

An Overview of Co-Design: Advantages, Challenges and Perspectives of Users' Involvement in the Design Process

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Abstract

Co-design is currently one of the most emergent approaches within design practices. Building on participatory design tradition and User-Centered approach, this approach affirmed in the literature's headlines as well as got adopted in a wide range of practices. Being described as capable to increase general processes' effectiveness by ensuring compatibility between users' needs and products/services' features scholars emphasize the advantages of replacing traditional top-down design approaches with a co-design one. While highlighting the advantages the field literature also indicates several challenges stemming from the adoption of co-design, generally revolving around the need to root the approach into a theoretical framework. According to an analysis of some main contributions developed in the literature, this paper aims to point out potential developments for the field, building on the analysis of the development of the approach throughout decades and analysing the challenges that practitioners and scholars are currently facing. A constructivist approach built on cultural psychology theory is finally argued as a theoretical framework capable to provide an advancement for the field.

Keywords

Co-design, Participatory Design, Constructivism, Cultural Psychology.

Introduction

In the last three decades, design methods have increasingly been shifting their focus from products/services' features to users' reactions and expectations for the design product. This reflected in a change affecting design practices and methods, directed to foster users' direct involvement within the design process.

According to this shift of perspective, one can consider the large spread of what is called the *co-design* approach as one of the most recent methods aimed at shaping design as a user-based practice. Indeed, co-design is gaining momentum not only within the professionals' domain but also in many businesses and organizations (Binder et al., 2008) reflecting the extent to which users are considered as essential components of the design process.

Compared to traditional product design practices, this approach entails a profound change of both designers and users' role, affecting more in general the whole landscape of design research. In this case, practitioners not only need to be trained for technical design, but rather to take into account users' expectations and needs. Generally, this current development can be conceived as part of what Sanders (2006) points out to be the shift from thinking about people as *customers* in the 1970s, *consumers* in the 1980s, *users*, *participants*, *adapters* and *co-creators* in the 2000s.

Accordingly, there is no unanimous consensus regarding the methods and strategies to steer such design practices in an effective manner. Also a segment of the design literature still raise some controversies related to the actual advantages, highlighting the lack of shared theoretical and methodological models driving co-design practices.

The goal of this paper is to help designers and researchers to depict more in detail which benefits to aim for and which challenges to account for when adopting a co-design approach. In addition, I will stress the need to root the approach to a theoretical framework capable to provide a common ground between practitioners. Accordingly, an array of benefits and drawbacks of co-design will be discussed in order to highlight the evolution of the approach, pointing out to future perspectives.

In the first section of this paper, having analyzed the literature and explored different definitions, the evolution of the co-design approach will be inspected, from its origins up until the most recent developments. The second section will point out exploring and understanding what can be defined as the added value of co-design within the design research practices. Conversely, the third section will focus on the pitfalls and challenges affecting co-design approaches. The general aim is to provide insights on what the future will look like for co-design, according to designers' different perspectives and challenges.

An Overview of Co-Design Through the Landscape of Design Practices

1. A Step Back into the History of Participatory Methods Within Design Practices

The co-design approach builds upon two traditions: Participatory Design (PD) and User-Centered Design (UCD). PD originated in Europe in the early 70s from the social movements' struggles for democracy and human development (Carroll, 1996); social empowerment and emancipatory purpose are therefore at the core of the resulting design approach. Thus, PD was shaped as a model aimed at investigating, understanding, reflecting, establishing, developing and supporting mutual learning between multiple participants in collective *reflection-in-action* (Schön, 1983). On the wake of the European experience and with the corresponding northern American social movements designers adopted PD methodologies overseas which led to the development of UCD approach in the US since the late 1970s. User-Centered Design originated a decade later as a method aimed at increasing the effectiveness of design, opening to methods providing insights on users' needs and desires (Norman & Draper, 1986). Overall, PD is to be seen as the wider theoretical framework based on direct users' involvement, while UCD appears as the application of its principles to Human-Computer Interaction research.

As a result, UCD can also shape users' participation in a *non-participatory* way (Carroll, 1996); two examples include the use of user descriptions (Card, 2018) or the operationalization of users' involvement by surveys. This slight variation indicates that what matters in a UCD perspective is users' involvement rather than their active participation into the design process.

However, PD and UCD approaches share a common principle; participants typically undertake the two roles of users and designers, especially where the former strive to articulate their aims and to learn the technological means to obtain them and the latter need to build a stronger link between technical skills and the understanding of users' expectations.

Building on these approaches, users' involvement has been constantly growing within the design field where the notion of co-design has largely become popular.

2. A Changing Design Scenario

Regarding to methodology, it is widely recognized that the potential added value of participatory design and user-centered approaches build up on evolving beyond conventional design methods, integrating them with social sciences techniques, such as focus groups or contextual interviews (Scott et al., 2009). However, starting from 1980s, social sciences have become an important source for User-Centered approaches (Bredies et al., 2010), used to inform designers not only about users, but generally about the social context they were designing for (Bayazit, 2004).

Overall, users' involvement takes over as the core of the design process where instead traditional design methods take place as techniques to be shaped according to users' needs and expectations. This reason underpins the current popularity of co-creation and co-design notions, highlighting the fact that design structures are increasingly shaped around the involvement of end-users and their relation with designers.

As a matter of fact, this co-created approach entails a different structure of the design process, bringing to light some controversies related to the shifting allocation of power — who decides what— that may potentially threaten the existing structures and roles, requiring a higher control in the hand of end-users. Such a change particularly affects private and public bodies at the same time faced with the need to align technological push with end-users' needs progressively.

The effort to understand how users behave in response to designed artefacts has proven to be problematic due to the complex interaction between technologies, users and societal structures (Oudshoorn & Pinch, 2003). Simultaneously, the constant progress of technology pushes design experts to build consistent criteria in order to deal with the changing scenario. These criteria refer to what is related to users' contexts of practice and habits as well as motivations and expectations, according to which innovative technologies are shaped and implemented. Assuming that innovations do not happen in a vacuum, one can consider that economical, social and political determinants are crucial to shape either what technologies are chosen to be developed for as well as the extent to which such technologies are accepted by the general public.

