

# DESIGN AND SOCIAL INNOVATION IN VULNERABLE COMMUNITIES

Luis MEJIA and Maria Clara BETANCOURT  
Icesi University, Colombia

## ABSTRACT

Industrial Design's responsibility is to design friendly environments for users that minimize the impact of proposed solutions ensuring that these will be regenerative and that they will give back more resources than the ones they have taken, always keeping in mind the improvement in societies' conditions. In a country of contrasts such as Colombia, social innovation is a challenge for disciplines with high social impact. For this reason the academy has been inclined to educate future professionals with high sense of social responsibility, searching always for sustainability, being understood as a tool that helps to mitigate current economic and social imbalances.

This is why the Industrial Design Academic Program is looking forward to promoting solutions that face the future with a special emphasis on social responsibility, trying to intervene directly in particular sectors of the society, as well as specific communities with a high vulnerability level. A research methodology has been implemented during the last five years, concluding with a thesis design project developed by undergraduate senior students. This methodology directly involves the students with the specific environment to be affected, relating them directly with the problem and giving them the possibility to make an ethnographical study that allows the development of a design project centred in real needs. Up to this moment, the methodology has been successfully implemented achieving the development of projects that have been able to respond to real social needs using design as a tool for improving sustainability in the country.

*Key words: Sustainability, social design, social innovation, academy*

## 1 INTRODUCTION

Finding a way for human development to be sustainable for the 7 billion people currently living on the planet is one of the challenges of the 21st century. In order to guarantee the planet's sustainability, the U.N. (United Nations) has issued 8 development goals for 2015 [5], which include eradicating extreme poverty and hunger, achieving universal primary education, promoting gender equality and women's autonomy, reducing infant mortality, improving maternal health and guaranteeing the environment's sustainability.

The progress of human development is not sustainable, and the environmental risks reduce it even more. This is the most serious problem of the less developed countries, which make inequalities between them bigger every day [5]. The countries in Latin America and the Caribbean are reducing the huge income gaps while taking measures to face the environmental threats that could stop the advancement rate in human development in the region according to the Human Development Report 2011 [6]. Under these perspectives, the region requires disciplines committed for progress and human development in order to obtain a higher benefit within sustainable exploitation parameters, vulnerable sectors, and groups and communities that may present intervention possibilities. Sustainable design does not just mean eco-efficiency, energy optimization, or better usage of resources and waste reduction; it really means collective transformations.

Historically, sustainability has been approached from a clean production and eco-efficiency point of view (Figure 1). It has also been evidenced that working from an ecology and economics point of view is not enough in order to achieve sustainability, which has poverty as its biggest barrier [1]. This is why in the academy the social aspect is merged for sustainable development, taking into account economic growth and ecological balance and specifically emphasizing social progress. Colombia is a country of contrasts, it has a population of 45,508,205 inhabitants from which 24,4% of the total population lives in the country side and from this number, close to 53,5% lives under poverty

conditions, composed by 10,5% of afro descendant population and 3,4% of indigenous population, distributed mainly along the Pacific Coast and the Colombian Amazon regions respectively. Among the biggest contrasts it can be found that just 11.9% of the total population possesses a university education, clearly showing there is a social imbalance between education and poverty.

The global direction towards sustainable development is not traced, there are known good practices but their application is particular for each country, academy or industry. An important initiative for sustainability is documentation, revelation of information and strategies used. Based on the above, the motivation of this article is to report the work done by the academy, specifically from the point of view of the Industrial Design Program at the ICESI University in Colombia of what has been done in the last five years of research and development with innovative products of a high social impact.

