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Cross-Cultural Ventures to Design Stone Products

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Abstract: This paper is part of an ongoing research, addressing the design of stone products to guide materials to new applications in a reality that asks for local qualities, sustainability, and change. The authors present the thesis that unexpected materials can be obtained through the mix-combination of its basic components. Accidental materials speak through a complex network of interrelationships in relation to the context. So, the power of expressiveness can be obtained through the controlled mixture of its elementary components. In a world where things deliberately unstable are the raw material for the construction of unstable identities, it is urgent to be constantly attentive. It is necessary to ensure that the flexibility and the ability to adapt quickly follow changing patterns from the outside world. The study is based on a mixed practice and supports cross-fertilization and design-driven innovation to create cooperation between different mediators to communicate new meanings with the sense of future. The design process involved design students and the productive sector. The authors want to prove that it is possible to find innovative ways, looking for references in new scenarios that can determine innovation and guide the material to new applications that affirms globally by local qualities.

Keywords: Education, Technology, Materials, Innovation, Sustainability.

Introduction

Cross-cultural competence is a set of culture knowledge developed through education, and experience that provide the skill to operate successfully within a culturally complex environment. In fact, cross-cultural capability can be seen as a toolkit if one deal with different cultural software in one place, at the same time and considering analogous circumstances. Although, it is important to learn the culture just as it is vital to learn its language, studying them in the same way, by learning how to participate in meaningful practices (Hooker, 2003). Thus, in this study, to design materials to new unforeseen and extraordinary requests can be achieved through cross-cultural ventures guide by the sense of culture, and language.

For one side, culture is the whole complex which includes knowledge, beliefs, art, morals, laws, customs and other capabilities and habits acquired by human being as a member of a society (Berry, 1992). The concept of culture covers different human activities and becomes dynamic in its ability to interact with time and contemporarily, with the other areas with which it relates. Plus, cultures are ways of interacting diversity and even in the same society social actors use language for very different purposes (Hooker, 2003).

For another side, about language it is possible to define it as the power to speak logically enough to respond to and to create recognizable social skills to define the sense of humanity. In fact, language is the first global interpretation of the world and therefore cannot be replaced with nothing (Gadamer, 2002). This statement seems to indicate that not always language has been understood as an entity, that has a meaning, and that does

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not serve just to describe or classify things. This path seems to announce that we use language to produce, and that interpretation is a process to know about the world, by the involvement of factors that cooperate to qualify this experience (Soares & Aparo, 2022). Having this judgement in mind, for instance, radical unconventionality from normal speech interaction can cause interlocutors to judge one not only insane, but less than completely human (Wilce, 2005). This paper explores the connection between madness - as part of language - and fundamental human dialectal capacities, such as the act of designing materials.

Madness was no longer to be inscribed in the negativity of existence, as one of its most brutal figures, but it progressively took its place in the positivity of known things (Foucault, 2006). For instance, as Erasmus of Rotterdam (2004) states, madness can be understood as synonymous of creativity, in the sense that it accompanies an inspiring force, proper to young people and move away from a rational way of thinking, stimulating unconventional ideas and, by this reason, innovative positions. It means the competence to create connections among things that characterized youth. In design materials, accidental (madness) materials speak through a complex network of interrelationships inherent to the context and, the control of expressiveness can be achieved through the controlled crossing of their elementary components (Branzi, 1983). This purpose, connects with the idea of working with young people, directs this study to interpret design materials as a system of product more complex and biunivocal and, the attempt to give a symbolic order in society and in the market. Moreover, it is a system of meaning as the consumer does not buy a product because it has quality, but because it shares a system of values that the company, through the product system, managed to communicate to the consumer (Zurlo, 2003).

Background

Today's relativity presents complexity, liquidness, and contradiction, and "in a world in which deliberately unstable things are the raw building material of identities that are by necessity unstable, one needs to be constantly on the alert; but above all one needs to guard one's own flexibility and speed of readjustment to follow swiftly the changing patterns of the world 'out there'" (Bauman, 2000). In fact, the History of Design is full of cases that present design as a facilitator for new applications for materials, referring to parallels worlds and defining new operational scenarios. In this paradigm, there are materials such as Technogel and Corian.

This paper highlights the statement of the partner company - the Portuguese company ValeuOptimized - about vStone. It is a stone product enormously versatile, allowing one to change some paradigms in the use of natural stone in all its application segments, enhancing creativity and the development of new decorative solutions. Consequently, the cautious designer Latour (2008) is qualified to (re)educate for a fair and sustainable consumption of society. The designer will be able to propose new solutions for the change, carriers of meanings and, at the same time, with the sense of the future (Aparo & Soares, 2012). In recent years, many designers have been able to interpret the innovations that come from the research world – also through cross-fertilization operations, that is, technology exchanges between different sectors – to create highly successful products (Raimondo, 2005).