Therefore, technological innovation and the related design practices cannot only rely on the product/service's inner-technical features; the complexity of the environment where those innovations take place require practitioners to adopt increasingly complex and interdisciplinary methods. Modern societies, especially the western ones, are currently characterized by an increasing hyper-differentiation of the environment; financial market oscillations, abrupt climate changes as well as the spread of social movements are just a few of the perturbation phenomena western societies are facing. Companies and experts are increasingly required to steer the technological innovation according to specific and precisely defined goals referring to the end-users, their contexts of practice and representation as well as the environment where these changes will occur. According to such a scenario, the concept of *experience* has become a central tenet of design approaches, demonstrating the effort to move beyond the linear creation of nice looking and functioning objects, but rather expanding such process to the design of experiences, services and processes (Suri, 2003). In this regard, the design-in-use approach (Nelson et al., 2009; Bredies et al., 2010) has striven to overcome this user-oriented vs product-oriented dichotomy.

According to this model, the goal of the design process is not any more to optimize an existing product, rather to shape this latter as a possible source of innovation. Having users takeover the product to come up with new ideas about potential uses and forms can be disseminated in social groups to give rise to *trends of use* (Nelson et al., 2009).

In general, under the push of technological innovation, the design scenario is undergoing a massive change that some ascribe to the fact that the technical skills are now more accessible and therefore design is becoming an everyday activity rather than a professional study (Lee, 2007) or a specialized knowledge. Also, the dominating market-driven approach emphasizes the absolute need to include customer/users within the production process. In other words, fostering a user-centered approach results in the fact that even people without a design education or specific background are put at the core of design activities (Sanders, 2006).

As a result, designers have replaced their priorities more and more from product design towards the design of experiences for people, communities and cultures, that are now even more connected and informed (Sanders & Stappers, 2008). As the traditional design disciplines were focused on the specific technical features of a product, the emerging design practices aim to include users' needs and expectations within this process, pushing designers to adopt a wider approach.

In order to respond to the shift of societal needs and the related design requirements, a large amount of practitioners/designers have decided to even drop the user-centered perspective, that they consider as still far from real users' involvement, to a co-design one. In this case participation of end-users in the design process is the essential condition (Sanders, 2006). More in detail, both user-centered and co-design approaches put the user at the core of the design process, however, the main difference is how users are involved; in user-centered design users' involvement is not always direct and can be ascribed only to some stages of the process while co-design aims to be a continuous and fully shared process, where users' role cannot be disentangled from designer's.

3. *The Heritage of Participatory Design in Co-Design*

According to this difference between user-centered design and co-design, at a closer look the latter seems to trace the same outline of the participatory design approach, where users' involvement can not only be considered as a part of the process, but rather its main feature. It is also the spread of design to new areas has reinforced such shift from user-centered towards co-design approaches. For example, the social economy challenges, where design, far from being a tool aimed at product creation, is applied to deal with social challenges as IDEO (2015) pointed out. The direct involvement of users is expected to allow people affected by the design to contribute creatively to what is being made. Also at the same time they can empower and give voice to those traditionally left out of the design process (Pedersen, 2016).

Similar to what happened in participatory design, in co-design the decision-making model as well as the participatory approaches have currently been integrated in the design process. The participatory approaches have initially born within social movements to fight for social rights and to give back power to those excluded by the political power. In fact, the co-design approach based on a participatory structure is applied to design as a form of critique to the traditional rationalist approach that, associated with Taylorism, assumed *one best way* to perform. On the other hand, co-design is to be thought as a more open and constructive approach where knowledge is situated in a complex net of artefacts, practices and interactions between people and their social, cultural, economical, political as well as physical environment.

4. *The Participatory Setting's Effect Over the Designer and User's Role*

According to such participatory perspective, design is to be conceived as essentially interpretive and strictly rooted to the context where the process takes place as well as the users live. Designers neither can fragment their activity into discrete tasks, nor conceive design as totally described and optimized (Spinuzzi, 2005).

The co-design approach explicitly resists the notion that knowledge can be completely formalized and classified. Participants' knowledge and perspectives are put at the core of the process, becoming invaluable when researching their activity and designing new ways to enact each activity.

Even though definitions of co-design are multiple and sometimes very heterogeneous, referring to co-design usually evokes an approach that points to a commitment to direct participation as users and stakeholders being actual designers within the design process (Sanders & Stappers, 2008; Kensing & Greenbaum, 2012). Bradwell and Marr (2008) define co-design as a broad *umbrella term* that refers to design processes that seek to combine the views, input and skills of people with many different perspectives to address a specific problem. More in detail, co-design can be defined as a cooperative process bringing people and design professionals together in order to find new and innovative solutions for different aspects of everyday life which can vary from the creation of technological products as well as the management of complex social issues (Vechakul et al., 2015).

According to such perspective, companies offer a deliberate design role for regular people in which *enabling platforms* (Manzini, 2007) or *convivial tools* (Sanders, 2006) give them the capability to engage with each other in creating new concepts and designs collaboratively and also to build upon existing and evolving ideas (Leadbeater, 2008).

Therefore, the spread of co-design is having an impact on several aspects of the current design practices. First of all, the roles of the players are expected to be different; according to the depicted framework, users are given the position of *experts of their experience*, playing a wider role in knowledge development, idea generation and concept development. In this regard Hocking et al. (2016) pointed out to *wicked problems* as one of the main challenges that design is currently facing. Accordingly, *designers are asked to respond to environmental change, the diverse social and ethical requirements of changing communities, conflicting aesthetic responses from different traditions and to empathize with different interpretations of social relationships over time. To respond to all of these together in times of transformational change, calls for a different way of thinking to the specialized and competitive understanding that produced many of the issues in the first place.* In order to tackle the wicked problems that may arise from such complexity, it is required to move beyond the compartmentalization of knowledge towards collective thinking that can meet the demands of transformational change.

