustainable products and this knowledge is brought to the design projects they facilitate.

The process is first introduced to potential clients and users through the visual model seen in Fig. 2. This articulation makes clear the aims of each stage of the process and helps clients to understand the commitment they need to make. In these early stages the adviser seeks to understand the client's needs well enough to inform the choice of an architect to work on the project. There is a growing bank of architects who have been trained in the DMO process. DMO advisers remain neutral but direct clients to a list of architects on their website where details of previous projects can also be seen. Once appointed, the architect works alongside the DMO adviser at each step of the process. Throughout, the DMO adviser assumes the role of the navigator, assisting the organisation through the design process and acting, where necessary, as mediator between stakeholders, architect and building project manager.

3.2. A Four Step Process

The DMO process is a simple four step model bringing public sector employees, architects and designers together to understand needs and wishes, which can then be translated into design proposals. At the start of the project a core group is set up within the commissioning organisation to work with the DMO team. Typically this group will comprise members of middle management and staff representatives as well as an in-house project manager from the public sector client organisation. Participative workshops are the locii for user engagement. PD techniques are chosen and adapted creatively for each design context.

The process ensures that the requirements, function and meaning of the building are fully considered before costly commitments are made. This is achieved through understanding and articulating the needs of user groups and stakeholders. The version of the process presented here is the model currently

used, which can be applied to the design of new buildings and regeneration projects as well as to refurbishment projects. The steps of the process are discussed below.

Fig. 2 Design Med Omtanke process 2009

3.2. 1 Step 1 Common Ground: developing shared understanding

At this stage the core project group is formed. In the first workshop, to which all relevant stakeholders are invited, the DMO adviser works with the group to help them; articulate their starting point and context; clarify their motivations and ambitions for the project and; consider how the needs of all stakeholders might be identified and analysed.

The DMO adviser's expertise is used to identify common values and facilitate the exchange of knowledge and experiences to help the group to work creatively and generate ideas about the positive and important functions of the organisation. A variety of narrative and visual exercises are used to establish the identity of the client group and identify preferences that will inform the architect's visualisation. For example mood boards and posters are created to express aspirations, such as how the group would like end-users to experience the service.

The outcome of this stage is an understanding of the background and context and a plan for the work ahead. For example, in the design of a new health centre in a refurbished public building, the focus of this first stage was on what a good health centre should look like, how to see the whole patient, body and soul, and the creation of a space to promotes health and well being. (Fig 3) The consensual nature of the workshop leads to the filtering out of more extreme ideas that lay outside of the collective vision; in a science park project one participant lobbied for the inclusion of concrete trees in the scheme but the group agreed that this was not an idea they wished to pursue.

Fig. 3 Reception area of the Kungshöjd Health Centre. Furniture and lighting have been chosen to create a welcoming ambience. Glass screens have been used to create private areas. The dual height counter can be seen Source: Lisa Brunnström

3.2.2. Step 2 A sustainable footing: needs clarification and sustainability

This second stage is also workshop based and focuses on the clarification of user needs. Depending on the project this clarification may be sought through interviews or questionnaires with the client user group prior to the workshop. Staff from the commissioning organisation are brought together to work as a group to articulate their current working practices and assess effective and less effective practices, i.e. what they do well and what they could do better in terms of accessibility for their client group.

In this second workshop the DMO team educate the project group about the design issues and work creatively with them to look for sustainable solutions. Where necessary the team draws on its collective knowledge of the legal requirements, such as disability access, and existing solutions. Further group work is carried out to analyse sustainability, the potential environmental impact and any inclusive design issues. The stage ends with a summary of work to that point and consideration of the positives and negatives that have been identified.

