SHAPING THE INDIVIDUAL DESIGNER: PARTICIPATORY DESIGN IN EMERGENCY CONTEXT.

Briede Westermeyer, Juan Carlos; Cartes, Jorge; Bustamante, Alejandro; Perez, Marcela

ABSTRACT

This article deals with the user-centered teaching-learning and design methodology used by teachers and students in the industrial design setting. The purpose of such approach is to create and strengthen attitude competencies regarding knowledge and know-how. The context is the earthquake and tsunami that occurred in Chile on February 27th, 2010, where the user-centered design methodology is applied in object-based preparation for the emergency housing context. This approach involves the final user from the beginning of the work proposal. Such a learning method allowed students to identify users' basic needs, along with other requirements that are part of the dwelling features and also related to higher needs, which, to be dealt with, assume that individuals should be observed from physical – psychological – emotional – cultural viewpoints, by the time feasible solutions are considered. This methodology is analyzed from a professional Industrial Design education viewpoint, thus illustrating all factors to be taken into consideration for the design of solutions that meet people's needs to make effective dwellings in the case of emergencies.

Keywords: Design, Education, Design, Individual, Emergency Context, Earthquake.

1 INTRODUCTION

To educate is to promote the intellectual, cognitive, and spiritual potential of the students: to do this requires a systematic outlook with the finality of stimulating the development of persons. The present article will show an estimation of a change of paradigm in the formative process of the industrial designer, thus understanding a change in relation to the human beings' understanding of the approach, wherein teachers perceive each student as an active subject who is building up his/her own realism [1]. Knowledge education is a dynamic and interactive process and that people are no longer a simple environment-related product, nor are they an outcome of their internal motivation, but rather the interaction of these two elements brings about its own structure of human behavior [2].

Such a new way of increasing knowledge will be explained based on an actual experience that our country underwent in February 2010, and how this emergency situation, caused by the earthquake and tsunami that hit the Bio-Bio, Maule and Araucanía Regions, makes us think about the scope and role a Designing Individual or Subject should have. Likewise, we have to understand that "the designer's critical role is to contribute to all that we may use in order to help us achieve a better quality of life".

Finally a conclusion will be presented about the experiments and corresponding impact or transcendence of the methodology within the social emergency, product design, and the educative context.

2 CONTEXTUALIZATION

Considering the political, economic, and emergent social compromise scenarios, on the dawn of February, 27th, 2010, Chile suffered from one of the largest natural catastrophes in both national and international history; a situation which changed the life conditions of the people, both with respect to their living environment as much as on a personal level as well. This disaster generated a psychosocial impact that in turn weakened the social interactions and environment.

That day, the desires to continually become more than what one is, the hopes, and the goals, the independence and liberty were interrupted by the earthquake and subsequent tsunami, which lead us to compulsorily change the focus of our daily lives. The first priority was now to satisfy basic needs, starting first with the physiological ones, understood of those such as the lack of clothing, food, water; those of security, that which is considered to be elements of protection, fearlessness, necessity of an order structure; as the result of completely destroyed neighborhoods, a phase of reconstruction also

began, with the finality of reestablishing the sense of belonging in the communities that were divided as a consequence of the disaster.

In the first place, the government, according to the Civil Protection Plan adopted in 2002; makes a reference to the Assistance of the Damned Population [3] whereby the measure for the lack of resources for dwellings is the emergency shelter as a transitory solution. This so-called “shack” shares, in its production and analysis, aspects from two disciplines-architecture and design. Its parts and rooms of lumber (panels, doors, linking elements, etc.) were, upon being assembled through a partly-handicraft construction process, with manual tools, placed on-site, constituting a provisional 'house' for the damned.

The experience from the teaching and learning of the design workshop, intended for the user in his third year of his industrial design major at the Universidad de Bio-Bio, who when facing the post-earthquake life based on what he lived through in his own region (8th region of Bio-Bio, province of Concepcion), researches the affected context, applying a methodology of design centered on the user in emergencies (DCUE). This methodology intends to complement the generic issues of the DCU approach with additional strategies and approaches in order to provide information with respect to the affected community's needs and requirements.

As a solid and first approximation of the problem, the students construct, through the NGO, “Un Techo para Chile”, shacks for the damned. This action contributes as experience in two respects: it provides a thorough knowledge of the structure and related qualities and also of the perceptive measure of its habitability. The goal is objective design implementation that satisfies the basic operational needs, which support the habitability of the home, but are contextualized according to spatial limitations, constructive instability, and transitory period of implementation (two years). From here, the contrast between simple occupation of the space and genuine appropriation of this arises.

