CREATING, SUSTAINING AND OPTIMISING THE COLLABORATIVE REALM FOR PARTICIPATORY DESIGN

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ABSTRACT

Participatory design attempts to actively involve beneficiaries of design in the design process towards ensuring that the designed product/service meets their needs. This calls for an integration of the domain of designer with the domain of the user to create a realm of collaboration between the designer and the user for an effective involvement of the user in the design process. There is also the need to, in addition to creating the collaborative realm, also focus on sustaining the realm and optimizing the output of the realm. This paper recognizes the key place of decision-making in the design process and proposes a conceptual model, based on various concepts, towards creating sustaining and optimizing a collaborative realm for an effective participatory design. The model primarily relies on various theories on participatory design, motivation and collaboration. Significantly the model ends with a proposal for a user-involvement framework that incorporates a lean decision-making system such as Choosing By Advantages.

KEYWORDS

Participatory design, user-involvement, collaboration, decision-making

INTRODUCTION

Participatory design, according to Sanders (2006), is an approach to design that attempts to actively involve beneficiaries throughout the design development process to the extent that it is possible. Even though the concept of participatory design and user involvement are believed to have evolved in the 1960's based on the Scandinavian commitment to the ideals of democracy in work organizations (Jensen, 2006; Sanders, 2006; Granath, 2001; Damodaran, 1996), there is also historical evidence of attempts, particularly in the wake of the modernist movement, to shift focus from the design of objects to the design of the *use* of those objects so that they become functional to the needs of users. Modernism brought with it a reaction against what was seen as a preoccupation with the phenomenon of form and decoration of

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objects - with little relevance on the needs of people and society - leading to a new agenda in which the well-being of people should be enhanced through properly designed appliances and housing (Redstrom, 2005).

The importance of participatory design is widely documented and has been expressed by Cross (1972) in the writing: (t)here is certainly a need for new approaches to design if we are to arrest the escalating problems of the man-made world, and citizen participation in decision making could possibly provide a necessary reorientation. Lee (2006) also spelt out the significance of participatory design to include: improving designer-user relationship, inspiring the designers and making designs usable and acceptable to users. Participatory approaches to design process, especially at the early stages of design, may help designers to understand the users and legitimize decisions therefore avoiding later disagreements with the design outcomes and several changes in design (Caixeta, 2013).

FORMS OF USER-INVOLVEMENT

"Involvement" as a term is generic, encompassing a range of varying degrees of participation. Each degree of participation depends on the relationship between the user and service provider, such as the designer, as well as their respective degree of influence in decision-making (Arnstein, 1969; Kujala, 2003). Damodaran (1996) presented three forms of user-involvement as a continuum made up of informative, consultative and participative, to represent the varying range of degrees of participation (Figure 1).

Increasing intensity of involvement

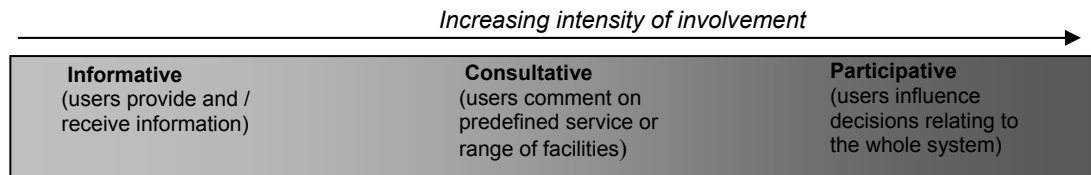| **Informative** (users provide and / receive information)	**Consultative** (users comment on predefined service or range of facilities)	**Participative** (users influence decisions relating to the whole system)

Figure 1: Forms of User involvement (adapted from Damodaran, 1996)

The informative form, which is the lower level of involvement, is the instance whereby users give and / or receive information. The consultative form represents the intermediate level in which case users are allowed to comment on predefined facilities. The high level of involvement is the participative form where users are given the opportunity to influence decisions in relation to the whole system.