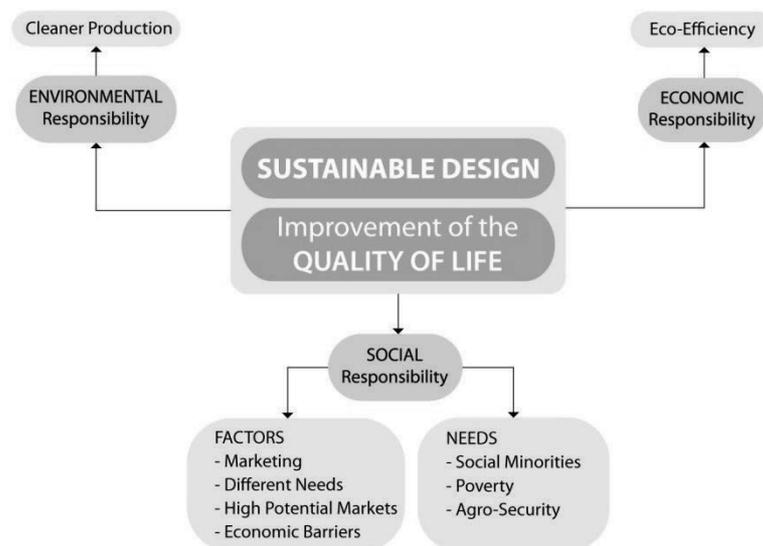


Figure 1. Relation between social responsibility and sustainable design

The objective of sustainable design that the Industrial Design Program uses is inspired by the people's quality of life in order to promote a design that faces the future, emphasizing social and environmental aspects. The idea is to design our surrounding environment with social responsibility in order to minimize the impact for minorities and creating a regenerative and inclusive design. This means giving back to the environment more resources than the ones that have been taken from it and improving the conditions of everyone concentrating on those sectors and communities which have the highest vulnerability.

Through the development of research projects, mechanisms that impact society have been analyzed, generating proposals that aim to improve the living conditions of those specific demographic groups, determined regions or particular ethnic groups. One-year research projects are done by undergraduate senior students, which offer varied solutions that can be classified according to the following groups:

## 1.1 Objective groups for social innovation

### 1.1.1 Isolated communities, social and racial minorities and populations facing poverty.

An example of these contexts is the Colombia Pacific Coast with a rural population mainly consisting of Afro and indigenous descendants that represent close to 3.6% of the total country's population. Both groups have been known for living by their ancestral traditions and cultural heritage. Inside these minorities, handicapped people and those who are part of the pyramid's base shall also be taken into account.

### 1.1.2 Agricultural sector.

Colombia is an agricultural country by excellence due to the fact that it has a large land expansion with diverse climates and located in the global tropical zone where there are no seasons, allowing the

harvesting of crops all year long. Marginalization situations in rural zones such as the violence factor or the lack of economic resources and opportunities for its inhabitants or the lack government support are factors that lead to the under exploitation of the agricultural pantry.

Contexts like those mentioned above are ones that give the opportunity to students to have infinite real-life experiences with the communities where they want to intervene with industrial design. This introduction opens the door to the next phase in this methodological approach.

## **2 METHODOLOGY APPLIED TO THE DEVELOPMENT OF SOCIAL CHARACTER PROJECTS**

For the Industrial Design Program, sustainability is conceived as a transversal formation axis, which is supported on the subjects of “Design Theory and Practice” and developed under the traditional scheme of an apprentice teacher. During five years of undergraduate study, design projects with increasing complexity are developed which must be approached from the analysis of the surrounding environment and context until the formulation of a proposal or solution is achieved. This process of growing complexity is synthesized in the final phase of the students’ education under the realization of an interdisciplinary research project and materialization of a proposal defined as “thesis design project”, done during their senior year.

The environment in which each student will work is decided by each student due to the particular conditions of the country. Many of them initiate investigations of the most complex sectors including minority populations and the agricultural sector.

The methodology used for these projects originates in a phase of analysis and problem identification, exploration and fieldwork visiting the involved communities or companies, planning the activities, conceptualization of ideas, and generation for the development of a prototype. The focus of these projects is always innovation without regarding which is the objective group to which the solutions are directed. Research is always the starting point of any design project through the usage of a method. It is also important to mention that although the project has only academic goals, thus there are some that can end up with a real efficient implementation after the formative academic phase.

Design and research are terms that describe two activities that traditionally have been separated as the design activity (who designs) and the research (the scientist) [4]. For the combination of these two activities a communication exchange is developed, in this case, which is very important for the development of innovative products. In the development of a project, the designer and the scientist consist of the same person and show the methodology used where there is a research phase and a design phase.

### **2.1 Ethnographic research**

For more than four years the students have been developing short duration projects (one month) with specific communities solving simple problems such as looking forward to improve the living conditions of depressed zones in cities or the countryside. These small projects give the students a broader perception of the social reality that will later transform that dimension of previous knowledge, giving them the tools to enter the formulation and definition phase of the design problem.



Figure 2. Research project for social innovation

The real problem of innovating in poor sectors of the population is not related to developing low cost products, but rather to satisfy the real people's needs with those products. This exercise is only possible when the designer-researcher immerses him or herself in the way of life of these people and detects the real problems starting from the observation of the surrounding environment (Figure 2). The ethnographic or qualitative proposed research is a method of useful application in the analysis and solution of design problems. In the initial stage of the social design process, the way of life of a particular group of individuals is analyzed through behavioural observation and description as well as their actions, the interaction with others and with their surrounding environment. Cultural elements to be studied can include rituals, myths, social symbols, productive processes, health subsystems, day-to-day life and conflicts among others [3]. These descriptions and behaviour analysis lead the student to define the research problem to be solved through design.