3 USER CENTERED DESIGN IN EMERGENCY SETTINGS.

As people, we have basic needs or rather; the feeling of lacking something which is what motivates us to search for satisfaction of these necessities. In the face of emergency situations, the human needs are crossed; this is to say that the shortage of first -order needs is made apparent first. In accordance with the above, the national response to disaster is the Civil Protection System which hierarchically contains diverse levels: Prevention, Response, and Recovery. The recovery deals with the rehabilitation and reconstruction as these also have as an end goal to restore the individual and group equilibrium of a society in a disaster situation. The rehabilitation process has the construction of emergency shelters as its end. This action, which covers the need for protection, begins from the field of action and support of the industrial designer. It is precisely this action that provides the beginning of the methodological standpoint from which the students worked.

The stages of alert and alarm activate mechanisms and strategies that seek to give answers to the human and social system, which has seen its structural development altered in the emergency, through the Recovery Phase with a Rehabilitation plan that begins to be executed by taking into consideration as a first step, the response to the first order needs: habilitation of supplies of basic services and habilitation of room and boards; within this step, the response is based on the order of needs which is introduced by humanist psychologist, Abraham Maslow, who indicates that the beginning is the physiological order needs, such as clothing and nutrition; followed by the introduction of protection and order in the streets, which in the Rehabilitation stage corresponds to the construction of emergency shelters and the habilitation of alternative roads. This is then followed by responding to the second level of the hierarchy of needs corresponding with safety according to that which is indicated by the humanist psychologist [4].

In as much, the state politics in an emergency are aligned with the Motivational Theory of Abraham Maslow, which poses that the human beings tend to satisfy their primary needs in the first place and then search to satisfy higher level needs such as those of self-esteem.

One of the strategies taken in the rehabilitation stage is the shack (Mediagua), where from the social standpoint, is understood as a concrete and transitory solution to a catastrophic situation, that which has brought together distinct groups from the social structure to argue and reflect upon this measure. The questions that emergencies provoke in the contextual analysis ask if the structure is truly a solution for the nucleus of persons and their communities; if it reaches satisfaction of actual necessities; and if it complies with basic levels of comfort.

Observing this situation from the aforementioned perspective, we note that if it complies in the context of a temporary solution, such that the persons have access (although unstable) to clothes, are provided with a space to spend the night, feel safe, and moreover, have a private space within their familial nucleus. Fulfillment of these needs allows the people to begin to reconstruct their own quality of life with consideration to variables such as peacefulness (subjective well-being), social cohesion, perception of belonging, physical and mental health, and physical environment among others.

Perhaps the reflection would have to stop in process if it is examine from the perspective that the external interventions provoke and install momentary housing solutions without the participation of the persons in the construction of their immediate environment; assuming the notion of being human and being damned as a completely reactive body, mobilizing only in response to external stimuli. We hypothesize that the active inclusion of the affected persons in the reconstruction of their habitat contributes, in a positive manner, to the effective reconstruction of the human dimension of inhabiting a place; to return the people to their own autonomy is a starting point for reestablishing their dignity[1]. Then the product of this methodology, this is to say the objective solutions, has by default a double meaning: to better the quality of life via the improvement of the physical environment and in addition, to contribute to the reconstruction of the private world of the damned.

We have to take into consideration that the "man is not found in the molded practice according to humanity, nor in teaching him how to be human. The role of the natural environment is in the practice that permits man or helps man to realize his own potentials and skills, not those of the natural environment itself"[5].

Upon confronting this specific context, one of the specific challenges to integrate the basic needs was that these needs change and that their reaches and limitations vary depending on factors such as, among others, the cultural heritage and the socioeconomic status of the affected. Part of the symptoms of this catastrophe is precisely-centered in the scenario in which the society suffers, transversally and without differentiation from this natural phenomenon, leaving damned people from diverse context and social stratus. All of these persons benefitted from a unique and standardized solution knowing vulgarly as a shack or "media-agua". A name inherited from the typology of the structure that was named after a technical constructive attribute which today has been replaced by a roofing of 2 "waters" (aguas). This standardized solution has been or still continues being given to people in different situations of loss, which will undoubtedly produce distinct impacts in the beneficiaries. [2]

