Understanding the collaborative-participatory design

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Abstract. In this study, the role of collaboration in design is discussed, placing emphasis on how to include end-users in the development process. The study is based on a literature review focusing on aspects of collaboration in design, usability and human factors. Thereby, it introduces, compares and contrasts the characteristics of both collaborative and user-centered design perspectives, leading to the collaborative-participatory design approach. Finally, the advantages, disadvantages and precautions of implementing collaborative and participatory models are pointed out.

Keywords: Collaboration, participation, user, design

1. Introduction

In the last decade, design processes and products have undergone remarkable changes, mostly due to globalization and computerization. However, there is another important aspect that needs to be brought into discussion: has design practice changed? Not long ago, designers used to work predominantly alone or in internal teams of a company, whereas now they often undertake projects in teams of professionals from different companies, where multiple disciplines are represented and end-customers are also active participants.

This multidisciplinary perspective in project development has been increasingly incorporated by organizations, which means a change in traditional design approaches. In this shifting context, believing that innovation comes exclusively from specific technical know-how or domain expertise is considered an erroneous view. Moreover, working in interdisciplinary teams is more and more being regarded as essential for design, since multiple expertise and different ways of thinking allow the same design problem to be tackled from different points of view. This wide-ranging perspective fosters a fairly detailed understanding of the problem, gives room to diverse ideas and may even produce more creative solutions. Thus, complex and heterogeneous contexts are not a hindrance but an element that generates innovative work environments.

When a project is developed with joint efforts from many people, the design process may be called collaborative. However, the practice of collaborative design may include the participation of non-designers, who also contribute to the process in different ways. Therefore, the broader purpose of collaborative design is to share an understanding of design through the integration of different skills, ideas, resources and responsibilities in a development process.

The practice of collaborative design, continuously influenced by societal changes, has lead to the inclusion of end-users in the design process. This approach is widely known as user-centered design and began in the 1970s. User-centered design was widespread in the 1990s and proved to be very useful in the design and development of consumer products [13].

Thirty years later, the presence of the user in the design process has become a widely discussed topic in design research. The idea of an open design process is nowadays the background for a wider range of design activities. User involvement has been well observed and has been noted to happen at various points and levels of the design process. Reinforcing this practice has the potential to make it increasingly more common, among organizations of all

sizes [9]. Nevertheless, its practice and related consequences have not been as clearly documented.

Within this context, in this study, we compare and contrast the principles and procedures in collaborative approaches and user-centered design. We also draw attention to the practice of participatory and collaborative process and envision possible implications for the Design field.

2. Collaborative user-centered design

User-centered design is a collaborative design approach that is based in user involvement in the development of systems, products and services. Its main purpose is to improve understanding about user needs, their requirements while carrying out the task under study, their interaction and appreciation of what is developed. According to [8], the key principles of Human-Centered Design are:

- The active involvement of users and clear understanding of user and task requirements;
- An appropriate allocation of function between user and system;
- Iteration of design solutions;
- Multi-disciplinary design teams.

The main assumption behind human-centered design is that the greater the user involvement in the design process, the greater the chances that what is designed is suitable for their purposes and for the environment in which interaction will occur. This allows the final result of the process to be more effective, efficient and secure. Still, greater user involvement with the project, according to [10], allows designers to have greater control of user expectations, as users are involved in the process. This leads to a sense of ownership of what is developed, which often results in a high satisfaction level and a smoother integration between what is designed and the environment in which the product will be used.

Much has been discussed about human-centered design and its processes, which led to the development of widely accepted principles in the development of useful and usable systems and a set of processes and techniques are now defined in normative documents such as ISO 9241-210 (Ergonomics of human-system interaction - Part 210: human-centered design for interactive systems) and technical reports as ISO TR 16982 (Ergonomics of human-system interaction - Usability methods Supporting human-centered design).

However, weak definitions and different applications have made it difficult for researchers to come to consensus on the term "user involvement" [5]. Despite being used as a correspondent to "participatory design" or even "usability testing", in general, user involvement has been applied to describe the designer's direct contact with the end user [5, 6]. Some recurrent synonyms found by [5, 6] are, for example, "focus on users", "consulting end users," "connecting systems with users" and "user participation".