3.2.3. Step 3 Towards the future: visualisation and evaluation

This stage begins with a workshop involving the greatest number of staff and stakeholders possible. The focus is on envisioning the future. In the health centre project mentioned this led to *“ideas about how we could be more proactive with cooking classes and training opportunities. How we could use the facilities to the maximum by being more flexible. Natural elements, fire, earth, air and water were included in the vision of a good health care centre as a way to describe the space to be created”* (DMO website). The group is encouraged to develop mood boards to inform the architect’s conceptualisation of possible solutions. At this stage priorities are identified so that the desired outcomes of the project can be realised within the funding available.

Following the workshop the architect works on a visual description of the design, based on the users’ mood boards and ideas, to design an environment which has the identity envisaged by the stakeholders. This visualisation plus written documentation is presented back to stakeholders in a meeting. Following user approval the project manager and the architect, overseen by the DMO adviser, work together to bring all the important information and priorities into a final document that is the Action Plan.

3.2.4. Step 4 From idea to implementation: design and procurement

At this stage primary responsibility for detailed design of the project shifts to the architect and design work begins with sketch proposals for the building and its spaces. Until this stage the constraints of costs are not considered, but at this point the architect works to realise the ideas generated within the budget allocated. These proposals are integrative, bringing the ideas from the work with users into one, coherent vision. The proposals are followed by substantive sketches, which anchor and articulate the ideas in developed proposals. Once the developed proposals are drawn up construction work begins on the building and the architect works with the project manager to ensure integrity. The DMO team is not involved in the construction process directly. However, where necessary, solutions are found to reduce cost whilst maintaining the vision for the project.

In this detailed design phase, products and materials are chosen with a view to durability, sustainability and accessibility. The interior architect uses the Västra Götaland “Green List” to procure furnishings that meet these criteria. Final selections of products and detailed decisions are made in conjunction with the core project group.

In some situations products are specially commissioned to meet user requirements. For example in the Snickargården Nursery project, discussed below, the need for a flexible workstation for craft activities was identified. A bespoke item was commissioned but this design is now included on the Green List and available to other organisations.

3.2.5. Completion and celebration

On completion of a project there is always a party to celebrate the work and show the results. Finally an evaluation of the project is carried out and the knowledge gained is added to the experience of the DMO team.

3.6. The DMO process in new build projects

For new build projects, the first three steps of DMO process take place during the feasibility study stage when a new building is first proposed and indicative costs are identified. In this phase the DMO team work with the project group to generate the specification for the new building. The technical study for building work is carried out in parallel, though there may also be a feasibility study before work begins. The output of the feasibility study phase is a specification to inform the tendering and planning stage of the building process.

During the planning stages for the building phase DMO works with stakeholders to plan the interior of the new building. As construction work progresses interior design work, based on identified needs takes place in parallel.

4. The DMO approach in practice

The DMO approach has proven to be effective at different scales from small-scale one-off projects through to community regeneration. Four cases are briefly described below to illustrate the scalability of the approach and highlight aspects of the process and its contribution to the sustainability agenda, points are summarised in table 1 below.

4.1. Commissioning and sustainable growth: Snickargården Nursery

The Snickargården Nursery project was one of the first building projects to be completed using the DMO process in 2003 and has contributed to sustainable economic development in the region. Products, specially designed and commissioned, were produced by local furniture and textile manufacturers for this project. DMO subsequently worked with the manufacturers to add these products to the Green List catalogue, enabling their widespread procurement. (Figs 4a, 4b)

Fig. 4 (a) Craft table with room for materials underneath, the height allows staff to help children without bending. (b) Foldable Cupboard that allows the creation of a room within a room: Note the castors that give the furniture greater flexibility. Source: Lisa Brunnström

4.2. Aiding organisational development: Kungshöjd Health Centre and the Forsythia Project

In the Kungshöjd health centre project the DMO process demonstrates the value of the process as well as the outcomes. As part of the DMO process 50 patients were interviewed by primary care staff about their experiences of the health service, mirroring the approach used by Luck in the design of a university building (Luck 2003). The client views the value of DMO as greater than the physical outcomes of the project. The core primary care team (PCT) initiated the “Forsythia project” to encourage all primary care teams to undertake the DMO process, as it is seen to achieve not only a coherent, sustainable and user centred environment but also to build common vision and understanding of all those involved, leading to improved and more effective working relationships. The core PCT has created a concept book showing examples of work done. Staff, in un-refurbished clinics, are encouraged to view DMO projects and the concept book, to see what is possible. The DMO process has since been used for the re-design of several other primary care centres.