That people have specific needs that must be understood and taken care of will live in these spaces. "Same as a certain object that might be useful for us or else might make us feel uncomfortable about, the space we live in may also be that nest we are willing to have, or it might be a jail where we are locked up" [6]. André Ricard relates architecture, interior decoration, and object design as the disciplines that create the dwelling's conditions: "interior decoration and architecture are design variables. Their role is to create spaces to live, where it is necessary to apply the same good sense and harmony to be used when creating an object. Salovaara [7] states that a need turns out to be an objective that a given user wants to achieve by using a product. On the other hand, Katz has defined needs as a desired outcome or indication of a wish that will be channeled into a desired outcome [8]. A need may also be stated as a perceived lack of something. Given the above, it must be taken into consideration the fact that the object-based setting not only is a material area independent from its users, nor is its interaction merely practical, but it creates a symbolic and identifying environment for the dweller regarding his/her evolution within such space: "we do not inhabit because we have built, but we build and have built as we inhabit; i.e., it's because we are the ones who inhabit" [9]. Objects in space are the elements that make up dwelling, thus these objects being understood as facilitators of the spaces, are actually used as mediating interfaces between the inhabitant and a given space. We may place them within an "object-based dimension", where various action-related organizations are

[1] «The autonomy is as fundamental to the dignity of the human nature and the whole rational environment». KANT, 1. FMC, p. 73; GMS, Ak. IV, p. 436, 6-7

[2] The earthquake affected, without distinction, the familial groups from all the quintiles and the grade of resistance of each family goes in direct relation with their resources for which if we consider that almost 80% of the inhabitants in the zones most affected by the earthquake and tsunami are from the quintiles 2,3,4 and 5, we have a large part of the population that already possessed or inhabited a house and a high percentage of this population is found in established urban zones from which it can be deduced that they had basic services, access to shops, and lives in spaces of social codependence.

set up. In turn, these create their own layout that identifies each housing space's particular features. Such arrangements, when following one another in time, become symbolic reference points that people and social groups become identified with, and that, one way or the other, provide them with some stability through a kind of feeling of certainty when being able to advance in actions vs. outcomes[3].

In the context of the emergency associated with the 8.8 earthquake that affected, with greatest intensity, the regions of Maule and Bio Bio, many of the actions associated with symbolic constructs were seen as altered, causing a profound and sudden change in the habits of the communities. The condition of adaptation to the new context was addressed by each person and familial nucleus according to his own possibilities and also his own social heritage. This last factor is intimately related with one of the aspects that this article wants to touch on and intends to delve deeper into- how these objects construct the dwelling, making a distinction between the transitory, the permanent, and dignity of enough.

The Government has used the word "dignity" as a generic concept, in order to point out the minimum conditions regarding family dwelling under an emergency context. We believe that such concept should be reviewed, since its significance is closely linked to each settlement, geographic place, or a certain dwelling culture, changing its significance with respect to each setting. Therefore, it should be necessary to deal with design issues based on identity factors that come out from the territory own nature, as well as its history that expresses in the customs and uses of the communities affected by the earthquake. To rescue such identity is a must in the case of a dynamic culture like ours, but mainly because we start from the basis that, as individuals, we have varied needs[4].

3.1 METHODOLOGICAL BACKGROUND OF USER-CENTERED DESIGN

The process of product designs places as an inherent condition the consideration of the user within the multiple aspects that it should resolve, not only as a niche in the market and a potential client, but as a recipient of the product in question. The user-centered design, bases the human being as the center, beginning, and end of the design [10].

Classic design methodologies deal with the "design for the user" approach, [11] [12] [13], by adding users' requirements and needs in order to get them processed just by the design team. Then, users used to join through focus group, where he/she became aware of final solution, as a prototype. By doing so, he/she was able to test and give his/her opinion about the final solution. This form of product design is used in normal social situations and contexts given the implications in the development from necessary specifications to become the mean product. The information collected at the design level contrasts with other areas (marketing, logistics, and engineering) and is finally transferred to the production area in phases that operate within pre-determined times and spaces for the product and through the highly technological. In the context of web applications the concept of collaboration is also applied as the user is the key subject from the moment of evaluation, development, and until the design part of the applications. [14]. Which clearly is facilitated by the access to technology (laptop) because the interaction occurs through the screen. The constraints posed in an emergency context are clearly much more stringent. Safety design [15] responds to the needs in an emergency situation. "Emergency responses" should be developed with emergency plans at all levels with collaboration networks, both governmental and non-governmental. But when the networks failed, and the system don`t provide solutions, the fundamental collaborative approach is searched in the surrounding; the next door neighbor and the community as a basis of interaction, that the groups that work together towards a specific objective; it has as a characteristic that new knowledge is built together and that it's exchanged [16]. Co-Design [17] looks to involve the users in the design process with a focus on the

[3] Objects do not only help us to control the world because of their insertion in instrumental series, but also help us due to their insertion in mental series, to control time, to discontinue and sort it and classify it, same as the habits, when having it subjected to the same association restraints that arrange its layout in space. Baudrillard, J. (1968:107).