Moreover, from a practitioners' point of view, another barrier to the widespread dissemination of user's involvement in the design process is the fact that there are various approaches and a wide variety of techniques and tools from which to choose and implement. In this study, our initial contribution to facilitate user-centered design understanding is to review some user involvement taxonomies.

In a much-quoted study, [4] takes a wider view on the subject and defines customer focus as one of the key-components in a total quality management approach. The author identified three types of consumer involvement:

1. Design for customers: data, theories and models of users behavior are used as a basis for the project;
2. Design with customers: data on user preferences, needs and requirements are acquired through the reaction of the users when testing different design solutions; and
3. Design by costumers: the user is actively involved and takes part in the project of its own product.

Since then, [4] categorization has been frequently used as a guide to defining and classifying levels of user involvement, ranging from a passive opinion to an active involvement. More recently, [1] proposed a more practical description for the corresponding levels of user involvement in design:

1. Informative involvement: the user is seen as a source of information. Using techniques such as interviews, questionnaires, focus group or observation, the designer collects information considered necessary for project development;
2. Consultative involvement: the designer proposes solutions and brings them to users, so that they can evaluate and build opinions on such solutions. This kind of involvement can be achieved through the same techniques used in the previous level, plus usability testing; and
3. Participatory involvement: the organization transfers to the user the power over project decisions, utilizes the techniques of experience exchange and idea generation (e.g., sto-

rytelling workshop, card sorting, braindrawing, journal, etc.), demanding a greater effort on planning, organization and execution when compared to the previous levels.

It is worthwhile noticing that user-centered design has permitted direct contact between designer and end-users, thus improving collaboration between the parties involved in the development process. However, there is still a controlling attitude from the designer, which can prevent the user from having a more active participation, this being the limiting factor for the user-centered approach [7]. In order to overcome such, the concept of "participatory design" gains strength, which allows a larger, more frequent and deeper conversation with the user, from the earliest to the final stages in the development process.

3. Collaborative-participatory design

Collaboration is understood as the possibility to gather active contribution from several actors during a creative process [11]. In the field of Design, participation is understood as the possibility of active user intervention in project development, which fosters the subsequent appropriation of the products by users and the improvement of final results. In that sense, [12] define some specific features of participatory design: to be context oriented, to involve collaboration at various levels and to provide an iterative approach.

Therefore, collaborative-participatory design involves designing with the user, at the participatory design involvement level, and it points to the user as an inside and active contributor throughout each step of design development. In this kind of involvement, the researcher or designer invites the beneficiaries of the project to become partners in the development process, respecting their skills and considering them as co-creators.

[16] enumerate some aspects in which user-centered design differs from collaborative-participatory design. In the former, the roles of researcher and designer are interdependent but different: the user is represented by the designer, instead of being considered a fellow team member. In the latter, the challenge for the collaborative-participatory researcher is to create the necessary tools and infrastructure to accommodate and facilitate this ongoing resonance with the user experience.

[14] also points out that crossing the boundaries between expert and participatory practice is not so simple for most people and that this change from expert to participant is particularly difficult. For the author, however, the designer will have to learn to work in both situations, since both are relevant in improving the human condition.

The evolution from user-centered design to collaborative-participatory design is changing the roles of designer, researcher and user. The user, who was considered only as a beneficiary of the design process, reaches the position of "expert in his experience" and plays an important and active role in extending knowledge, idea generation and concept development during the design process. Thus, in order to facilitate insights, the researcher supports the "expert in his experience" by providing tools for ideation and expression. In this case, designer and researcher collaborate with the tools, since these would be their skills [18].

In summary, whereas in a traditional design process the researcher acts as a translator between user and designer, in the collaborative-participatory design, the researcher assumes the role of facilitator. The reason for such is the assumption that creativity takes different forms and occurs at different levels. Thus, we need to increase our knowledge on how to provide experiences that facilitate the creative expression of people at all levels and hierarchies. This involves leading, guiding, and providing resources and platforms that encourage and protect the creative expression. The following session approaches some of the concerns that emerge while putting this in practice.