Three concepts of involvement have also been identified by Granath (2001) based on his observation of worker involvement in decision-making processes. The first concept is *formal participation* in design whereby involvement occurs through union representatives. In this case even though users have their representatives in the decision-making process, they almost will never be directly involved in the process. The second concept which is the data collection method is comparable to the informative model of Damodaran (1996), in which case interviews are used to extract information from users. The challenge with this concept as observed by Zwemmer (2008) is that even though users are directly involved they have difficulty understanding the questions and proposals of the designers. The use of Building

Information Modelling (BIM) with its better representative and communicative techniques could address this challenge of the users. The third concept, known as *co-design,* could be compared to the participative form in Damodaran (1996). Here the users are given the space to operate as experts and this expected to increase their level of commitment. The process of co-design is also seen as a way of opening the organisation for mutual learning in which users, clients and designers collaboratively contribute to output.

DECISION-MAKING AND THE DESIGN PROCESS

Decisions play a crucial role in the design process and as indicated in Damodaran (1996) forms of user-involvement model, the level of influence in decision-making is a function of level of participation. There are several indications in literature of the critical place of decisions and decision-making in design process (Hansen and Olsson, 2011; Kestle et al., 2011; Kestle, 2009; Emmitt et al., 2004; Whelton et al., 2001). Emmitt et al. (2004) for instance observed that lean design management is, among others, also linked to the improvement in the decision-making process. Kestle et al. (2011) also observed that in the Lean Project Delivery System (LPDS^{TM}), the job of the project delivery team is not only to provide what the customer wants, but to first help the customer decide what they want.

In their analogy of manufacturing process and design process, Bølviken et al. (2010) indicated that whereas the manufacturing process is completed with a physical action, the design task or process ends by means of a decision. Decision-making has also been found to play a crucial role in the management of the reciprocal interdependencies found in design process. It has been observed by Koskela et al. (2013) and Bølviken et al. (2010) that in the management of the reciprocal interdependencies in design, *decisions* are required to be made in ending design as an inherently expandable task, making trade-offs during design, as well as making or ending progress in negotiations and dialog in design process. It therefore follows that decision as a product and decision-making as a process, are critical elements of the design process and has tremendous impact on the outcome of construction projects. This establishes the basis for the argument that, beyond providing a space for users to be involved in the design process, there is a need for an elaboration of a sound decision-making system in the user involvement framework.

THE COLLABORATIVE PHILOSOPHY OF USER PARTICIPATION IN DESIGN

The willingness of the expert designer and the experienced user to collaboratively merge their respective domains of existence and operation is central to ensuring a genuine participatory design. Lee (2006) relied on the concept of "*concrete space*" and "*abstract space*" by the French Marxist philosopher, Henri Lefebvre, to illustrate the need for a collaborative overlap of the domain of the user and that of the designer for an effective participatory design (Figure 2). The concept of "concrete space" and "abstract space" was employed by Lefebvre (1970) to illustrate a disturbing urban design problem: "*the extraordinary passivity of the people most directly involved those who are affected by projects, influenced by strategies*".
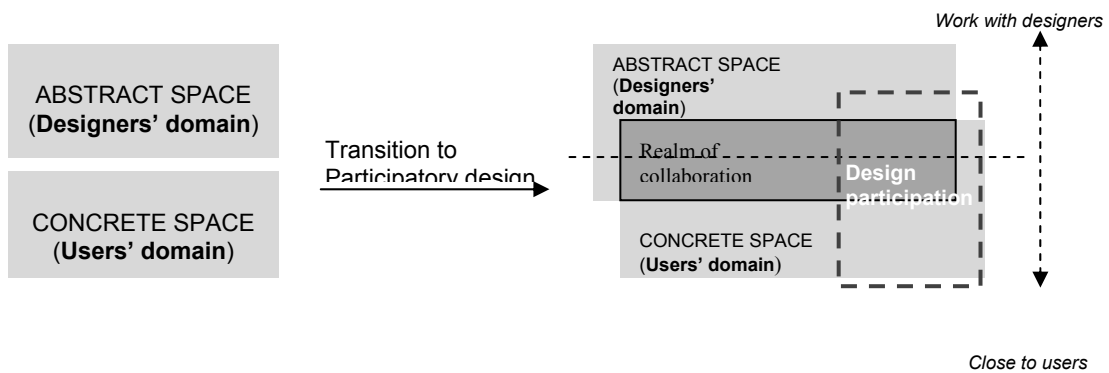
Figure 2: Collaboration of Abstract and Concrete Spaces for Participatory Design
(adapted from Lee, 2006)