In this framework designers are not excluded from the process, they rather collaborate and support the *experts-users* by providing them with tools for ideation and expression (Sleeswijk Visser et al., 2005) and facilitating expressions of creativity at all levels (Sanders & Stappers, 2008). Therefore, the designers and researchers' roles are gradually becoming mutually interdependent so that social scientists bring frameworks for the understanding of user experience to the table, while designers know how to synthesize and embody ideas and opportunities (Sanders, 2002).

Also, the tools and methods used by the new teams of co-designers are subject to a renewal, since they should be able to foster users' involvement as well as facilitating exchange among them. Simultaneously, research is becoming more prominent in the curricula of the quickly growing university-based design programs and also links between the social sciences and design are getting stronger (Sanders, 2002). Such a focus on the analytical part of the design process seems to respond to the need for a wider set of methodological and exploratory tools to deepen the complexity that the users and the social sphere bring into the process. As a result, several schools are including hybrid design/research skills such as participatory design techniques, ethnography and psychology into the curriculum of industrial design engineers (Stappers et al., 2007; Stappers et al., 2007). This change is currently producing new types of designers and researchers with skills based more on the purpose of designing as opposed to the products of designing as well as new models of design, such as social design (Gutiérrez & Jurow, 2016) or transition design (Irwin, 2015). Overall, the popularity of co-design approach brings into play a new perspective concerning the relationship between users and designers, as well as between products and design. Such a change is approached by several scholars highlighting both the added value as well as the weak points of this scenario.

Added Values of Co-Design

According to the general interest that users' involvement is increasingly leveraging not only within the professional community, but also as a general feature of technological innovation, this section will focus on depicting what the literature generally agrees the benefits of co-design are. In doing so, on the one hand the main outcomes that co-design approach is supposed to produce will be pointed out; on the other hand, I will analyze a case where the application of the approach to the healthcare sector provided an example on how such outcomes may be translated into practice. Generally speaking, benefits deriving from the adoption of co-design have been associated either to product and services' features or to the fit between the latter and users' needs, thus, leading to smoother and more effective design processes.

Respectively, [Kujala \(2003\)](#) analyzed the impact of co-design within ICT systems' design, pointing out some specific outcomes for the field; higher quality of system requirements, higher system quality, a better fit between the system and users' needs and improved satisfaction of users or customers. Similarly, [Alam \(2002\)](#) identified development of differentiated new services with unique benefits and better value for users, reduced development time, education of users —about the use, attributes and specifications of a new service— rapid diffusion and better market acceptance, improved public relations and also better long-term relationships between service provider and customers as added value of users' involvement.

In addition, several scholars conducted various experiments in which they invited “ordinary users” to generate ideas for innovative mobile ICT services ([Kristensson et al., 2002](#); [Magnusson, 2003](#); [Kristensson & Magnusson, 2010](#)). They found out that despite professional developers' ideas are more technologically feasible than the users', the latter can generate useful ideas for service innovation and provide a better fit between products and their needs.

Lastly, the co-design approach has been accounted for an improvement of efficiency and effectiveness as well ([Hoyer et al., 2010](#)). Efficiency can be improved as users' input integrates with designers' input and as co-creation facilitates continuous product/service improvements and reduces the risks of failure. Effectiveness can be improved as co-creation helps develop products that better match customers' needs, resulting in more positive attitudes of customers towards products and services and better relationships between the organization and its customers.

Pointing to the need for reliable methods to test and evaluate co-design practices' benefits, [Roser and Samson \(2009\)](#) suggested articulating Key Performance Indicators and monitoring their impact. They suggested a range of indicators such as the amount of new ideas for products/services, the originality, value or actual feasibility of the ideas, new ideas' development, marketing duration for new products/services or improvements, cost reductions, revenues, profitability and market share of the new/improved product/service, breaking-even duration for new product/service introductions, customer loyalty and satisfaction.

1. A Pathway to Foster Creativity

Despite the growing enthusiasm for co-design approaches amongst practitioners, policy-makers and the general public, little empirical evidence exists to assess the impact of such practices upon the generation of ideas ([Kristensson & Magnusson, 2010](#)). By means of a literature review and a series of case studies, [Steen et al. \(2011\)](#) showed that idea generation is a key benefit. However, there is still a few pieces of robust evidence supporting this idea and, in particular, the fact that co-design is to be considered as a more creative approach compared to more traditional approaches.

A series of related New Product Development ([Trott, 2008](#)) studies investigating the generation of ideas for future information and technology-based communication services found that involving ordinary users at the front-end of the design process resulted in the generation of both radical and incremental ideas for new products. Also that in certain circumstances ordinary users generated more original ideas than company experts ([Kristensson & Magnusson, 2010](#); [Kristensson et al., 2002](#)).

A prerequisite for successful idea generation was found to be *user experience* and its contents, which addresses the direct experience of the problem that actual or potential users develop. By comparing idea generation resulting from the application of traditional *passive* market research techniques with those generated using more *proactive* co-creation research tools [Witell et al. \(2011\)](#) found out that a higher number of original ideas were produced by users who used the co-creation tools than those who took part within conventional focus groups. They concluded this because idea generation by the co-creation participants was more actively grounded in consideration of specific problematic instances of use, rather than based upon more general discussion of users' needs.

Similarly, [Burns et al. \(2006\)](#) discussed transformation design as a way to manage change processes and to promote creativity and innovation, so that the people involved can engage in continuous learning and innovating. Co-design approaches are critical in transformation design because they allow people to communicate and cooperate across disciplines and between organizations. In the service design domain, [Sanders \(2002\)](#) distinguished three approaches to interact with users and customers during a design process: *say*, *do* and *make*, where *make* is associated with co-design. In interviews, one can listen to what other people *say* and interpret what they express. Through observation, one can watch what other people *do* and how they use products or services. Also in creative workshops, people can jointly explore and articulate their latent needs and jointly explore to *make* solutions. The key benefit of such *make* that distinguishes the co-design approach is that it supports and triggers joint creativity.