Once the design problem is identified, the student must interact directly with the specific community to be affected by his or her proposal. He or she must take into account all their cultural values, as well as their resources and specific needs. This assures a direct involvement of the target group to be affected and opens the opportunity for further implementation and verification for the design result.

## 2.2 Project development

Once the problem has been defined and the ethnographical research process has been done by the direct contact of the students with the environment that their proposal will affect, the student should try to involve the user so that he or she may cooperate by providing information and even possible solutions. The success of the exercise will depend on that the communication between both parties may be fluid during the entire process. The information will be obtained during the visits and individual and group discussions, with the people or community leaders through interviews.

This phase currently uses the traditional methodology for design such as the methodology proposed by Gui Bonsiepe [7] where the designing activity is divided into three general phases starting with structuring the problem and finalizing the project realization. Inasmuch as the previously described ethnographical methodology, it is of special importance for the project's phase where it relates to the functional model and more importantly the verification phase with the community or specific social group for which has been designed.

Recorded video verification is obligatory to demonstrate the usefulness of the object operated by the people that need it and in some cases the users' testimonials.



Figure 3. Student projects

As an example (Figure 3), four projects done by the students are exhibited. These projects clearly show the application of the described methodology scheme and its effective materialization giving answer to the specific needs of the surrounding environment.

- The first example is about the development of a station for the pre-harvest, harvest and post-harvest of the Borojó fruit in the Colombian pacific coast. Borojó, scientifically denominated as “Borojoa Patonoi”, is a fruit that presents high nutritional characteristics and is actually considered as an important source of nutrition, medicinal properties and economical income for farmers and local people. The traditional way of harvesting the crop has presented problems in its over-production, given its geographical location with difficult access that has resulted in plagues and rotting fruit. As a response to this, a system formed by three different elements was developed. The first element aids the pre-harvest protecting the fruit from external agents such as insects, the second element helps the harvest in the collection of both fruits still hanging from the trees and those that have already fallen, and a third element will aid in the handling and transportation of the product making easier its classification and commercialization.
- The second example is a system for attending births in the rural zones of the pacific coast that respects the ancestral cultural traditions followed by these people including giving birth with the assistance of a midwife. A midwife, or a Traditional Agent in Health, is a woman that attends pregnant women and newborns but has no medical college education. Their knowledge has been transmitted by their ancestors from generation to generation [8]. As a response to this situation, a project was developed with the collaboration of midwives that would allow the mother to locate vertically to give birth, and at the same time making things easier for both the mother and the midwife. The result of this project has been a portable station that the midwife can carry with her to the rural zones with difficult access.
- The goal of the third project is to help the population of the Colombian pacific coast, mainly the Afro descendants to grow river shrimp “*macrobrachium rosenbergui*”, as a sustainable food resource as well as for economic income. The result was a floating device that can be easily built by locals that permits both the fishing and growing of shrimp. The system works with the principle of size selection where the device attracts shrimp with food that has been grown, harvested and deposited inside. After the shrimp is inside the object, it can grow, develop and procreate. Due to their small size, the new shrimp can exit the element ensuring the river’s sustainability. In the meantime, the shrimps that comply with the ideal conditions will be collected and used as food source and as economic income improving the conditions of the local families without threatening the resource’s sustainability and surrounding environment.
- The fourth project is focused in the harvest process of quinoa “*Chenopodium quinoa*”. This project

was developed aiming to encourage the growing of the crop quinoa, considered by the FAO (Food and Agriculture Organization of the United Nations) as one of the millennium foods, due to the fact that it contains high nutritional properties. It is a system that will help the peasant in the venting, washing and drying process of the quinoa, optimizing the productive process and stimulating the harvest of this among the farmers of the region, and at the same time providing them with higher employment possibilities. It is important to highlight how the project was structured inside a government project called PANES (Food and nutrition action plan for schools) that tries to encourage the harvest of quinoa in order to nurture a beverage that has high amounts of protein that can be supplied for low-income children in public schools of the region.

### **3 CONCLUSIONS**

The purpose of research aiming to design high complexity solutions such as the ones related to social character implies that the student must be trained in both research and observation. Design has been considered as a creative activity and sometimes even an intuitive one, but not as a research activity acting as starting point for projects.

Innovating with design in depressed sectors with complex requirements for products is a huge challenge given the fact that these sectors represent a market with high potential but with high economic barriers due to the low-income levels. These communities have their particular needs and the products to be developed are difficult to market. That is why this implies a rigorous research project with a high capacity of analyzing and observing. This research/projecting process gives as a result a new generation of designers that integrate different worlds and cultures for the benefit of society. Working with vulnerable communities implies high and complex obstacles for the students because of its unique characteristics. Nevertheless, the experience for them widens their point of view towards society's diversity enriching their design formation.

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