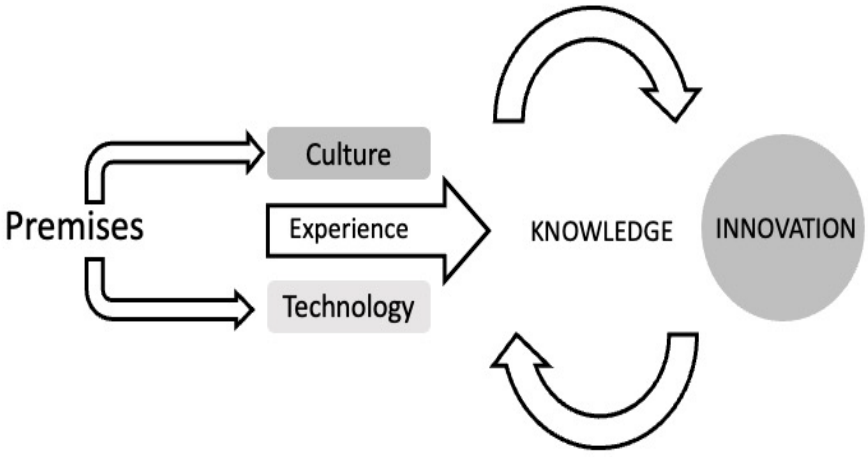

Figure 1. Design and materials to find innovation

Historically, one of these principles was applied during the seventies, notably, with primary design (Branzi, 1983) that started operating the first research in this direction, expanding the concept of design for the invention

of new materials and for the linguistic improvement of existing ones. Following the principles of lateral thinking (De Bono, 2017) perhaps the designer can find innovative ways, observing the material from a different position, leaving of trying to formulate logical answers, to look for references in new scenarios that can determine innovation. Based on the concept of cultural transfer (Manzini, 2006) the designer can guide the material to new application scenarios that go through the stories but, mainly, through the cultures of a world that is affirmed in a global way by the local qualities.

Research Process

Purpose

The study aims to highlight transversal participation in design process, relating different professionals from different subjects. It integrates a design school - including 34 students and 3 professors – a stone sheet material company - the Portuguese company ValeuOptimized – and several micro companies of the same place.

The main goals are:

- To develop an academic project that offers opportunities for the company and the students.
- To create innovative proposals in product areas that may consider sheet stone as the main material.
- To develop products that know how to enhance the properties and characteristics of the stone sheet.
- To increase concepts that may contribute in the future to the design of new products bearing new quality values for the sheet of stone.

The project was organized in four patterns connected with the stone field. The first scope was the stone and the culture of the north and was focused oriented on megalithic monuments, rock carvings and the first tools. The second option was the stone in Baroque poetry and was concentrated in the fields of architecture, painter, and sculpture. The third scope was the stone, the fragment and all, and was determined on Portuguese pavement and the mosaics. Finally, the fourth choice was the dry walls; the “mariolas”; and the stones between natural phenomena and legends (the rocking stones, the Moorish stones, the rocks brooders). Therefore, in this paper it was intended to analyze the stone sheet material culture as something systemic and interactive, which the result should be applied to a design product. Students developed different products, such as, seats, bags, toys, glasses, jewels, dresses, cutlery, vases.

Related work

The design professors has already developed projects related with stone material and the stone sheet material. For instance, in 2016 the authors created Lapis Lapidem’s project developed by under-degree design students. Lapis Lapidem was established under a protocol between IPVC, Mondim de Basto City Council – a city located in the North of Portugal - and Travassos Gold Museum – a museum situated in the North of the country. The project consisted of the creation of jewelry projects that cross yellow granite and filigree technique. In 2017 and in 2021 the stone sheet material was developed by two master design students during their dissertations. The students designed sheet stones focus oriented on lighting (Mendes, 2018) and furniture design (Vieira 2021).

Methodology

The research project was directed in distinctive phases and based on mixed, non-interventionist and interventionist methodology, linking quantitative and qualitative methods. In the non-interventionist phase, the study was established on analyzing theoretical concepts and literature review to create case studies that supported the theme. This paper studied the interventionist stage by saving and analyzing data and generating ideas, brainstorming, and prototyping. The students created connections with micro companies of the place to know procedures and specific techniques. The principal purpose was to implement this knowledge in new product development, linking sheet stone with different materials, such as, wood, ceramics, textiles, metals, natural fibers, cork, among others. Throughout this process it was necessary to create several mind maps and to realize the diversity and quantity of materials, technologies, and techniques.

Materials and appropriation

During the process, the diversity of sheet stone was highlighted. Thus, it was created team work to discover the potentialities of this material while connected with other materials. Creativity process promoted transversal work among students guaranteeing testing for all students. The cooperation among students were important to design process, considering that principles such as unity and co-design among students were introduced. Therefore, transversal work was promoted, ensuring the experimentation and testing phase for students. The cooperation among students was very important do design process.