[Mitchell et al. \(2016\)](#) conducted a study aimed at exploring the impact of co-design approach to a generation of proposals for reducing single occupancy car travel to and from a university campus. They showed that participants assigned to a co-design working condition generated significantly a higher quantity of ideas than those taking part in a more traditional email-based consultative process. The higher number of innovative ideas generated by the co-design group resulted from the greater number of ideas per-se generated by this group. However, there was no difference in the innovativeness of the ideas created by each group. Authors conclude that co-design activities increase the benefits where innovation is sought by means of encouraging idea generation, a proportion of which are likely to be innovative.

2. Enhancement of the Organizational Functions and the Design Process

[Roser and Samson \(2009\)](#) ascribed the following benefits to the co-design approach. The generation of shared knowledge which favors the access to users' experience, increased speed to market, better quality of products, higher satisfaction and increased loyalty of customers and users as well as lower costs. Furthermore, they accounted co-design for several positive effects on the organizational level too, such as the improvement of innovation practices and processes, the increase of quality and speed at which decisions are made in relation to the development and filtering of ideas along with a higher creativity at individual and group level.

Similarly, according to [Steen et al. \(2011\)](#) for businesses and organizations many benefits deriving from the adoption of a co-design approach can be ascribed to improving the creative process, the development of better service definitions, a more efficient project organization and an improvement of customers' or users' loyalty. Moreover, the co-design approach is expected to provide benefit to the organization(s) involved by fostering creativity or developing its capabilities to innovate and to think out-of-the-box, both within and besides the actual context of the project. Also, involving employees from different departments of the same organization may promote communication and cooperation between them as well as a chance to benefit from the learned co-design approach by applying it in future projects.

A Practical Adoption of the Co-Design Approach: Healthcare Services

The co-design approach has been adopted within a challenging environment including vulnerable populations in the healthcare sector. Interesting results have been derived from research exploring the patient and family involvement in palliative care delivery ([Blackwell et al., 2017](#)).

Specifically, these scholars referred to the experience-based co-design called EBCD (Bate & Robert, 2007; Robert et al., 2015), which is a form of participatory action research enabling staff and patients — or other service users— to co-design services and/or care pathways, together in partnership (The King's Fund, 2011). Thus, EBCD aims at exploring and improving a healthcare service upon the experiences of those both providing and using the service.

Besides the palliative care domain, EBCD is a form of co-design adopted by healthcare practitioners because of its underlying mechanisms that can be applied and led to improved experiences in a wide variety of settings. Such approach is based upon three bodies of knowledge: Narrative-based approaches to change (Launer, 2002), learning theory (Mowrer, 1960) and User-Centered Design (Robert, 2013). The whole process explores experiences by equipping participants with the means to draw understandings from their personal story in order to recognize the touch points with the service seen as the moments that shape the overall experience (Bate & Robert, 2007).

In their study, Blackwell et al., 2017 suggest that experience-based co-design can be an effective approach in order to foster collaboration and quality improvement in the work between older palliative patients, their families and the staff. Such approach can be adapted to include vulnerable older people in a participatory action research (Whyte, 1991) process and to take care of their needs. Overall, EBCD is described as a useful approach for encouraging collaborative working between vulnerable patients, family and staff in complex healthcare environment. The flexibility of the approach allows participants' specific needs to be accounted for. Also, it ensures wider participation for those who may usually not be able to provide input.

Cottam and Leadbeater (2004), contributed to research in the healthcare sector by quoting from an article in the British Medical Journal stating *the key to successful doctor-patient partnerships is to recognize that patients are experts of their experiences, their social circumstances, habits and behavior, attitudes to risk, values and preferences and thus, both types of knowledge are needed in co-design*. Correspondingly, Parker and Heapy (2006) advocated organizing cooperation between frontline professionals who deliver the service along with the service's customers, who experience the service; because both their perspectives are needed for successful service design.

Overall, it seems that a key challenge for co-designers is the selection of the most appropriate methods and tools, to apply them appropriately (Steen et al., 2011) also being and consistently with the environment — and its features— they are dealing with. The assumption underpinning such need is the choices regarding methods that can significantly affect both projects processes and outcomes. This also entails identifying who — users— to involve and what they will do — role— in the project as well as anticipating the eventual drawbacks of using a co-design approach.

Emerging Challenges for the Co-Design Approach

Despite the innovative capacities of co-design practices, scholars still highlight several critical issues for the approach. Co-design seems to be a powerful method in order to promote creativity and effectiveness of design processes by means of users' engagement. However, issues and controversies are not exempt to occur.

A segment of the literature ascribes the main pitfalls around the allocation of power among participants which, in turn, affects the whole design process. On the one hand, users' direct involvement is expected to foster creativity, empowerment and voice of those traditionally left out of the design process (Pedersen, 2016), on the other hand if not carefully managed, such a *new* power allocation may result in disruptive effects.

With power distribution effects on user/designer roles, several authors pinpoint to two further challenges that co-design is currently facing. The challenges include the need to clear the distinction between using co-design as a mean or a goal and its effects of organizational cultures and also the effect of adopting a fuzzy terminology related to the approach.

I argue that all these pitfalls may have referred to the general issue of emancipation (Bredies et al., 2010) that the approach is currently facing. On the one hand the adoption of other disciplines' theories and methods results in a rich array of instruments to be used, on the other, achieving a common language and theoretical ground is still far from the current scenario.

1. *The Effects of How Power is Distributed Between Users and Designers*

Hoyer et al. (2010) discussed two types of risks that co-design processes can encounter. The first one is the decrease of central control over the project, especially related to New Product Development (NPD) cases, caused by a wider amount of people, departments and organizations involved (Roser & Samson, 2009). The second type of risk is the increasing complexity produced by the approach as multiple goals and interests must be taken into account and balanced, requiring extra coordination costs as well as management skills.

Moreover, as Sanders and Stappers (2008) point out, by enhancing creative collaboration between designers and non-designers at all stages of the process, co-design counters the exclusion of users from the design outcomes that will inexorably affect them. However, this leads to co-design deeply interfering with the traditional distribution of power and roles within the process.

