Co-design in Public Spaces: an Interdisciplinary Approach to Street Furniture Development

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Abstract

Cities are developing at a rapid pace. As a result of this growth, the importance of public spaces has increased. This paper intends to discuss the role that elements such as street furniture play in this context, whilst proposing a specific design approach to develop them. It attempts to analyze the distinct user-product relationship between people and the objects that occupy urban areas, and suggest ways to improve it. Co-design emerges as an alternative to involve all the stakeholders in the design discussion. The lay public, city planners, politicians and designers are invited to participate in the creation of pieces of street furniture. The interdisciplinary aspect of co-design becomes evident, once each actor contributes to the process with a different perspective on the urban spaces' needs. The association between co-design and street furniture development promises to be very beneficial to public spaces. Some of the positive outcomes of this association may be reduction of vandalism and urban alienation, and the enrichment of the community life. The co-design process affects, however, the roles that the referred actors play in the traditional context, and depends on the compromise of some power structures to be successful.

Keywords

co-design; co-creation; interdisciplinarity; public spaces; street furniture.

Approximately 3.2 billion people live in urban areas today (Kries, 2006). Whilst cities are developing and growing, public spaces are acquiring increasing importance. The urban elements that occupy these areas deserve major attention from designers, city planners, politicians, as well as the lay public. This paper aims to analyze the distinct user-product relationship that evolves from the interactions between the people and the elements they experience in public spaces. Since this relationship is not exempt from deficiencies, the study also intends to identify problems that might interfere with it as well as suggest ways of improvement.

Since community design approaches have met with success, it makes sense that co-design may emerge as a possible tool for street furniture development. Through literature research, this investigation attempts to explore the principles of co-creation, while analyzing their applicability to this context. Considering that co-design implies the participation of non-designers in the design process, the discussion about the roles that the lay public, politicians, city planners, and designers would assume in the co-design process becomes necessary. Designers share the creative process with the public, who is the *user* of the products. The non-designers are the most interested in the improvements of the urban areas. The changes depend, however, on the decisions of city planners and politicians, also referred to as the *choosers*. All of these actors play an essential role in this context and are invited to participate in the co-design process, using their distinct knowledge to complement the interdisciplinary experience.

The possible outcomes of the association between co-design and street furniture development are evaluated. Improvements such as the reduction of vandalism and enrichment of the life of the community are some of the advantages that the involvement of all the stakeholders in the creation of urban elements can promote.

Context

The relation between industrial designers and the urban space is recent. Even though today designers create urban furniture, playgrounds and parks, guidance systems and means of transportation, it was just in the course of the 20th century that they started to take responsibility for

issues related to the city (Kries, 2006). According to Kries (2006), design received a great impetus in the post-war era. It was necessary to reconstruct the destroyed cities, and industrial designers, who before would collaborate with architects and urban planners, started to play an independent role, complementing the pragmatic and rational tendencies of Modernist architecture and urbanism.

From this time to now, much has changed. In 1950 there were 86 cities on earth with over one million inhabitants, today there are 400, and in 2015 there will be over 550 (Kries, 2006, p. 23). Cities are developing at a rapid pace, and it is clear that this growth poses challenges for designers. New demands on the design of public spaces are evolving and these professionals must be prepared to create products that satisfy the *users*' new needs. Kries (2006) exemplifies some of the new trends in public spaces by stating that "wireless Lan hot spots allow us to work and communicate anywhere within public areas" and "plasma screens and other façades transform high rises into communicative structures" (p. 23).

The new demands also affect the objects that occupy the urban areas: the urban elements. Creus (1996) defines urban elements as "objects which are used and which are integrated to the urban landscape" (p. 6). The expression 'street furniture' is commonly used to designate these objects as well. In this paper, both terms will be utilized as synonyms. In this category one can include benches, chairs, streetlights, flower boxes, bus shelters, bicycle racks, and litterbins, among others.

The importance of the urban elements to cities is evident. People are sometimes so accustomed to having them around that they do not even notice the role these elements play in their daily life. The significance of street furniture is strongly connected to accessibility. Urban elements make "the city accessible to everybody and easier to get around in" (Creus, 1996, p. 9). Ramps and sign panels properly situated can facilitate the public's locomotion and orientation. Pieces of street furniture also help people effectuate their everyday activities. Bus shelters, streetlights, and bicycle racks can be cited as crucial elements to support their common needs.