Based on Lefebvre's social space concept, Lee (2006) defined "concrete space" as the space in which we live and experience (i.e. the people's world), while "abstract space" was defined as the space of vision and geometry typically used by experts such as planners, architects and designers to interpret cites and create the physical environment in the concrete space using tools of abstraction and representation. Therefore in a typical building design process the domain of the user is the Concrete Space (CS) while the domain of the designer/architect is the Abstract Space (AS). The action of participatory design accordingly occurs in the realm where AS overlaps CS. Even though various forms of participatory design techniques (i.e. design for innovation; design for collaboration; design for emancipation; and design for motivation) have been proposed by Lee (2006), the general concept of user participation in design revolves around the creation of a collaborative design environment through the integration of the AS and CS.

The need for the creation of the collaborative realm between AS and CS towards ensuring a participatory design however leaves a pertinent unanswered question of how to foster and stabilize the realm of collaboration to make it effective. Three specific concerns emanate, for the attention of this paper. The first concern is the source of the pull between CS and AS to create the realm of collaboration. The second concern is how to sustain the created collaborative realm to prevent it from disintegration. The third concern is how to ensure that an optimum output, with respect to design decisions, is generated from the collaborative realm.

CREATING THE COLLABORATIVE REALM

The mediatory role of the client and her advisers, as presented by Jensen (2002), between the demand side – owner, investors, managers, employees, visitors etc - and the supply side - architects, engineers, contractors, material suppliers and service providers – is a possible source of the pull between CS and AS to foster collaboration (Figure 3).
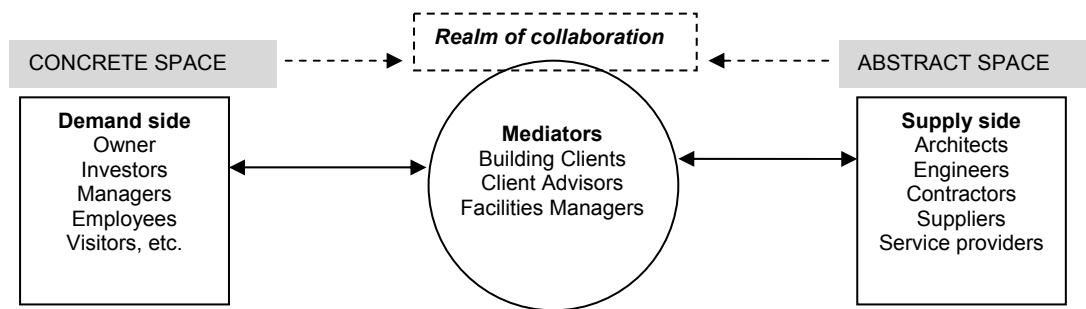
Figure 3: Client as a Mediator and a Source of Pull between CS and AS towards the Realm of Collaboration (Adapted from Jensen 2002)

This mediatory role of the client who could be a possible source of the pull between CS and AS agrees with Bertelsen et al. (2002) who indicate the possibility of the client acting as a change agent in the building process as against a more passive role as a procurer. Some shortcomings however exist in the possible pull role of the client as a mediator between AS and CS. Disappointment resulting from the ineffectiveness of the collaborative realm to produce the desired result of participatory design could discourage further collaboration, thus rendering he pull role of the client ineffective. Granath (2001) for instance observed that research and practice in Scandinavia indicates that disappointment from the results of collaboration in participatory design not only discourages the users from further participation in design, but also discourages the architect. This justifies the need for a research into the adoption of a decision system, within the collaborative realm, to make participatory design effective and encourage users and designers to continue to collaborate.