It seems that the co-design intrinsic logic shifts designers' traditional role as expert problem solvers towards a facilitator who's expected to steer users' awareness about design choices and provide professional advice about their consequences, while end-users are expected to feed the process by providing opinions and contextual experience (Siu, 2003).

Despite co-design may both increase users' perception about either the additional value of what is to be designed (Franke & Piller, 2004) and their satisfaction (Pu et al., 2015), Kleinsmann and Valkenburg (2008) challenge these assumptions stating that co-design is often designing with rather than for end-users. In their field study on a graphic design case, these authors brought to light that the role end-users were assigned to at the beginning — as the recipients of the graphic product being developed— changed after they used the information at hand, making the design irrelevant. End-users involved in this research preferred to design for others rather than act as representative end-users of their own context, assuming the traditional designer role. This outcome presents a paradox for designers wishing to engage in co-design, by challenging the assumed authenticity of end-user participants in respect to their role as end-users.

2. *Co-Design As a Mean As a Goal: Effects on Fit Between Co-Design and Organizational Cultures*

The first challenge being analyzed is when co-design fails to precisely and realistically articulate the expected goals. More precisely, when a conflict in the organizational culture generated by co-design occurs, achieving the set goals can be at risk. Therefore, it is crucial to align expected goals and benefits (Steen et al., 2011) with the organizational context where co-design takes place. Taking as example, the paradox of implementing co-design within a hierarchical organization where procedures step above clients' needs, can lead to failure and co-design may seem as a threat for the status quo.

What seems necessary to be highlighted is that in order not to fall into unexpected effects, it is crucial to distinguish whether co-design approach is adopted as a mean or a goal itself. In the first case, to be effective as a mean, the approach needs to be consistent with the achievement of the expected goals that, in turn, are a precise reflection of the organizational culture where the process takes place. As a result, once the goals have been set, co-design can be adopted as a mean when its effects on achieving the desired results are analyzed and made clear. Such effects will be a byproduct of the co-design adoption within the organizational culture.

Conversely, when co-design is pointed out as a goal of the overall process, the above dynamic is inverted. What then matters is to consistently identify and adopt means suitable for producing the expected outcome, given the organizational culture.

Therefore, when adopting co-design, as well as for any method, taking into account this distinction between means and goals is crucial to clear the extent to which the organizational culture shapes the process outcomes. If this distinction is not made evident, the risk is to mix up the two aspects, undermining the effectiveness of the whole process in which no clear rationale is made about the method's capacity to produce the design proposals. Also, for participatory methods the risk to solicit ideological struggles is higher than for more top-down ones so that organizational cultures can react in contrast.

3. *The Adoption of a Fuzzy Terminology*

Despite the broad application of co-design approach, the professional field still does not share a common terminology to ascribe the approach to a whole theoretical and methodological framework. Flourishing an array of very diverse applications, as well as the adoption of heterogeneous terminologies, lead to several controversies to arise. In this regard, Taffe (2015) argues that despite users are expected to be at the very heart of the design process, this claim is often contradicted by the terminology used to describe them. According to the author, some terminologies used to describe users' contribution show this contradiction by using very general definitions as *co-creator* (Ulrich et al., 2003; Payne et al., 2008) or *the voices of participants* (Robertson & Simonsen, 2012) putting on the same level each participant contributes rather than focusing on their subjectivity and specific contribution. Similarly, Cahill (2007) describes a case where co-design is used in a graphic design project pointing to the value of including *excluded or insider* perspectives in the outcome. Asking non-designers to act in a very technical design process can potentially downplay the *real* designer skills (Sanders & Stappers, 2014) at the same time overestimating users' contribution that can in turn lead to feeling overwhelmed by the task.

In general, the professional field seems to be far from sharing a common theoretical framework and this reflects in the adoption of a fuzzy terminology. Starting from the 1980s, social sciences have fed designers in shaping their practices and, as discussed above, this also reflected into co-design. However, the adoption of theories and approaches from other fields can be an obstacle to emancipate itself as an independent academic discipline. On the contrary, design researchers still need to investigate particular design-oriented ways of knowing (Cross, 2001) and generate independent theoretical and methodological positions (Bredies et al., 2010). By taking up theories from other disciplines, design risks neglect the development of proprietary theoretical positions (Jonas, 1996). In addition, while theories from psychology, linguistics or anthropology for instance, are frequently used, it is at the same time difficult to trace how they actually affect work practice (Bredies et al., 2010). This weak linking of theory and practice, together with the adoption of a clear and shared terminology still are a challenge in need to be faced by the professional community.

From Challenges to Future Perspectives

Co-design seems to be arising and developing from the actual experiences of practitioners, building on the participatory design research as well as on the user-centered approaches. These traditions are essentially built on a shared assumption; conceiving processes as focused on the user as the heart of design. However, as pointed out, the field is still in need of a shared theoretical framework explaining the extent to which users' involvement can be expected to produce the set goals and outcomes. This gives origin to an overlap between means and goals. The above mentioned challenges seem to be related to a common feature that is the lack of a shared theoretical framework, which in turn brings to fuzzy terminologies. Several scholars have also addressed this issue from another perspective, by highlighting that co-design may assume a different meaning whether designers or end-users are adopting it (Taffe, 2015). Research on shared understanding in co-design teams has found out that a lack of shared understanding can cause unnecessary iterative loops (Valkenburg & Dorst, 1998) as well as reducing the quality of the final product (Dong, 2005). On the other hand, the research of Song et al. (2003) revealed that the highest quality products originated from teams where a high and defined shared understanding was detected. If taken into account appropriately, at the beginning of a project, diversity of thoughts can lead to achieve innovation (Buijs, 1987; Moenaert & Souder, 1990; Emmanuelides, 1993).