4. Discussion

[14] emphasizes that designers are necessary professionals because they have highly developed skills that are essential when higher levels of amplitude and complexity are involved in a creative process. Due to proper selection and training, most designers possess appropriate skills on visual thinking, on the development of creative processes, and on finding information, being able to take necessary decisions in the absence of complete information.

However, for the traditional design paradigm, the practice of collaborative-participatory design may introduce new challenges in how to design, what to design and who designs. This practice can also affect the tools and methods supporting design teams. Thus, new concerns and precautions arise especially when

users become part of the design team, some of which are further addressed here.

Concerns on collaborative design

The process of collaborative design may demand high financial and human resources. Collaborative design teams integrate professionals from different areas, such as for example, engineers, psychologists, sociologists or anthropologists. This situation requires that team members reasoning and communication are elaborated in such ways that result in a shared understanding of the work at hand. In this sense, for collaboration to be really established and maintained within the group, the project group may need more time for socializing and managers face an increased investment on pro-labor. Thus, project managers should always keep an eye on deadlines and evaluate the cost-benefit relationship of collaboration in design.

Concerns on collaborative user-centered design

When dealing with collaborative user-centered design, one has to bear in mind that the results of user involvement in product development may be either positive or negative for the design process as a whole. Among the expected positive outcomes, it is worthwhile mentioning: better orientation to the design process, higher user satisfaction, better team synergy and more focus on delivery. Regarding the potential threats involved in this approach, one should consider: difficulty in accessing users directly, failure to deliver the expected benefits, costs and efforts dispensed in collecting and analyzing data about the user, difficulty in finding users willing to collaborate and a "possibly destructive" reaction of the user in the process.

Concerns on the design for the user

Even in those situations in which the designer is a fair representative of the user, there will always be differences in their perceptions and thoughts. [2] enumerates some crucial characteristics that definitely distinguish designers from end-users:

1. designers know too much about the product;
2. designers are too skilled in using computers and the Web in general; and
3. designers "care too much about their own baby" (they cannot envision/accept users' difficulties while interacting with the product they have created).

According to [2], there are three degrees of difference between designers and their users, ranging from a "small fissure" to a "gaping gulf":

1. Level 1 - the designer is the user: designers are core members of the target audience;
2. Level 2 – the designer understands the product: designers use the product themselves and, therefore, assume they know what other users need;
3. Level 3 – designing for a foreign domain: mission-critical applications or websites targeted at highly specialized users who perform narrow tasks that depend on expert domain knowledge within a context the designer cannot envision.

The author also points out that the strategy for bridging the gap depends on how severe it is. The greater the distance to the user, their tasks and their context, the greater should be the data gathering on information that improve and refine the project.

Concerns on the design with the user

The basis of design with users is taking the situation, the complaints and the criticisms made by the user seriously. However, applying all these considerations to a project may culminate in unnecessarily complex results. For this reason, the design team should follow a well-defined design process model, in order to be able to incorporate users' complaints or criticisms positively, or discard them in situations where these comments happen to be redundant. Having a broader vision and a non-discriminatory interpretation of results prevents the user from being either ignored or taken too seriously. That is, paying greater attention to the user discourse may lead to systems, products or services that are easier to learn, use and provide more satisfaction. However, when collecting data on user satisfaction, one should always take into account human contradictory and imprecise nature.

According to [3], for example, when it comes to past behavior, the user typically moves away from the truth. When answering questions in an interview or a focus group, the user tends to direct answers to what he believes the researcher wants to hear or what they believe to be socially accepted. When reporting their experiences, the user is actually telling what he remembers having done. Because human memory is unreliable, the user typically rationalizes behavior and emotions, justifying failures with statements that may be merely hypothetical.

Concerns on the design by the user

In the case of collaborative-participatory design, one should ensure that contributions to the development of the project are properly rewarded. While participating in a project, the user in general regards his contribution as more valuable than others understand to be. Forgetting to be grateful to a participant in a study involving many is also a common failure. For these reasons, it is important to anticipate and prevent problems through an early formal agreement. In this agreement the expected contributions of each participant are clarified, as well as the benefits provided and how these will be fairly shared.

