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GENERATIVE DESIGN WITH A PROSPECTIVE APPROACH TO THE DESIGN OF JEWELS

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ABSTRACT

Designing for the 21st century is a prospective that shows a transdisciplinary crossroads with advanced digital technologies that are used to design and manufacture. The next project is a design research that proposes to create pieces of jewelry through the generative design methodology, which uses algorithms that allow to con Figure complex geometries that can be modified in a parametric design software that makes 3D models. Harmonizing transdisciplinary methods such as generative design to create jewelry allows fostering creativity and innovation, achieving comprehensive projects that accelerate the manufacturing process and guiding the designer to experiment with advanced digital technology in traditional activities such as jewelry to achieve results that in a traditional way would be impossible to conceive; since the design without being transdisciplinary does not offer efficient alternatives nor does it cover the needs to disruptive problems emerging from emerging prospective scenarios of a globalized world that commits professionals and scholars of different precepts to the search for an updated knowledge that integrates and connects knowledge in a collaborative manner for growth where collaboration leads to the growth of the participating disciplines.

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INTRODUCTION

Talk about design it's a reference of a creative project activity that looks forward an economic, social and cultural wellness through the creation of models, objectives and services, each one with intellectual values and qualities transmitted from a designer. Lopez, Manchado, Sanz (2016) point up the design as a "innovation factor of introduction of the technologies and a crucial cultural nexus and the economic exchange", (p.10). This way, the design it's an influent action in the process in the construction of environments, it comes along with time attends and proposes intelligent solutions to the complex anthropic problems starting from multiple methodologies usage. The designer combines theorists, practical, technologies and conceptual elements that function as tools to accomplish multiple necessities from different precepts (social, cultural, economic, environment) belonging to the environment in which it develops.

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On the XXI century it results as a prospective that shows complex scenarios, the future where all societies take place each day is closer, technologic developments suggest to all different study areas a progressive update, as a combination with these to accomplish positive and efficient answers. Miklos, Tello, (2015) considers the prospective as a way to get closer to the future, which is not looking for its guessing, however it pretends its construction, anticipating this way the setting of a desirable future; then from that imagined future, meditate on the present to accomplish a better position in this real and desirable situation; since the prospective finds its interest in the evolution, the change and the dynamic of the social systems.

Industry 4.0 and transdisciplinary First innovation

Along the human history had been born different scenarios which transforms the economic, social, cultural and technologic systems; through a rupture that arises as a discontinuity phase, denominated industrial revolutions.

Each revolution is determined for one master piece which allows the rupture of a paradigm. Now we present a chronological line of the industrial revolutions (Figure 1) where it takes place the primordial factor that allow the breaking on each time; which are: creation of the steam machine, mass production, automatic production and connectivity. The Industry 4.0 or better known as the fourth industrial revolution suggest to the world-wide economies its adoption thru a series of multiple trends or enablers (Figure 2), which allows its consolidation pointing out a flexible specialize form of a smart production to conceive products, services and smart experiences, since the industry has a great challenge, that consist in wondering which technology will no longer be an option rather an appropriation challenge, (Kuri, 2017).

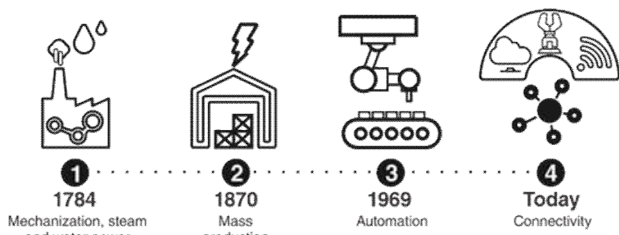


Figure 1. Timeline of Industries

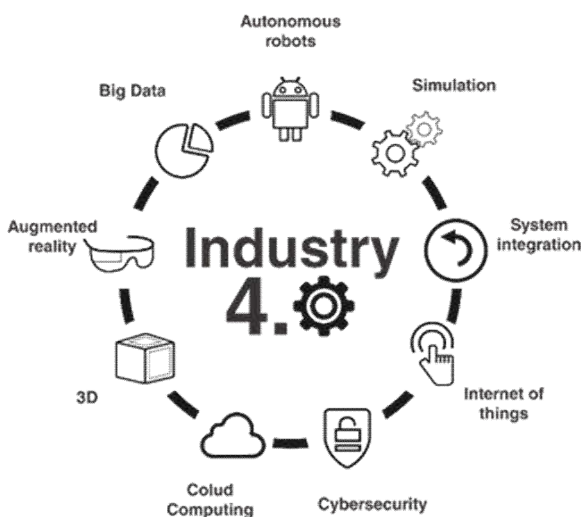


Figure 2. Trends of Industry 4.0

This is how the modernity shows a new method to design, a social participation where the great mass establishes a spin of the innovations and a paradigm change on the ideologies that reflects its emergent necessities. To innovate it must realize something different from the usual, that evocates to a progressive and continue improvement. Farias (2013) defines the innovation as a "new placings or methods improvements, organize structures and spaces, that is, from all those ideas that drive us thru changes to obtain improvements, (p. 158). Establishing projects on those prospective scenarios such as Industry 4.0 does, will allow to accomplish an innovation through the transdisciplinary acts that gets closer to societies a possible future and learn from the multidisciplinary; leads a development between collective intelligence with common objectives which integrates and connects knowledge as a collaborative way. This definition is completed by Ricalde, (2013, p. 25), the "transdisciplinary is the acceptances of the complexity, from the real world that can't be absorbed by the simple mode.