The function of stimulating the use of public spaces can be attributed to the urban elements. They are capable of providing these areas with a comfortable and attractive aspect. In this sense, they are able to aggregate people (Figure 1). Benches and tables in squares and parks fulfil this purpose. Contributing to the cities' identity is another function that street furniture can assume. Urban elements lend a city its identity, making it recognizable to us (Creus, 1996, p. 6-7). This idea becomes very clear when considering cities such as London and Paris. Britain's red telephone booths and Paris' metro entrances have such a strong character that they have developed a symbolic function. If these elements were removed, these cities could have their identity compromised.

Figure 1 Example of pieces of street furniture that aggregate people

In the context of this investigation, the *user* of the urban elements assumes considerable importance. Identifying the specificities of this user-product relationship is, therefore, necessary. Creus (1996) highlights the fact that *users* do not choose urban furniture by noting that "unlike indoor furniture, *users* do not buy urban furniture and, therefore, maximum citizen comprehension

of the elements has to be worked at" (p. 8). Malt (1970) also points out some aspects of the relationship between the public and the street furniture. He defends the idea that "the consumer, literally, the man in the street, never sees a variety of shelf goods" (p. 41). The *users* neither do comparison-shopping, nor are allowed to exercise the traditional veto of the market place.

At this point, it is important to understand who takes the decisions on public planning and how these decisions are made. Normally, city planners and politicians, also referred to in this paper as the *choosers*, are responsible for decisions regarding the public spaces. These decisions are often made without the knowledge and participation of the lay public. King, Ferrari, Conley, and Latimer (c1989) refer to the term urban alienation to define the lack of opportunity that the actual *users* have to participate in the design discussions. According to them, when people who are the most affected by the changes are not involved in the planning practices, they are more likely to be alienated. Alienated people do not feel that public spaces are part of their lives. In the same way, they do not feel related to the objects that occupy these areas. For this reason, acts of vandalism are closely related to urban alienation.

The solution to this situation might be public participation. King et al. (c1989) defend that "public participation reduces the vandalism and enriches the life of the community" (p. 163). In spite of the controversial response to the authors' claims, a shift in the contemporary design approaches suggests that the user involvement is highly important to longevity of product design solutions. As stated by Sanders (2005), "it has become increasingly evident that everyday people are no longer satisfied with simply being 'consumers'; they want to be 'creators' as well" (p. 5). This paper presents co-design as an interdisciplinary form of street furniture development in which designers, *users*, and *choosers* are involved.

Co-design in public spaces

The co-design process

Stappers & Sanders (2008) have identified a trend in the practice of design. "Designers have been moving increasingly closer to the future users of what they design" (p. 5). Furthermore, there has been a change in the focus of the emerging design practices. They centre on people's needs and societal needs. Co-design principles, stimulating the participation of the user in the development of design solutions for a group of people or the whole society, fit these tendencies perfectly.

Although practices such as co-design and co-creation seem to be relatively new, they have been used for nearly 40 years (Stappers & Sanders, 2008). Since the 1970s, research projects on participatory design have been developed in Europe, mainly in Norway, Sweden, and Denmark.

Stappers & Sanders (2008) define co-design as "the collective creativity of designers and people not trained in design working together in the design development process" (p. 6). They defend that co-design is a specific form of co-creation since the collective creativity is applied across the whole span of a design process. Kleinsmann (as cited in Kleinsmann & Valkenburg, 2008) developed a different definition, which emphasizes the interdisciplinary aspect of the process:

> Co-design is the process in which actors from different disciplines share their knowledge about both the design process and the design content. They do that in order to create shared understanding on both aspects, to be able to integrate and explore their knowledge and to achieve the larger common objective: the new product to be designed (p. 370-371).

In this paper, it is suggested a comprehension of co-design that results from the combination of the two definitions above. Co-design may be considered, for the purpose of this study, as an interdisciplinary process that involves designers and non-designers in the development of design solutions.

Co-design differs from user-centred design mainly in the role that the *user*, the researcher, and the designer play in the design process. According to the classical user-centred design process, the *user* is a passive object of study, the researcher brings knowledge from theories and complements this knowledge through observation and interviews, and the designer passively receives this knowledge, interprets it and uses it to generate ideas, concepts, etc. (Stappers & Sanders, 2008).

Stappers & Sanders (2008) explain that “in co-design, on the other hand, the roles get mixed up: the person who will eventually be served through the design process is given the position of ‘expert of his/her experience’” (p. 12). There is “a shift in attitude from designing for *users* to one of designing with *users*” (Sanders, 2002, p. 1). The researcher supports the *user*, providing tools for ideation and expression, and the designer develops tools for ideation in collaboration with the researcher and gives form to the ideas. Many times, the designer and the researcher are the same person.