On the one hand the involvement of the users as *experts of their experience* (Trischler et al., 2018) seems to enhance creativity, the overall efficiency of the process as well as the fit between users' needs and products/services' features, on the other hand several issues about how to steer the process and make it effective are still to be tackled. The definition of a shared theoretical framework can help in overcoming the problem of *users replacing designers* by providing designers with a new role, professionals entitled to analyze and steer the design process towards the expected outcomes. In this regard, a shared theoretical framework should provide experts with conceptual models capable of understanding and steering the social dynamics involved within the design process. Several proposals have been made by the literature (Bredies et al., 2010; Brown et al., 2010; Hocking et al., 2016) however, despite the efforts of actors to come out with theoretical models capable of *tackling wicked problems* (Brown et al., 2010) or emancipating design as *independent academic discipline* (Bredies et al., 2010) — such as transdisciplinary imagination or constructivist approach— some issues seem far from being solved. Among those, in regard to the transdisciplinary imagination model, Farrell (2011) points out the contradiction between aiming to solve problems that do not respond to a linear logic through a linear, post-modernist, industrial problem solving mindset. The author highlighted the main challenge that the twenty-first century paradigms are facing, like thinking differently about the problems at hand is the problem at hand.

The constructivist approach to design (Bredies et al., 2010) seems to tackle this issue, suggesting a different approach. First, the idea that perception is a constructive act and, second, that meanings are shaped and coordinated by means of interaction and communication. However, while developing the conceptual framework underlying these phenomena, authors do not refer to a model explaining how meanings are generated and shared. Instead, they refer to *use as design*, which implies re-connecting two segments of the design process — input and output— as a strategy/design structure to tackle the creation of meanings.

What seems still critical in this strategy/design structure, is that, although it is recognized that meanings are a result of interactions, *use as design* is a specific way of shaping interaction, for the generation of meanings related to this structure. A specific model capable to explain how meanings are created and shared between actors is still missing, and this still is responsible for driving professionals and researchers towards the use of a linear-causal logic.

Conclusions

The present review aims to gather and explore some features of co-design, pointing to its strengths as well as drawbacks according to the retrieved literature. Several contributions were compared in order to highlight the differences between the main approaches/perspectives according. Also to the various fields where the co-design approach is largely used. In this regard, it is worth to mention a specific feature of this approach; co-design is largely used in fields or domains that are not strictly related to traditional design. Namely amongst them, it is worth mentioning social innovation (DiSalvo et al., 2011; Ssozi-Mugarura et al., 2017), children scholar education (Penuel et al., 2007; Dodero et al., 2014; Van Mechelen et al., 2017) and healthcare (Cottam & Leadbeater, 2004; Bate & Robert, 2007; Aidemark et al., 2015; Blackwell & Lowton, 2017).

The literature investigated, showed that the main and distinctive feature of co-design approaches, namely the direct involvement of users throughout the whole design process, is certainly an asset of this approach. Also in this paper's view, the expression of a need to reshape practices by basically challenging the assumed power structure is an important feature as well. This point links to what Jonas et al. (2010) refers as being the shift towards *postmodernist* approach, not only conceived as a smarter and more flexible way to tackle the raising complexity that practitioners are facing, but also as a reaction against the strictness of *traditional* scientific approaches. The direct involvement of users that co-design fosters, can be seen as an expression of this shift.

At the same time, this radical change of perspective may also generate several pitfalls, such as mixing means and goals of practices as well as adopting shared methodologies/terminology. The main hypothesis is that further steps still need to be done to make co-design practices more effective and prevent falling into controversies and paradoxes, such as challenging causal-linear approaches through the use of — again— causal-linear logic. In other words, co-design still needs to be underpinned by a more specific theoretical framework capable to promote a clear distinction between means and goals, as well as to offer a clear understanding of the social dynamics generating the creation of meanings between actors.

This paper aims to highlight that co-design can benefit from more specific contributions from social sciences, such as cultural psychology (Valsiner & Rosa, 2007; Salvatore, 2015) by providing a theoretical framework of how meanings are continuously generated and shared among actors. This approach can help the field overcome the fuzziness which participatory methodologies are often associated with and as a reflection of co-design practices too. The fuzziness appears as participation is confused with being a goal of co-design — as co-design produces participation— and a mean to achieve pre-defined goals. The idea of a cultural psychology perspective is supported by providing a theoretical framework capable of explaining the dynamics underpinning social relationships that can lead to a clearer definition and use of the co-design participatory component.

Summarizing, hopefully this contribution will stimulate and feed the discussion between practitioners, scholars and professionals around the perspectives and developments for co-design that still is one of the main expressions of a need to paradigm shift in the design field. Therefore, future researches and discussions to feed into this topic are aimed for, fostering the dialogue between disciplines adopting discursive and constructivist approaches towards the creation of a shared understanding.

References

- Aidemark, J., Askenäs, L., Nygårdh, A., & Strömberg, A. (2015). *User involvement in the co-design of self-care support systems for heart failure patients*. *Procedia Computer Science*, 64, p. 118-124.
- Alam, I. (2002). *An exploratory investigation of user involvement in new service development*. *Journal of the Academy of Marketing Science*, 30(3), p. 250-261.
- Bate, P., & Robert, G. (2007). *Bringing user experience to healthcare improvement: The concepts, methods and practices of experience-based design*. Radcliffe Publishing.
- Bayazit, N. (2004). *Investigating design: A review of forty years of design research*. *Design issues*, 20(1), p. 16-29.
- Binder, T., Brandt, E. & Gregory, J. (2008). *Design participation (-s) –a creative commons for ongoing change*. p. 79-83.
- Blackwell, R. W., Lowton, K., Robert, G., Grudzen, C., & Grocott, P. (2017). *Using Experience-based Co-design with older patients, their families and staff to improve palliative care experiences in the Emergency Department: A reflective critique on the process and outcomes*. *International journal of nursing studies*, 68, p. 83-94.
- Bradwell, P., & Marr, S. (2008). *Making the most of collaboration: An international survey of public service co-design*. London: Demos.
- Bredies, K., Chow, R., & Joost, G. (2010). *Addressing use as design: a comparison of constructivist design approaches*. *The Design Journal*, 13(2), p. 156-179.
- Brown, V. A., Harris, J. A., & Russell, J. Y. (Eds.). (2010). *Tackling wicked problems through the transdisciplinary imagination*. Earthscan.
- Buijs, J. A. (1987). *Innovation can be taught*. *Research policy*, 16(6), p. 303-314.