The organisation of workshops, involving designers and users, could also be one of the strategies for creating a field of pull between the AS and CS for the formation of the realm of collaboration. A number of user-involvement studies (Christoffersen and Emmitt, 2009; Oijevaar et al; Zwemmer, 2008) have adopted workshops as a forum for fostering collaboration between AS and CS. Kjølle et al. (2005) also identified the use of boundary objects as a means of creating a better environment in which different actors such as those of AS and those of CS cooperate. Boundary objects, according to Carlsen et al. (2004, p. 229), are *"objects that become shared foci for the attention and explorative activities of people with initially different interests, expertise and language"*. A Statement of vision and goals is a typical example of a boundary object.

One other way of fostering the pull between AS and CS, to create the realm of collaboration, is the use of incentives and incentive systems. Several definitions of incentives and incentive systems have been presented (Schöttle and Gehbauer, 2012; Kuhl, 2007; Becker, 1995; Beyer, 1990; Rosenstiel, 1975; Wild, 1973). In the context of this study we however adopt the definition of an incentive, by Beyer (1990), as a stimulus which activates a certain behaviour; and that of an incentive system, by Schöttle and Gehbauer (2012), as the sum of all used monetary and non-monetary incentives that foster collaboration between different parties such as designers and users. Incentives of the incentive system should motivate construction project parities such as designers and users to move away from their uncooperative posture to choose

the cooperative strategy to ensure an overlap of AS and CS (Schöttle and Gehbauer, 2012). It has further been observed by Kossbiel (1994) that incentives must necessarily represent value to the recipients in order to cause a motivation towards an action such as collaboration.

Even though monetary incentives (wages, bonuses etc.) and non-monetary incentives (social contact, information access, social approval etc.) may play a complimentary role in establishing collaboration as explained by Schöttle and Gehbauer (2012), monetary incentives, according to Deming (2000), has only a short term effect. Economic incentives have also been observed to impair intrinsic motivation (Darrington and Howell, 2010; Schulz, 2000). Unlike extrinsic motivation which arises out of external incentives such as wages, intrinsic motivation is motivation an individual receive from performing the task at stake, and emanates from personal values and desires. Darrington and Howell (2010) see intrinsic motivation as highly significant to the achievement of lean project delivery, further indicating that trust-based incentives tend to motivate higher levels of performance than mandatory incentives tied to a defined level of performance. It is our hypotheses, in this paper, that the adoption of a decision-making system, such as CBA, that is participative, transparent and auditable is a source of a trust-based intrinsic incentive to foster collaboration in participatory design.

SUSTAINING THE COLLABORATIVE REALM

The usefulness of the realm of collaboration created is largely dependent on its sustainability and stability across the participatory design process. It is therefore worthwhile to explore measures to prevent the collaborative realm from untimely collapse. One of the important measures of ensuring the sustainability of collaboration is to create an incentive that is motivating enough to prevent participants within the collaborative realm from exiting or becoming inactive. While Lichtig (2005) proposed the concept of rational contracts to build an association robust enough to survive the unavoidable conflicts and challenges that would come up during project delivery, Zwemmer (2008) suggested the use of feedback as a strategy to retain users' commitment to the collaborative process.

The teams in the collaborative realm are made up of members with different histories, backgrounds and capabilities, and in the context of this paper, coming from AS as designers and CS as users. The task, according to Howell (2013), is how to manage the balance between the cooperation and competition among the members of these teams with diverse orientation. The reliance on non-economic incentives, such as equity and fairness, for individual motivation is one of the strategies for managing this balance (Howell, 2013). Even though notable theories of individual motivation such as Bentham's *Carrot and Stick* (Bentham, 1789), Maslow's *Hierarchy of Needs* (Maslow, 1943), Herzberg's *Two Factor* (Herzberg, 1987) and Pink's *Self Development Theory* (Pink, 2010) overlook the power of the sense of equity or fairness in teams, Bowles (2008) has demonstrated how the drive for fairness is a more powerful motivation, among individuals working in groups, than financial motivation (Howell, 2013).

One of the major activities that take place in the collaborative realm during participatory design is making decisions on various aspects of design. The method by which decisions are made within the realm of collaboration could therefore play a

critical role in providing an intrinsic motivation to sustain the stability of the collaborative realm. Following the identification of equity and fairness as major sources of intrinsic motivations (Howell, 2013; Bowles, 2008) for individuals to operate optimally in groups, we need to explore decision systems that encourage fairness and equity for adoption in the collaborative realm of participatory design.