Again, the interdisciplinary nature of co-design becomes evident. If interdisciplinarity is an “individual as much as a group affair, with team members allowing the perspectives and methods of others to interpenetrate and influence their thinking and understanding of a problem” (Sillitoe, 2004, p. 14), co-design is a perfect example of interdisciplinary work, where designer, researcher, and *user* work collaboratively in order to reach a common goal. The concept of interdisciplinarity, however, becomes broader in this context where it not only results from the union of different academic disciplines, but from the combination of different perspectives on a problem or topic.

Although the *users* do not represent a specific discipline in the co-design process, they contribute with their valuable knowledge about their experience to the process, and evolve as a key element. Sanders (2005) discusses the changes in the way designers think about people (Figure 2). If in the 1980’s they were referred as customers and consumers, in the 1990’s, they started to be seen as *users*, participants, and adapters. In the 2000’s, with the participatory approaches, people are considered co-creators and are invited to participate in the actual designing. In order for this to happen, the users’ knowledge has to be considered as important as the knowledge of the other professionals in the team, which can be an obstacle to the co-design practice.

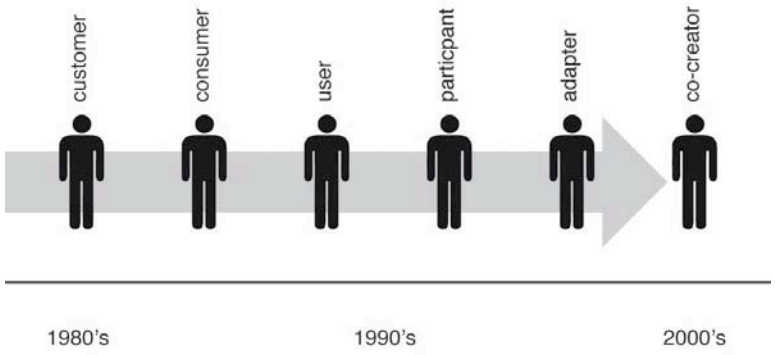

Figure 2 Changes in the way designers think about people (influenced by Sanders, 2005)

The co-design practice faces many other hurdles. As stated by Stappers & Sanders (2008), a premise for co-creativity is the idea that all people are creative. This idea is not commonly accepted, mainly by the business community. In addition, “co-designing threatens the existing power structures by requiring that control be relinquished and given to potential customers, consumers or end-users” (Stappers & Sanders, 2008, p. 9). Distributing and sharing the control is not easy for businesspeople who have been in control for a large period of time. Trained professionals are willing and eager to carry out their roles and are very often unwilling to accept input from lay people (Iacofano, Moore, & Goltsman, 1988, p. 78). Furthermore, “participatory thinking is antithetical to consumerism” (Stappers & Sanders, 2008, p. 9). Many companies base their sale strategies on convincing consumers that they will be happier buying their products and co-design does not interest them. Finally, co-creation is often seen “as [an] academic endeavor with little or no relevance for the competitive marketplace” (Stappers & Sanders, 2008, p. 10). This view on co-design is starting to change, in part because of the successful collaborative experiences between companies and universities. The groundswell of interest in ‘open source’ design has also contributed to a better acceptation of co-design, which becomes very clear in the Internet context. According to Sanders (1999), “new computer tools and applications have made self-expression through personal websites accessible to everyone with the time and desire to build one” (p.6). More recent studies reveal that “over half of all on-line American teenagers create their own content” (Sanders, 2006, p. 31).

Co-design experiences related in the literature have in many cases focused on healthcare environments and products. On some occasions, they had the purpose of improving the quality of life of people with certain diseases (Clemensen, Larsen, Kyng, & Kirkevold, 2007), or ameliorating nurses' workplaces (Stappers & Sanders, 2008) (Figure 3). In other cases, co-design principles were applied to contexts such as farms (Stappers & Sanders, 2008: 11), and learning environments (Druin, Stewart, Proft, Baderson, & Hollan, 1997).

Figure 3 Nurses co-creating a concept for ideal workflow on a patient floor (Stappers & Sanders, 2008)

King et al. (c1989) define co-design as "a combination of community, cooperative, and collaborative design" (p. 3) and affirm that architecture has been a community concern since the early days of our society. According to them, the exclusion of community from the creation of its architecture results in social alienation, and inhuman environments. Collective creativity, on the other hand, "causes neglected public buildings and open spaces to come alive and vandalism to cease" (King et al., c1989, p. 3).