- Burns, C., Cottam, H., Vanstone, C., & Winhall, J. (2006). *Transformation design*. London: Design Council.
- Cahill, C. (2007). *Including excluded perspectives in participatory action research*. *Design Studies*, 28(3), p. 325-340.
- Card, S. K. (Ed.). (2018). *The psychology of human-computer interaction*. Crc Press.
- Carroll, J. M. (1996). *Encountering others: Reciprocal openings in participatory design and user-centered design*. *Human-computer interaction*, 11(3), p. 285-290.
- Cottam, H., & Leadbeater, C. (2004). *Health: Co-creating services*. London: Design Council.
- Cross, N. (2001). *Designerly ways of knowing: Design discipline versus design science*. *Design Issues*, 17(3), p. 49–55.
- DiSalvo, C., Lodato, T., Fries, L., Schechter, B., & Barnwell, T. (2011). *The collective articulation of issues as design practice*. *CoDesign*, 7(3-4), p. 185-197.
- Dodero, G., Gennari, R., Melonio, A., & Torello, S. (2014). *Towards tangible gamified co-design at school: two studies in primary schools*. In *Proceedings of the first ACM SIGCHI annual symposium on Computer-human interaction in play*. p. 77-86. ACM.
- Dong, A. (2005). *The latent semantic approach to studying design team communication*. *Design Studies*, 26(5), p. 445-461.
- Emmanuelides, P. A. (1993). *Towards an integrative framework of performance in product development projects*. *Journal of Engineering and Technology Management*, 10(4), p. 363-392.
- Farrell, K. N. (2011). *Tackling wicked problems through the transdisciplinary imagination*. *Journal of Environmental Policy and Planning* 13(1):75-77
- Franke, N., & Piller, F. (2004). *Value creation by toolkits for user innovation and design: The case of the watch market*. *Journal of product innovation management*, 21(6), p. 401-415.
- Gutiérrez, K. D., & Jurow, A. S. (2016). *Social design experiments: Toward equity by design*. *Journal of the Learning Sciences*, 25(4), p. 565-598.
- Hocking, V. T., Brown, V. A., & Harris, J. A. (2016). *Tackling wicked problems through collective design*. *Intelligent Buildings International*, 8(1), p. 24-36.
- Hoyer, W. D., Chandy, R., Dorotic, M., Krafft, M., & Singh, S. S. (2010). *Consumer cocreation in new product development*. *Journal of Service Research*, 13(3), p. 283-296.
- IDEO. (2015). *The field guide to human-centered design: design kit*. IDEO.
- Irwin, T. (2015). *Transition design: A proposal for a new area of design practice, study, and research*. *Design and Culture*, 7(2), p. 229-246.
- Jonas, W. (1996). *Design als systemische Intervention – für ein neues (altes) "postheroisches" Designverständnis*. 17. Designwiss. Kolloquium 'Objekt und Prozeß'. Halle, Germany, 28–30 November 1996.
- Jonas, W., Chow, R., Bredies, K., & Vent, K. (2010). *Far Beyond Dualisms in Methodology-An Integrative Design Research Medium" MAPS"*. In *Proceedings of DRS conference design & complexity*.
- Kensing, F., and Greenbaum J. (2012). *Heritage: Having a Say*. In *Routledge International Handbook of Participatory Design*, edited by J. Simonsen and T. Robertson, p. 21–36. London: Routledge.
- Kleinsmann, M., & Valkenburg, R. (2008). *Barriers and enablers for creating shared understanding in co-design projects*. *Design studies*, 29(4), p. 369-386.

- Kristensson, P., & Magnusson, P. R. (2010). *Tuning users' innovativeness during ideation*. *Creativity and innovation management*, 19(2), p. 147-159.
- Kristensson, P., Magnusson, P. R., & Matthing, J. (2002). *Users as a hidden resource for creativity: Findings from an experimental study on user involvement*. *Creativity and innovation management*, 11(1), p. 55-61.
- Kujala, S. (2003). *User involvement: A review of the benefits and challenges*. *Behavior and Information Technology*, 22(1), p. 1-16.
- Launer, J. (2002). *Narrative-based primary care: a practical guide*. Radcliffe Publishing.
- Leadbeater, C. (2008). *We-think: The power of mass creativity*. Profile Books Limited.
- Lee, Y. (2007). *Design participation tactics: involving people in the design of their built environment* (Doctoral dissertation, The Hong Kong Polytechnic University).
- Magnusson, P. R. (2003). *Benefits of involving users in service innovation*. *European Journal of Innovation Management*.
- Manzini, E. (2007). *Design, social innovation and sustainable ways of living: Creative communities and diffused social enterprise in the transition towards a sustainable network society*. Design, Social Innovation and Sustainable Development for Escola de Altos Estudos da Capes e COPPE/UFRJ. Rio de Janeiro, Brazil.
- Mitchell, V., Ross, T., May, A., Sims, R., & Parker, C. (2016). *Empirical investigation of the impact of using co-design methods when generating proposals for sustainable travel solutions*. *CoDesign*, 12(4), p. 205-220.
- Moenaert, R. K., & Souder, W. E. (1990). *An information transfer model for integrating marketing and R&D personnel in new product development projects*. *Journal of product innovation management*, 7(2), p. 91-107.
- Mowrer, O. (1960). *Learning theory and behavior*. John Wiley & Sons Inc. <https://doi.org/10.1037/10802-000>
- Nelson, J., Buisine, S., & Aoussat, A. (2009). *Design in use: some methodological considerations*. In CIRP MS'09, 42nd CIRP Conference on Manufacturing Systems. p. 3-5.
- Norman, D. A., & Draper, S. W. (1986). *User centered system design: New perspectives on human-computer interaction*. CRC Press.
- Oudshoorn, N., & Pinch, T. (2003). *How users matter: the co-construction of users and technology (inside technology)*. the MIT Press.
- Parker, S., & Heapy, J. (2006). *The journey to the interface*. London: Demos.
- Payne, A. F., Storbacka, K., & Frow, P. (2008). *Managing the co-creation of value*. *Journal of the academy of marketing science*, 36(1), p. 83-96.
- Pedersen, J. (2016). *War and peace in codesign*. *CoDesign*, 12(3), p. 171-184.
- Penuel, W. R., Roschelle, J., & Shechtman, N. (2007). *Designing formative assessment software with teachers: An analysis of the co-design process*. *Research and Practice in Technology Enhanced Learning*, 2(01), p. 51-74.
- Pu, W. P., Chen, K., & Shieh, M. D. (2015). *The effect of co-design and flow experience on customer satisfaction and purchase intention online*. *Issues in Business Management and Economics*, 3(4), p. 59-66.
- Robert, G. (2013). *Participatory action research: using experience-based co-design to improve the quality of healthcare services. Understanding and Using Experiences: Improving Patient Care*. Oxford University Press, Oxford, p. 138-149.