OPTIMIZING THE COLLABORATIVE REALM

The essence of creating the realm of collaboration, by overlapping AS and CS, is to generate an atmosphere for an effective user participation in design, so as to produce designs to aptly serve their functions and meet the needs of users. Due to the fact that making decisions is a key activity within the collaborative realm, the effectiveness of the realm of collaboration will depend on the soundness of those decisions and the quality of the accompanying outcomes. Decision-making methods influence decisions, the decisions result in actions, and finally actions lead to outcomes; therefore if outcomes matter, then the decision-making methods also matter (Suhr, 1999). The need therefore arises, as is the subject of this paper, to identify and incorporate a sound decision-making system within the realm of collaboration to optimise the output of the realm. CBA, which according to Howell (2013), gives project organisations a decision-making system for producing sound, reliable and grounded choices is worthy of consideration.

A CONCEPTUAL MODEL FOR CREATING, SUSTAINING AND OPTIMIZING THE COLLABORATIVE REALM

A conceptual model for creating, sustaining and optimizing the collaborative realm to achieve participatory design through the involvement of users is presented in Figure 4. This model is based on a number of concepts and theories discussed in the foregoing sections. Notable among these concepts and theories include Henri Lefebvre's concept of "concrete space" and "abstract space" based on which Lee (2006) proposed the collaborative realm; Jensen (2002) concept of the mediatory role of the clients and her advisers between the "demand side" and "supply side" of project delivery; Damodaran (1996) forms of user-involvement, as well as theories and concepts of collaboration and motivation by Schöttle and Gehbauer (2012), Bowles (2008), Darrington and Howell (2010), Howell (2013), Lichtig (2005) and Deming (2000).
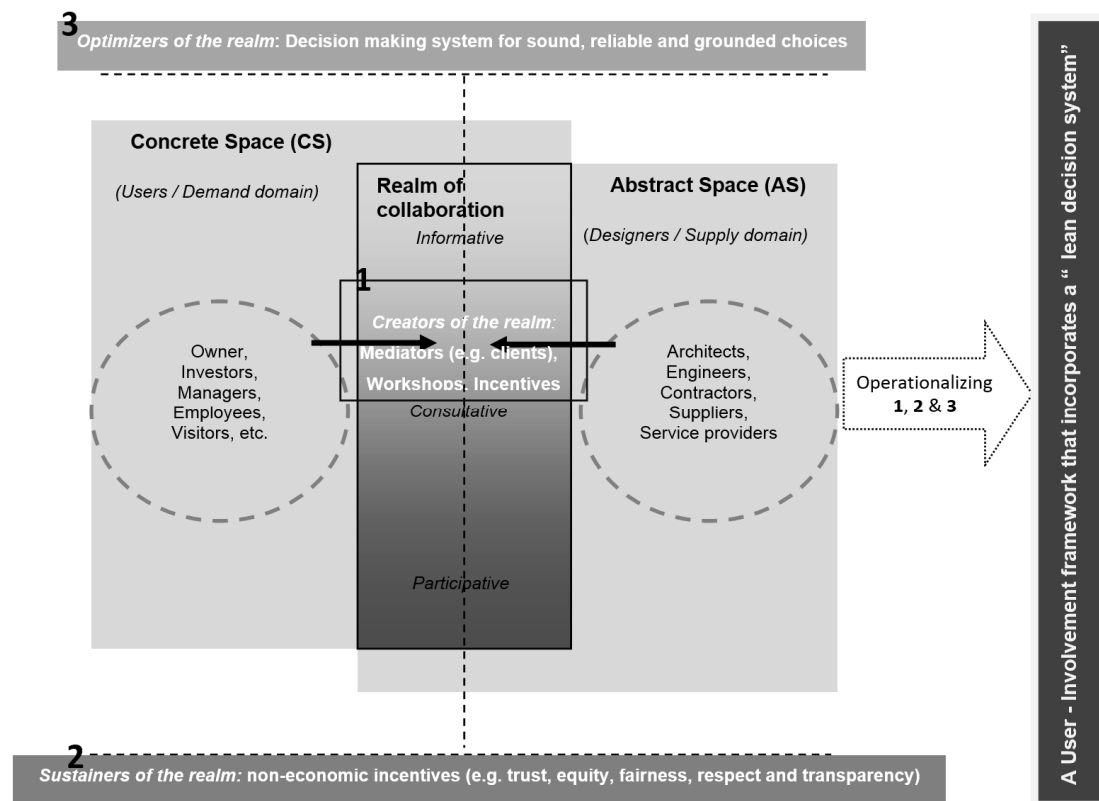
Figure 4: A Conceptual Model for Creating, Sustaining and Optimizing the Realm of Collaboration for Participatory Design