4.3 Fostering creative engagement: Gothia Science Park

Gothia Science Park in Skövde exemplifies the use of the DMO process in a new build construction project. DMO worked with both business and academic communities to design a 14 000 square metre entrance space linking two buildings to provide a creative environment for academia and business to meet (Fig. 5). Ideas were freely generated in workshops and participants evaluated these to reach a consensus. Ideas were rank ordered so the most popular could be acted upon first, for example, everyone agreed on the inclusion of a sedum wall but other ideas were shelved.

When the architect's proposals were presented to a combined meeting of the two communities, they were accepted enthusiastically as an accurate interpretation of the workshop consensus. The outcome was a series of different and flexible spaces, with movement and signposting through the building achieved using colour and organic shapes. Sustainable materials were used throughout and cost savings were achieved by using refurbished seating in the conference hall.

Fig. 5 Artist's impression of the outside of the Gothia Science Park shared area.

4.4. Community regeneration, DMO large scale: Rydal

The Rydal example shows the DMO process used at a large scale developing sustainable ideas for economic regeneration. The aim of the DMO project was to find more ideas for economic regeneration in the village area.

Initial explorations began deliberately slowly, with coffee meetings for advisers to get to know the community and identify key community figures. Three themes emerged from the first workshop and DMO invited people to meet to explore these possibilities before the second workshop, some visited another regeneration project. 150 people attended the second workshop where decorative banners and actors were used to stimulate discussion, 60 participants engaged with specially created design activities.

From this workshop a brochure of ideas was created by DMO and presented back to the community. The outcome is that Rydal has now created a centre for sustainable design in the old textile mill at the heart of the village (Fig. 6).

Fig. 6 Rydal Design Centre, the converted textile mill at the heart of the village. Source: David Margues

Project	Scale	Participants	Outcomes	Consequences
Snickargården Nursery	Self contained nursery building 876m ²	Nursery Staff, parents, council officers	Purpose built, sustainably furnished, nursery. Specially commissioned furniture and textiles.	High levels of staff satisfaction, Further DMO projects in the municipality including the Rydal project
Kungshöjd Health Centre	Three clinics plus call centre in two floors of a building	Primary care service Chief Executive, primary care service managers, primary care project team, designated project manager. 50 Patients interviewed by the PCT about their experiences,	Purpose built, sustainably furnished, clinics and workspaces, with commissioned furniture. Forsythia project, encouraging other PCT teams to use process.	High levels of staff satisfaction, Further DMO projects in the PCT service

		needs and wishes.		
Gothia Science Park	Conference and meeting space 14 000m ²	University of Skövde faculty members, start up companies on site, GSP project manager	Purpose built, sustainably furnished, meeting space. improved communication between academic and business communities.	Too recent to identify
Rydal Community Regeneration	Village 300 inhabitants	150 village residents, council officers, Rydal Community Association, local politicians	Design centre, exhibition and events spaces, shop, cafe, Centre for expertise in Sustainable Design.	Successful implementation of a sustainable scheme for regeneration

Table 1 A comparison of the scale and outcomes of four DMO projects

5. Evaluation of the DMO process

There have been two evaluations carried out of the DMO process both of which indicate the value of the DMO process.

5.1. Evaluation by clients and architects

In 2009 an evaluation was carried out by Nilsson. Twenty public sector organisations that had worked with DMO were surveyed and interviewed. The usefulness of the process was evaluated as very high (4.5 out of 5). Levels of client satisfaction are higher still (4.91). The evaluation found that organisations perceived the process as helpful for early identification of needs, and the establishment of priorities. The process was also appreciated for its focus on sustainability. However, some respondents identified the process as incurring extra costs because of the increased demand on stakeholders' time at the beginning of a project. A tension was also perceived between economic and environmental considerations.