As previously mentioned, this view was perceived as controversial. Nonetheless, it is possible to state that street furniture should be a community concern now. Urban elements support the community's activities, and should be designed according to the community's needs and values. It would be interesting to evaluate if co-creation in the development of these objects may also be a solution to alienation and vandalism.

The user, the chooser, and the designer

In the context of urban spaces, three actors assume crucial importance: the *user*, the *chooser*, and the *designer*. Stakeholders in the public spaces' issues, they are invited to participate in the development of street furniture, providing their distinct knowledge to the co-design process. The advantages of transforming an activity that was before practiced only by designers into an interdisciplinary collaborative process are related to a better comprehension of the *users*' needs, and the development of realistic solutions that can be more easily implemented.

The roles that lay people, city planners, politicians, and designers assume in the proposed co-design process are debated in next sections.

The public

The *users* of the urban elements assume the role of co-designers. They become a critical component of the process (Sanders, 2002), participating in "knowledge development, idea generation and concept development" (Stappers & Sanders, 2008, p. 12). Undertaking the position of 'experts of their experiences' (Stappers & Sanders, 2008), people contribute to the process with

their knowledge about their way of life, the site values, history, and circulation (King et al., c1989). They are able to inform the functions that the urban elements must accommodate. They also better understand the activities that take place in specific public areas as well as the time of the day that these spaces are used. Finally, they know the local history in depth. This information is crucial to the development of urban elements that meet the community's needs.

In order to participate in the design process, the *users* must be given appropriate tools to express themselves (Stappers & Sanders, 2008). King et al. (c1989) suggest the use of an artist as a facilitator who draws the participants' ideas. More recent research, however, focuses on the development of other co-designing tools and techniques such as three-dimensional toolkits (Stappers & Sanders, 2008) (Figure 4) that allow common people to communicate their own ideas. In the case of Figure 4, the non-designer participants were primarily nurses whose experience with circulation and access to equipment, supplies, and patients was essential to the design.

Figure 4 Nurses co-designing the ideal future patient room using a three-dimensional toolkit for generative prototyping (Stappers & Sanders, 2008)

The city planners and politicians

These actors are not commonly cited in the co-design literature. Nevertheless, they should also take part in the co-design process in this context. As stakeholders in urban spaces' topics, they are capable of enhancing the interdisciplinary collaboration for the development of street furniture.

The inclusion of politicians in the process is important to "create a climate in which government action can realize community ideas" (King et al., c1989, p. 25). The planners can guarantee the continuity of the discussion on the strategies that follow the workshop (King et al., c1989). These actors provide knowledge on governmental policies, interests and restrictions, a subject that other participants are normally not familiar with.

The designers

The designers are responsible for developing the tools and methods for generative design thinking (Stappers & Sanders, 2008). These tools will support the *users* in the expression of their ideas. Designers also analyze and interpret the *users*' ideas and use them as a source of inspiration and innovation. They provide expert knowledge on existing and new technology, production processes and business context that the other stakeholders do not have (Stappers & Sanders, 2008). Taking into consideration the information and ideas provided by the other stakeholders, they design the final product that will meet the *users*' needs and the *choosers*' criteria of decision.

The outcomes of the association between co-design and street furniture development

The outcomes of the association between co-design and street furniture development promise to be very positive. The proximity between the lay public and the designer may result in a better comprehension of the *users*' needs, and can certainly improve design decisions about urban elements.

Since they are considered everybody's spaces, public areas are democratic by nature. They are, therefore, environments conducive to the acceptance of principles of idea sharing and to the democratization of the opportunity to create, which are important requirements to co-design. Furthermore, the distinct user-product relationship in these cases is not related to consumerism since pieces of street furniture are neither exposed in shelves nor participate in the exaggerated consumption dynamics. Again, urban spaces seem to be an ideal context for the development of these kinds of activities.

There are some examples in the literature that relate effective cases of use of co-design in public spaces. According to King et al. (c1989), public participation curtailed vandalism in Wessburn Park, Burnaby, British Columbia, 1977. By painting murals over the entire exterior of a community centre, children reduced the incidence of acts of vandalism in the proximities because they started to use the area intensely and care for it vigilantly. The same authors (c1989) affirm that community based design has improved community life in many cases. The collaborative experience encouraged people that had never talked to each other before to begin talking and listening. After workshops, community members interact more, which can also enrich community life.