[4] The modern concept of human dignity does not reject the existence of inequality between individuals. The part that it does reject is that these natural social inequalities are the justification for an unequal treatment on the part of institutions or for a degrading treatment between individuals. In other words, each individual merits respect for the simple fact of being human. (Antonio Pelé An approximation of the context of universal human dignity: philosophy, law, and politics magazine,
V.4, 2004-2005, pp 9-13)

co-creation which attempts to make participants out of the users including in the defining of scenarios of use for the projects. The participatory design, coined the 1970s, follows the premise of unifying expertise on the part of the designers with their technical know-how discipline and of users that have experience in the use of the products[18].
In summary, there are many methodologies, techniques, and methods to register, systemize, and utilize the user's voice associated with the UCD [19] where the central difference with traditional approaches are changes from "design for" to "design with." These patterns suggest a generic structure where users are dealt about under normal conditions. In this case, the applied pattern was adapted from the experience that the “Un Techo para Chile” innovation center has had in overcoming poverty [20]. These models propose a generic structure where the user is spoken of in conditions of normality.
The knowledge of what people say, do, and think is considered as one of the strengths in order to be able to empathize with the user and legitimize him as an equal, wherein the participant and the organizer should both be a facilitator of processes within their respective communicative abilities and has as a disadvantage the need to utilize greater time and more careful planning for the gathering of information, with the risk that process will be perceived from an informal standpoint in the initial stages**.** Within this scenario we find methodologies of the closest approximation to the context of an emergency and that would fulfill the requirement of active incorporation of the user at the time of dealing with the associated problems.

In this sense, the management of the design process and the approach should adapt to the conditions of the emergency, directing themselves towards the development of the obtainment of rapid results and answers but without losing ownership and efficiency, a process where the iteration and feedback are reduced in order to obtain a product, within the context where the user cannot wait and should have his basic needs satisfied in his critical condition. The project address from the standpoint of action, where the production develops together with the construction, directing itself towards an obligatory, clearly pragmatic approach.

4. METHODOLOGICAL APPROACH: USER-CENTERED DESIGN WITHIN AN EMERGENCY CONTEXT

The following is a summary of the methodology applied in the teaching-learning process and in the user-centered design workshop carried out by the third year students of the Industrial Design Program at Universidad del Bio-Bio during the First Term 2010. The purpose of this is to develop an innovative thought process that meets users’ needs. This is understood from a creative standpoint as the capability which allows us to grow and that which lets us be human. Therefore, this is not only a few people’s privilege, but rather a core characteristic of human reasoning [21]. It is understood that this way of teaching strengthens the Twenty First century Industrial Designer profile. It is expected that he/she should understand that innovation comes about from communication and encounter spaces that break the limits of each discipline and culture [22]. Designers are expected to have the capability of applying users’ dreams to life`s basic problems. Human relationships, based on love, and in turn, understood as emotion, are social relationships; this means, users’ approaches means acceptance of coexistence and the shaping of social communities. The resulting approaches to action are collaboration and sharing [23]. The above interactions make it possible to educate an individual, who designs, in a joint manner. The performance required by this methodology leads to the fact of a meeting between the designer within the student and the community which is in need of the product. Closely related processes are developed, such as motivation understood as “the processes that influence the intensity, direction, and persistence of the effort made by an individual when seeking an objective” [24]. “Whenever I co-build something, I get involved, I trust somebody else, while somebody else trusts me, I become committed with myself and somebody else, I communicate, which is generated by a sense of belonging”. Being part of a group is actually a response to our own sources, to be a resident instead of a passer-by. In accordance with Maslow it is also important to take the neighborhood, its territory, its style, its class and its own tendency to form groups into consideration, so as to show deep animal trends, such as flock and herd, and to be able to join and to belong. In order to map out the teaching-learning process and the relation between activities and competences are shown in Table 1.

Table 1. Teaching – Learning process methodology. Source: Own production

TEACHING-LEARNING PROCESS METHODOLOGY			
Activities	**Competence**		
	Attitudinal	**Procedural**	**Knowledge**
Consulting tasks done with communities in carrying out needs inventories	- Reflection - Responsibility - Empathy - Communication	- Creating patterns for an approach - Role allotment among members of the group, knowing each member's strengths and weaknesses	- Getting to know the cultural setting - Knowing the methodological tools for information management and development of community based tasks. - Awareness of community dynamics. - Being aware of their own student expectations. - Knowing their own strengths and weaknesses regarding this new project.
On-site tasks	- Team work - Communication - Leadership - Persuasion skills	- Select suitable method for a given condition. - Request assistance and encourage group to participate.	- Knowing family traits. - Knowledge about community setting.
Monitoring and escorting professors in each one of the students' process stages during the Quarter (2 meetings per week), thus shaping a learning community	- Process deep thought - A glance at the customer - Persuasion skills - Team work - Planning and tracking	- Stages fulfillment assessment - Showing work proposal management. - Proposal and final product introduction. - End	- Identifying DCU stages. - Being aware of user's profile under emergency condition.