A similar evaluation was carried out with twenty architects involved with DMO. This showed the main benefit of the DMO approach to be the relationship built between the architect and the commissioning organisation, which leads to good end results. However, the time demanded in the early stages of a project is seen as slightly problematic. One architect commented that it is difficult to charge for this time when tendering for a contract (Nilsson 2009).

5.2. Economic evaluation

In 2006 DMO commissioned an independent analysis of the economics of the DMO process (Svahn, 2006). This study compared the costs of the Snickargården project with a nursery designed without the DMO process. The evaluation

showed the costs of the DMO project were higher by around 1500 Euros per child (Table 2). However, the DMO project created a nursery with more space per child. When this space advantage is factored into account, the investment per square metre is lower for the DMO project. If the flexibility of the space and the durability of the Snickargården furnishings, extend the life of the space by two years longer than the comparison building, then the investment per child would be equalised without need to factor in the extra space. An evaluation carried out with staff, parents and experts also identified other areas of added value such as the use of sustainable materials and the flexibility and ambience of the Snickargården space. These aspects could not be costed in the report. The conclusion was that although use of the process led to higher costs in the short term, in the medium to long term costs are offset by savings because there is less need for modification and alterations if a space meets user needs from the outset (Svahn 2006).

	Snickargården	Björ förskola
Size of building	876 m ²	541 m ²
Space per child	10 m ²	8 m ²
Total Investment	9 341 612 Kr 1 015 935 euro	6 405 490 Kr 696 621 euro
Investment per m ²	11.535 Kr 1.2545 euro	12.805Kr 1.3926 euro
Investment per child	142 314 Kr 15 477euro	125 957Kr 13 698 euro
Potential number of children that could be accommodated	90	60
Number of children currently accommodated	71	55

Table 2 Comparison of Snickargården and Björ förskola

6. Discussion

The DMO approach brings together Participatory Design techniques with concerns for sustainability creating an accessible way for lay users to contribute to the design process. The educative role of the process gives it a very different emphasis to other construction process models, such as the RIBA (RIBA 2000) process which covers all phases of a construction project and is aimed at the professional actors in the process. DMO conforms to CABE's (CABE 2003) recommendation for the creation of a project team in building projects, though the role of design champion, recommended by CABE (2002 (CABE 2002)), is adopted by the DMO adviser, rather than someone within the client organisation. Other design process models assume that the user is presented with multiple solution alternatives early in the process (RIBA 2000). In the DMO process the architect spends three workshops absorbing users wishes, need and preferences before presenting the user with a single potential solution. Further discussions centre on this design allowing users to critique concrete suggestions. Throughout this process the guidance of the DMO adviser ensures that issues of sustainability remain are considered and addressed. The DMO approach thus addresses issues that conventional construction process models do not resolve.

The spirit of DMO echoes those of service design processes as it aims to turn the commissioning a building or refurbishment into an empowering and pleasurable process. The Product Service System (PSS), defined by Mont (2003 (Mont and Lindhqvist 2003)) as "a system of products, services, supporting networks, and infrastructure that is designed to be competitive, satisfy customers' needs, and have a lower environmental impact than traditional business models", also arises from Scandinavian traditions, and emphasises that, to achieve sustainable results, it is necessary to look at products and the processes in which they are used as a whole. Although this system is concerned with products rather than buildings it points to the possibilities for extension of the DMO model into this domain.

In discussion of the Process Protocol process and "fuzzy front end" (Smith 1998) issues, Kagioglou, Cooper et al (2000 (Kagioglou, Cooper et al. 2000)) flag up the need assist clients to identify needs in the pre-project phase of a construction project Tzortzopoulos and colleagues (Tzortzopoulos, Cooper et al. 2006) articulate this further, identifying the need to support the novice client at the front end of public sector construction projects. The DMO process successfully meets this need and also helps to mitigate the ongoing emergence of requirements during the design process as discussed by Luck et al by ensuring that these are fully articulated prior to the design proposal being drawn up by the architect. (Luck, Haenlein et al. 2001).