The democratization of the innovation permits that *users* "develop what they want, rather than relying on manufacturers to act as their (often very imperfect) agents" (Von Hippel, 2005, p. 1). Likewise, the democratization of the development of street furniture pieces also allows the user to create what they want and need. It certainly guarantees a better comprehension of the product by the user. Furthermore, it enables the community to create their own identity. The products that the community members help create reflect the community's shared values (King et al., c1989), which strongly influences their attitude toward the public objects. As a result, they develop an affective relation with these objects and there could be a reduction of vandalism. The urban alienation also tends to disappear once all members of the community (young people and adults, poor and rich, powerless and powerful) are invited to enter into the design dialogue (King et al., c1989).

Discussion

The debate on co-design practices should incorporate questions about people's disposition to change and adapt to the new trends. Participatory experience is not simply a method or set of methodologies, it is a mindset and an attitude about people (Sanders, 2002, p. 1). Co-design implies a shift in the roles that the actors are used to play. The *user*, the *chooser*, and the designer represent three different views and are crucial to guarantee the interdisciplinary character of the process.

Whilst the public, who is the most affected by the decisions on urban planning, might be very interested in taking part in the process, the city planners and politicians might want to analyze the advantages and disadvantages of being involved in such kind of projects. Although the benefits of co-designing urban elements are clear, in order to participate in the discussion, the *choosers* need to share their power of decision with the other stakeholders in the project. As already mentioned, co-design threatens the power structures (Stappers & Sanders, 2008), and, in this situation, it becomes evident.

Most public involvement programmes fall in the consultation category (Iacofano et al., 1988, p. 78). It is important, then, to emphasize that co-design widely differs from this category of *user* participation (Table 1). Consultation or dialogue is based "on the concept of using *users'* knowledge as a source of information, and asking *users* to comment on the designers' proposal while the design is in progress" (Siu, 2003, p. 72). "Citizen surveys and questionnaires fall into this category" (Iacofano et al., 1988, p.78), which gives the designer the right to make the final decisions concerning the project (Siu, 2003), while the city planners and politicians make the decisions related to implementation. In co-design, the *user*, the *chooser*, and the designer are

considered experts. For this reason, the *user* and the *chooser* participate in the design process since its early stages. The designer elaborates proposals with them, and shares the decision-making power with all the stakeholders. Differently from co-design, consultation does not jeopardize the established power structures, and this is probably one of the reasons why this category of *user* participation has been so largely implemented.

	CONSULTATION	CO-DESIGN
user	Source of information Comments on the designer's proposal while the design is in process Does not participate in the decision-making process	Expert of his/her experience Co-designer Participates in the design process since its early stages Participates in the decision-making process
chooser	Expert Makes the final decisions concerning the implementation	Expert Co-designer Participates in the design process since its early stages Participates in the decision-making process
designer	Expert Elaborates proposals Makes the final decisions concerning the project	Expert Elaborates proposals with the *user* and the *chooser* Participates in the decision-making process

Table 1 Differences between co-design and consultation

Another point regarding urban planning must be considered. Malt (1970) investigated the industry of street furniture fragmentation. Even today, many cities are not interested in producing an interrelated line of equipment. Given that the awareness of the importance of the urban elements is still in development, it might be difficult to convince some governments to invest in co-design projects with this purpose. Even though the advantages of involving the public in the process are obvious, changing past habits and thoughts is always a challenge.

Similarly, designers also face hurdles with the advent of co-design. To participate in this process, they have to work collaboratively with *users* and *choosers*. In the past, they used to rely on their individual creativity. Now, the acceptance of the idea that everyone can be creative too is demanded from them. It is just a matter of giving people the right tools to express themselves. In addition, designers are challenged to consider the knowledge that comes from the experience of the *users* as valuable as their own academic and experiential knowledge.

With the evolution of co-design, designers might experience the sensation of "losing [even more] control of the design process" (Sanders, 2006, p. 32). The *choosers* might feel less empowered as well. These reactions are expected when there are substantial changes in the traditional processes. However, the key to the success of co-design experiences in urban spaces is prioritizing the general well being. The stakeholders might need to compromise some power and authority. The benefits to the community and the urban environment, on the other hand, will be considerable.

Conclusion

Urban spaces are a perfect scenario for co-design. Engaging people in the development of urban elements they will use and with which they did not have any previous relationship, might be a

solution for under-used and neglected areas with good potential. The co-design process almost guarantees that the final product will meet the public's needs according to their values, the history of the place and the time of the day it is used.