Attitudinal, Procedural, and Knowledge competencies are defined and broken down as how they serve in the integral formation of the student in the function of the activities and the methodologies of the design approach.

*Table 2. Phases of methodological implementation for the collaborative design in emergency contexts***.**

Phase	**Observed Performance**	**Outcome**	**Methodology Application**
1.- Invitation	Meet the user at his/her habitat and community. A non-structured encounter. Invite him/her to join the process	Forge relationships and socialize the work idea Create commitment Knowledge of role of design in the emergency situations.	**Immersion in context** Construct shacks. Get to know and work in the

			real life context, hand in hand with the inhabitants.
2.- Information management	Meetings and discussions Create map of resources: Materials, Human technicians	Become familiar with the first source of needs and the requirements of the users, ranges and their problems in relation with the objective.	Immersion in the lives. Get to know the people that live in the community, what they do, characteristics, etc.
3.- Problem Approach	Agree with the user (family) actions to be performed. Assessment of the available resources User participation	Problems detected with the users in order of priority considering key aspects in the context and reality of these. User participation in the search for a solution recognizes the user as the other constructor of his own reality.	Prioritize needs and problems
4.- Conceptual design	Solution management through brainstorming technique. Verify the actions that have been performed with respect to those requirements and conditions this product is expected to satisfy.	Design selection with the user. Elaboration of design.	Device, Volumetric Models On-site presentations
			Evaluation and Development of Solutions (Classroom-Prototypes-Shack) Verify the conditions and spatial limitations where the object should be able to be useful.
5.- Verification	Meeting with users to present models of volumetric devices	Operative model	On-Site verification of the final solution. Testing of solutions with the user.

In the above-mentioned methodological application showed in table 2 the development of the solution was addressed according to a pragmatic approach that considers and utilizes what is available within the context. Such that the design strategies in action are: a) Construct, Combine (existing objects) and design and construct links.

5 CONCLUSIONS

We believe that it is fundamental within the initial process to be able to determine and then manage the human, technical, and material resources for the design and actual implementation of a solution within the context of an emergency.

The emergency and the need to obtain fast responses along with their almost immediate implementation narrow the development of solutions based on the availability of resources present in the context. In that sense and as a strategy to reduce time and cost of materialization, the solution should utilize, reutilize, and recycle existing products, components, and materials in the context.

The experience of collaborative participation to deal with the emergency not only contributes to the material of reconstruction of the affected environment but also as an internal reaffirmation of the individual in the sense that from a therapeutic point of view , it contributes to lessening the traumatic experience.

From the educative point of view, to work with the contingency post-earthquake and tsunami allows the students to confront real and immediate problems, and to work with people, allows them to measure the complexity of human beings and develop empathetic responses to basic needs. This strengthens their commitment to work through the bonds of trust that are generated in this process such as by developing technical (design) skills as much as attitudinal ones that allow them to maintain focus on the integrity of human beings when giving solutions in emergency situations.

From the point of view of product design, the process and techniques defined by theoretical models are modified when applied in real contexts. The emergency requires immediate results so the process is addressed through a pragmatic approach directed towards obtaining rapid results, taking into account minimum iterations in the build-testing stage throughout the project development. The valuation and decision of the user is contemplated from the detection of the problem until the generation of its respective solutions. This permits a constant feedback that assures that the most appropriate solution is found for the said problem, both with respect to user and context.

The conditions of this emergency limit the use of computer tools that assist in the collaborative design process. Instead, it promotes a "face to face" collaboration. In this project, the work teams should consider their strengths, technical skills, and attitudes which can best be developed using the resources available in this type of environment. Such that they should also consider means of communication that are compatible and conciliatory with the users with whom they are working. For such effects, it is of utmost importance that the tools and means of representation can be understood by people outside of the discipline. This can be accomplished by utilizing resources such as images and isometric freehand drawings, tangible devices such as models and operating models with actual materials.

The possibility of having real devices (shacks) installed in the design school allowed for reliving the actual conditions along with spatial limitations. To examine the possible solutions in real time a scenario allows for reduced times of speculation in adjusting the dimensions, operating principles, and for use in effective compliance, reducing the iterations.

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