Table 1. Cooperation process

Variables		Number	Mean
Age	20-24		22
Gender	F	20	57.2
	M	15	48.8
Total		35	100

Figure 1. Students prototypes with the connection of the stone sheet to different materials and in diverse environments.

Students worked on different qualities of stone sheet, namely:

- D. Black;

- Black with polyester resin;
- Zeera Green;
- Galaxy;
- Silver gold;
- Forest brown marble;
- Tecla wood;
- Diamond Shimmer;
- Red Clay;
- Autumn grey;
- Blazing Cooper;

With the support of the company, the characteristics of each material were identified. With this knowledge it was possible to move on to an experimentation phase, relating the different qualities of stone sheets with other materials such as fabric, ceramics, wood, metal.

Results and Discussion

- In this process the malleable sample, such as D. Black, it is possible to cut the sheets with scissors.
- With some sheets of stone, sewing thread was experimented with either using a sewing machine or using hand sewing and the result was achieved. In this sewing process, the stone sheet was linked to fabrics and cardboard.
- Another successful result was the bonding of the stone sheet to pine wood agglomerate, using nails.
- Likewise, the cutting process was developed, using a circular drilling machine measuring 1.5cm and 2.5cm.
- In another experiment, curves and rounded shapes were created in the stone sheet, using dull files. The result was positive when dealing with harder samples such as Silver Gold. This type of experience fits into implementation areas such as jewelry.
- An alternative process developed was the bending of the material through heating with a flame. The material cools down after 10 seconds, hardening and taking on the new shape.

With the experiments carried out, it is concluded that not only the material connects naturally to other materials, but also that it is possible to assume it in diversified areas.

Conclusion

In the scope of Product Design, the methodology of cross-fertilization was used, which allowed students to interpret the innovations that dispute the world of research to create new products.In terms of application, around 32 prototypes were materialized, many of them developed in collaboration with companies - both industrial and artisanal - in the northern region of Portugal, particularly in the district of Viana do Castelo. On the one hand, one of the objectives of the project was to give students the opportunity to achieve reading and interpretation of the material. On the other hand, one of the purposes was to make the material known to the companies that collaborated with the students in the project.

Scientific Ethics Declaration

The authors declare that they are responsible for the scientific, ethical, and legal aspects of the paper published in EPSTEM.

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References

Aparo, E., Soares, L. (2012). *Seis projetos à procura de um autor: Sei progetti in cerca d'autore.* Firenze: Alinea.

Bauman, Z. (2000). *Liquid modernity*. UK, Cambridge: Polity Press.

Berry, J. W. (1992). *Cross-cultural psychology: Research and applications.* UK, Cambridge : University Press.

Branzi, A. (1983). *Merchandise and metropolis.* University of Palermo: EPOS.

De Bono, E. (2017). *Little handbook of creativity.* Milan: BUR Rizzoli.

Foucault, M. (2006). *History of madness.* London: Routledge.

Gadamer, H.G. (2002). *Verdad y Método II.* Salamanca: Sígueme.

Hooker, J. (2003). *Working across cultures.* Stanford University Press.

Latour, B. (2008). A Cautious Prometheus? A few steps toward a philosophy of design: (With special attention to Peter Sloterdijk*). "Networks of Design" Annual International Conference of the Design History Society (*pp.2-10). Cornwall, UK: Universal Publishers.

Manzini, E. (2006). *A cosmopolitan localism . Perspectives for sustainable local development and hyphotheses on the role of design* (pp.1-6). Milan: Sistema Design Italia.

Manzini,E.,& Bertola,P.(2004).*Multiverse design:Notes on the phenomenology of design* (pp.165-176). Milan: POLIdesign.

Mendes, T. (2018).*The design in the introduction of stone leaf, for the creation of a new product in the field of lighting.* (Master dissertation). Retrieved from http://hdl.handle.net/20.500.11960/2093

Raimondo, C. (2004).Materials design in Bertola. *In* Manzini,E.,& Bertola,P. *Multiverse design:Notes on the phenomenology of design* pp 141-151). Milan: POLİdesign

Rotterdan, E. (2004). *The praise of folly.* New York: Barnes & Noble Publishing.

Soares, L., Aparo, E. (2022). Hermenêutica as a design methodology: La hermenéutica as a design methodolog. *Latin American Journal of Development, 4*(1), 48–54.

ValueOptimized. Retrived from https://valueoptimized.com/

Vieira, D. (2021). *Novos materiais para novos contextos: o processo de design no âmbito do equipamento para o bem-estar social.* (Master dissertation). Retrieved from http://hdl.handle.net/20.500.11960/2628

Wilce, J. (2005). *A companion to linguistic anthropology* (pp. 414-430). New Jersey: Blackwell Publishing

Zurlo, F. (2004). Product system design. *In* Manzini,E.,& Bertola,P. *Multiverse design:Notes on the phenomenology of design* (pp 141-151). Milan: POLİdesign, 141-151.

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