The outcomes of co-design exceed the features of the final product. Co-design workshops enrich the community life, promoting interaction between the community members. They claim a share in the success of the final product (King et al., c1989), and develop an affective relation with it. As a result, it might be possible to note the reduction of vandalism.

The success of the interdisciplinary process depends on the participation of all the stakeholders in the project. In this case, the *user*, the *chooser*, and the designer should be involved in the development of urban equipments. People become co-designers and contribute to the process with their expertise about their own experiences. Their creativity is explored through the use of appropriate tools. The *choosers* participate of the discussion and provide knowledge on governmental policies. They are able to discern viable from unviable solutions. Finally, the designers develop tools for the *users* to express their ideas. They also use these ideas in the conception of the final product.

It is clear that there is a shift in the roles that each actor traditionally plays. A compromise is, therefore, necessary. Instead of keeping their comfortable positions, the actors must share their power of decision, or creative process in order to reach a major goal, which is the benefit to the urban environment.

The changes that are being proposed are huge, but they are already in course. Co-design is being adopted in many contexts, and the idea that when people's creativity is amplified by co-design processes (Sanders, 2006), the results are advantageous to the society as a whole, is being increasingly accepted. Employing co-design practices to the development of street furniture might be a favourable opportunity to improve public spaces. If "all people have something to offer to the design process" (Sanders, 2002, p. 1), one can imagine how many good contributions can be made by common people, politicians, urban planners, and designers working collaboratively to ameliorate cities.

References

Clemensen, J., Larsen, S. B., Kyng, M., & Kirkevold, M. (2007). Participatory design in health sciences: Using cooperative experimental methods in developing health services and computer technology. *Qualitative Health Research, 17*(1), 122-130.

Creus, M. Q. (1996). Urban areas, furniture and elements. In J. M. Serra (Ed.), *Elementos urbanos : Mobiliario y microarquitectura = urban elements : Furniture and microarchitecture* (pp. 6-14). Barcelona : Editorial Gustavo Gili.

Druin, A., Stewart, J., Proft, D., Baderson, B., & Hollan, J. (1997). *KidPad: A Design Collaboration Between Children, Technologists, and Educators.* Paper presented at the Computer Human Interactions Conference, Atlanta, Georgia.

Iacofano, D. S., Moore, R. C., & Goltsman, S. M. (1988). Public involvement in transit planning : a case study of Pierce Transit, Tacoma, Washington, USA. *Design Studies*, 76-85.

King, S., Ferrari, D., Conley, M., & Latimer, B. (c1989.). *Co-design : A process of design participation*. New York : Van Nostrand Reinhold.

Kleinsmann, M., & Valkenburg, R. (2008). Barriers and enablers for creating shared understanding in co-design projects. *Design Studies, 29*(4), 369-386.

Kries, M. (2006). On the relationship between design and city. In M. Kries (Ed.), *Designcity : Design for urban space and the design city discussion* (pp. 21-24). Berlin, Germany: Transform-Berlin.

Malt, H. L. (1970). *Furnishing the city.* New York : McGraw-Hill.

Sanders, E. B. (2002). From user-centered to participatory design approaches. In J. Frascara (Ed.), *Design and the social sciences : Making connections* (pp. 1-8). London ; New York : Taylor & Francis/Contemporary Trends Institute.

Sanders, E. B. (2005). Information, inspiration and co-creation. Paper presented at the *6th International Conference of the European Academy of Design*, Bremen, Germany.

Sanders, E. B. (2006). Design serving people. In Yrjö Sotamaa (Ed.), *Cumulus Working Papers* (pp. 28-33). Helsinki : Painotalo Miktor.

Sanders, E. B & Stappers, P.J. (2008). Co-creation and the new landscapes of design. *CoDesign International Journal of CoCreation in Design and the Arts*, 4(1), 5-18.

Serra, J. M. (c1996). *Elementos urbanos : Mobiliario y microarquitectura = urban elements : Furniture and microarchitecture*. Barcelona : Editorial Gustavo Gili.

Sillitoe, P. (2004). Interdisciplinary experiences : Working with indigenous knowledge in development. *Interdisciplinary Science Reviews*, 29(1), 6-23.

Siu, K. W. (2003). Users' Creative Responses and Designers ' Roles. *Design Issues*, *19*(2), 64-74.

Von Hippel, E. (c2005.). *Democratizing innovation*. Cambridge, Mass. : MIT Press.

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