The conceptual model contains the collaborative realm arising out of the overlap between AS and CS. The creation, sustenance and optimisation of the realm depend on the operation of three zones in the model (i.e. 1, 2 & 3). The collaborative realm is expected to be generated in "zone 1" through the action of mediators (e.g. clients and their advisers), organisation of workshops and use of incentives (particularly non-economic, trust-based incentives). The elements of mediators, workshops and incentives, in "zone 1", therefore collectively or individually form the "pull (s)" that act between AS and CS to bring them together to create the collaborative realm. Worthy of note is the fact that the element of incentives in "zone 1" refers to intrinsic incentives which, according to Schöttle and Gehbauer (2012), are non-monetary, based on personal desires and values, and spontaneously emanate from performing the task.

Sustaining and stabilising the collaborative realm to prevent it from untimely collapse is addressed by "zone 2" which also relies on the use of non-economic incentives such as the creation of an atmosphere of trust, equity, fairness and respect. This component of the model makes use of the intrinsic incentives as a source of motivation to maintain individuals, balance their diversities and sustain their desired contribution in the collaborative realm. "Zone 2" of the model is therefore a container of the non-economic incentives of fairness, trust, equity, respect etc.

The effectiveness of the collaborative realm depends on putting mechanisms in place to optimise its output. "Zone 3" of the model contains elements that are

expected to optimise the operations of the realm. Given the fact that the design process is characterised by a myriad of decisions and that any output of design is an output of decisions (see Lawson, 2006), a quest to optimise the operations of the collaborative realm will require an attention to the decision system adopted. Contained in "zone 3" of the model is a decision system that leads to sound, reliable and grounded choices.

Due to the important place of decisions in design process (Abraham et al., 2013; Koskela et al., 2013; Bølviken et al., 2010; Kestle, 2009; Lawson, 2006; Emmitt et al., 2004), it implies that attempting to operationalize zones 1, 2 & 3, of the model, towards creating, sustaining and optimising the collaborative realm, may require an attention to the decision system to be employed. It is quite apparent that the various zones of the conceptual model largely rely on elements that agree with lean project delivery practices. These elements include the intrinsic incentives of fairness, equity, trust, transparency and respect, as well as adoption of a decision system for sound reliable and grounded choices. There is therefore the need for the development of a user-involvement framework which incorporates a lean decision-making system to operationalize zones 1, 2 & 3 of the conceptual model for the creation, sustenance, and optimisation of the collaborative realm towards a participatory design. A "lean decision-making system" here refers to a decision-making system that is aligned to the lean tenets of transparency, participative, simplicity, based on facts, among others.

CONCLUSION

The benefit of participatory design, as has been outlined in several studies, include, among others, generation of value to the client and end-user. There is therefore the need to create an enabling realm through the collaborative merger of the domain of the user with that of the designer to enhance an effective participatory design. It has also been observed that in addition to creating the collaborative realm for participatory design, there is the need to also pay attention to sustaining and optimising the created realm. This calls for the incorporation of the lean thinking tenets of fairness, equity, trust, transparency and respect, as well as adoption of a decision system for sound reliable and grounded choices in the operation of the collaborative realm. In view of the critical place of decisions and decision-making processes in the design process, the paper concludes with a proposal for the development of a user-involvement framework that incorporates a lean decision system to ensure fairness, equity, trust, transparency, respect, among others, in participatory design.

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