- Robert, G., Cornwell, J., Locock, L., Purushotham, A., Sturme, G., & Gager, M. (2015). *Patients and staff as codesigners of healthcare services*. *BMJ*, 350, g7714.
- Robertson, T., & Simonsen, J. (2012). *Challenges and opportunities in contemporary participatory design*. *Design Issues*, 28(3), p. 3-9.
- Roser, T., & Samson, A. (2009). *Co-creation: New paths to value*. London: Promise / LSE Enterprise.
- Salvatore, S. (2015). *Psychology in Black and White: The Project of a Theory Driven Science*. IAP.
- Sanders, E.B.-N. (2002). *From user-centered to participatory design approaches*. In, *Design and the social sciences: Making connections*. p. 1-8. CRC Press.
- Sanders, E.B.-N., (2006). *Design research in 2006*. *Design research quarterly*, 1 (1).
- Sanders, E. B.-N., and Stappers P. J. (2008). *Co-creation and the New Landscapes of Design*. *CoDesign* 4 (1), p. 5–18.
- Sanders, E. B.-N., & Stappers, P. J. (2014). *Probes, toolkits and prototypes: three approaches to making in codesigning*. *CoDesign*, 10(1), p. 5-14.
- Schön, D. (1983). *The reflective practitioner*. New York, 1083.
- Scott, K., Quist, J., & Bakker, C. (2009). *Co-design, social practices and sustainable innovation: involving users in a living lab exploratory study on bathing*. In *Proceedings of Paper for the “Joint Actions on Climate Change” Conference*, Aalborg, Denmark. p. 8-9.
- Siu, K. W. M. (2003). *Users' creative responses and designers' roles*. *Design Issues*, 19(2), p. 64-73.
- Sleeswijk Visser, F. S., Stappers, P. J., Van der Lugt, R., & Sanders, E. B. (2005). *Contextmapping: experiences from practice*. *CoDesign*, 1(2), p. 119-149.
- Song, S., Dong, A., & Agogino, A. M. (2003). *Time variation of design “story telling” in engineering design teams*. In *DS 31: Proceedings of ICED 03, the 14th International Conference on Engineering Design*, Stockholm.
- Spinuzzi, C. (2005). *The methodology of participatory design*. *Technical communication*, 52(2), p. 163-174.
- Ssozi-Mugarura, F., Blake, E., & Rivett, U. (2017). *Codesigning with communities to support rural water management in Uganda*. *CoDesign*, 13(2), p. 110-126.
- Stappers, P. J., Hekkert, P., & Keyson, D. (2007). *Design for Interaction: Consolidating the User-Centred Focus in Industrial Design Engineering*. In *DS 43: Proceedings of E&PDE 2007, the 9th International Conference on Engineering and Product Design Education*, University of Northumbria, Newcastle, UK, 13.-14.09. 2007.
- Stappers, P. J., Sleeswijk Visser, F., & van der Lugt, R. (2007). *Teaching contextmapping to industrial design students*. *Proceedings of include 2007*, p. 1-6.
- Steen, M., Manschot, M., & De Koning, N. (2011). *Benefits of co-design in service design projects*. *International Journal of Design*, 5(2).
- Suri, J. F. (2003). *The experience of evolution: developments in design practice*. *The Design Journal*, 6(2), p. 39-48.
- Taffe, S. (2015). *The hybrid designer/end-user: Revealing paradoxes in co-design*. *Design studies*, 40, p. 39-59.
- The King's Fund, (2011). *Experience-based co-design. Working with patients to improve health care* [Online]. Available at <http://www.kingsfund.org.uk/projects/ebed>

- Trischler, J., Zehrer, A., & Westman, J. (2018). *A designerly way of analyzing the customer experience*. Journal of Services Marketing.
- Trott, P. (2008). *Innovation management and new product development*. Pearson education.
- Ulrich, P. V., Anderson-Connell, L. J., & Wu, W. (2003). *Consumer codesign of apparel for mass customization*. Journal of Fashion Marketing and Management: An International Journal.
- Valsiner, J., & Rosa, A. (Eds.). (2007). *The Cambridge handbook of sociocultural psychology*. Cambridge University Press
- Valkenburg, R., & Dorst, K. (1998). *The reflective practice of design teams*. Design studies, 19(3), 249-271.
- Van Mechelen, M., Derboven, J., Laenen, A., Willems, B., Geerts, D., & Abeele, V. V. (2017). *The GLID method: Moving from design features to underlying values in co-design*. International Journal of Human-Computer Studies, 97, p. 116-128.
- Vechakul, J., Shrimali, B. P., & Sandhu, J. S. (2015). *Human-centered design as an approach for place-based innovation in public health: a case study from Oakland, California*. Maternal and child health journal, 19(12), p. 2552-2559.
- Whyte, W. F. E. (1991). *Participatory action research*. Sage Publications, Inc.
- Witell, L., Kristensson, P., Gustafsson, A., & Löfgren, M. (2011). *Idea generation: customer co-creation versus traditional market research techniques*. Journal of Service Management, 22(2), p. 140-159.