It is important to note that the DMO process is focused on the work carried out with end-users and stakeholder and does not attempt to prescribe the process of translation, idea generation and detailed design that is carried out by the designer once all stakeholder needs, requirements and wishes have been identified. This approach is successful in ensuring that the detailed design work encapsulates the ideas of the stakeholders identified in the three workshops. The workshops, which are central to the process, build bridges between the problem and solution spaces by identifying key concepts that are articulated and embodied by the designer, as observed by Cross in the creative design process (Cross 1997).

Sustainability is built into the process explicitly through the procurement of sustainable materials and locally produced furniture. The shepherding of the DMO adviser and their expert knowledge enables the user to easily specify sustainable products that meet their requirements and, in many cases, exceed their expectations. However other aspects of sustainable building, such as site orientation, insulation and shading are the remit of the design professionals and are not in the scope of the participatory design work. The strength of DMO lies in thorough elicitation of user needs followed by user involvement in decisions that they have the knowledge and experience to make, while enabling the professional to apply their own expertise.

In their work on mental wellbeing and the physical environment Cooper et al (Cooper 2008; Cooper 2009), identify three main issues that profoundly impact on wellbeing; quality of the fabric, quality of the ambient environment, and psychological impact of the environment. Finding solutions to these issues is

fundamental to the ethos and approach of DMO and is achieved through the empathic articulation and translation of user requirements into physical spaces. However, as the evaluations found, to achieve this has resource implications, in terms of the staff time required at the commencement of a project and the up front cost of sustainable solutions.

In the DMO approach costs are not considered until the end of the participative phase. This is deliberately done to avoid constraining the process and to free the client to think creatively. This appears to have been successful, the purchase of good quality products leads to longer product life. When necessary the use of recycled furniture has enabled cost savings. An executive of the Kungshöjd Health Centre commented “when you talk directly to a furniture manufacturer they help you to buy a lot of furniture very cheaply. A designer helps you to buy the right furniture at a good price”. Thus the DMO approach helps to avoid costly issues that the novice client may not perceive, such as those identified by Tzortzopoulos et al; ill defined service models; immature requirements; lack of prioritisation and management and; poor implication of the changes. It should be noted that the DMO service is free to clients this is made possible by regional funding with small contributions from E.U. Sources and SVID. Without this subsidy the cost to the client would be greater.

DMO has been developed in the Swedish culture, which has a long history of consensus and participation. Public funding enables the services of the DMO team to be offered freely to clients. Whilst there are some questions about whether this approach would be feasible in a different cultural context, participative design has been successfully used in many countries, which suggests that there is scope for the DMO approach to work in new places and contexts.

7. Conclusions

The experience of the DMO project demonstrates that a combination of participatory design and sustainability can be successfully combined to achieve outcomes that delight end-users, and educate participants about sustainable design. This is achieved through the orchestration of the process by the DMO adviser who acts, alongside the architect, as facilitator and sympathetic educator with an explicit sustainability agenda. The DMO adviser keeps issues of sustainability at the forefront of solution generation. Furthermore, the inclusion of multiple stakeholder perspectives in the process and facilitation of deep understanding between the needs and wishes of different groups enables consensus to be reached leading to solutions which are widely appreciated. The key to the success of this facilitation process undoubtedly lies in the relationships that are built between clients, DMO advisers and architects. These relationships were observed to be very good. In discussions with new DMO advisers, the nurturing culture of the DMO organisation was identified as assisting this.

Though this article has focused on the design process, the work of DMO advisers with manufacturers contributes a great deal to the outcomes achieved on DMO

projects enabling the commissioning of product designs that can be made available to others and added to the pool of sustainable products available for procurement, which, in turn, facilitates the growth of local companies.

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