5. Conclusion and future work

This study focused on the collaborative approach recently incorporated into design processes. It described the strategies and levels of end-user involvement in the design of systems, products and services, placing emphasis on the collaborative-participatory design. Theoretical aspects of collaboration, usability and human factors, in addition to practitioners' concerns, were considered in the discussion of the advantages and difficulties in applying different modalities of the user-centered design perspective.

The main purpose of this article was to highlight the importance of taking specific precautions to integrate users in project development. Likewise, it is also imperative to enhance the role of the user so that he identifies with both the process and the final results. The paper pointed out that these two factors are decisive for the success of a collaborative-participatory project.

Our approach to the question at hand was mainly theoretical. It was beyond the scope of this study to survey how each modality of the user-centered design perspective or each level of user-involvement has been applied within companies in different market niches. In this sense, it is recommended that future research on the subject addresses the real costs, benefits and difficulties faced by those who are ac-

tually taking the challenge of putting the collaborative-participatory design into practice.

References

[1] Cybis, W., Betiol, A. H., Faust, R. Ergonomia e Usabilidade, conhecimentos, métodos e aplicações. São Paulo: Novatec Editora LTDA, 2007.

[2] Nielsen J. Alertbox, March 17, 2008: Bridging the Designer–User Gap. Abril de 2011. http://www.useit.com/alertbox/designer-user-differences.html

[3] Nielsen J. Alertbox, August 5, 2001: First Rule of Usability: Don't Listen to Users. Abril de 2011. http://www.useit.com/alertbox/20010805.html

[4] Kaulio, M. A. Customer, consumer and user involvement in product development: A framework and a review of selected methods. Total Quality Management, Vol. 9(1), pp.141-149, 1998.

[5] Kujala, S. User involvement: a review of the benefits and challenges. Behaviour and Information Technology, Vol. 22(1), pp.1-16, 2003.

[6] Kujala, S. Effective user involvement in product development by improving the analysis of user needs. Behaviour and Information Technology, 2007.

[7] Lee, J. H. User-designer collaboration during the early stage of the product development process. PhD thesis, Queensland University of Technology, 2008.

[8] Maguire, M. Methods to support human-centred design. Int. J. Human-Computer Studies, vol 55, 2001. p. 587-634.

[9] Mao, J.,Vredenburg, K., Smith, P. W., Carey, T. The state of user-centered design practice. Commun. ACM 48, 105-109, 2005.

[10] Preece, D., Abras, J., Maloney-Krichmar C. User-Centered Design. In Bainbridge, W. Encyclopedia of Human-Computer Interaction. Thousand Oaks: Sage Publications, 2004.

[11] Pratschke, A.; Almeida, C. R. P.; Rocca, R. L.; Santiago, R. P.. Da participação à colaboração: estruturando ambientes digitais de conhecimento. In: Sigradi, IX Congresso Iberoamericano de Gráfica Digital, 2005, Lima. Sigradi, Visión y Visualización. Lima : Sigradi e Universidad Peruana de Ciencias Aplicadas, 2005. v. 1. p. 315-320.

[12] Rocha, H. V.; Baranauskas, M. C. C. Design e avaliação de interfaces humano-computador. Campinas: NIED/UNICAMP, 2003.

[13] Sanders, E. B.-N. Converging Perspectives: Product Development Research for the 1990s. Design Management Journal, Vol. 3(4), pp.49-54, 1992.

[14] Sanders, E.B.-N. Virtuosos of the Experience Domain. In Proceedings of the 2001 IDSA Education Conference, 2001.

[15] Sanders, E.B.-N. From User-Centered to Participatory Design Approaches. SonicRim In Design and the Social Sciences. J.Frascara (Ed.), Taylor & Francis Books Limited, 2002.

[16] Sanders, E.B.-N. Stappers, P. J. Co-creation and the new landscapes of design, CoDesign, 4: 1, 5 — 18, 2008.