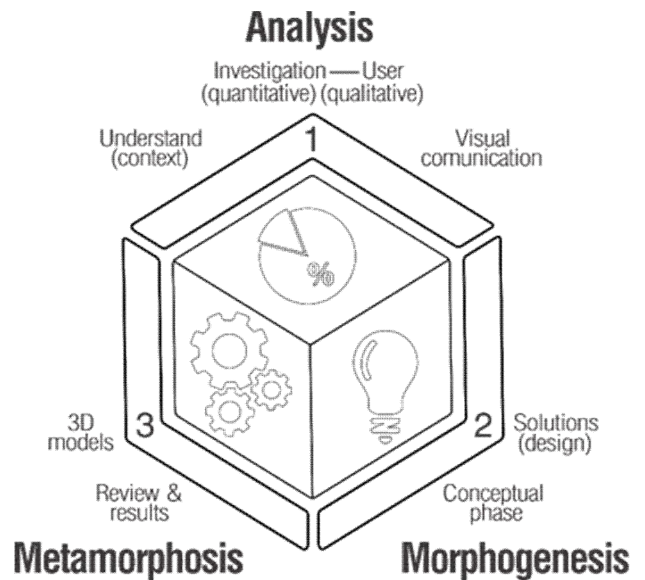


Figure 3. Representation of method generative design

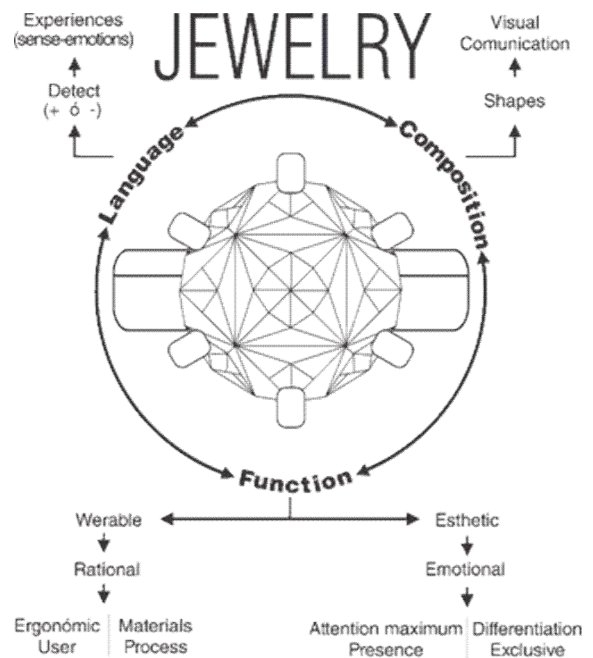


Figure 4. Aspects in the configuration of the jewel

In the transdisciplinary collaboration, we could appreciate how the natural, social and cultural environment influence in the structural and conceptual solution of the design". Previously the design was seeing as an application of the acknowledge from a same area, (architecture, graphic design, industrial, urbanism), which show it as a discipline certainly orthodox, and think as an efficient collaboration between expert of different acknowledge and techniques will result as an action almost impossible because of the distrust and ignorance on their action field; because of that the transdisciplinary allows a collaboration increase offering efficient solutions and an opportunity where the design seen from an isolated view will not offer solutions to a complex world.

METHODS

The present project is a design investigation that propose to take care of the suggested necessities in the advanced digital

production for Industry 4.0, apply to jewelry design. Retaken with Asterios Agkathidis, (2016) who proposes a method of generative design, in which innovated solutions are developed with the incorporation of contextual parameters, of effectiveness, structural, materials, typological and advance digital technologies of implementations where algorithms are used and allow to set up complex modifiable geometrics in a software of design which covers individual necessities of the users through a custom design (parametric), allowing to give an answer in real time for design patterns that are used to design and manufacture. This method is developed from a cyclic process (Figure 3) that includes three phases: Analysis, Morphogenesis and Metamorphosis, where each one is complemented through specific aspects.

PHASE 1. Analysis

In this phase it was researched and explored qualitative and quantitative aspects that result as efficient data and information; that were converted to aspects, characteristics and requirements that are present on the project design set up, which generate efficient information with real proximities that avoid subsequent problems and maximize the design process.

Context Aspects

- Product design: Jewelry pieces (pendants)
- Main users: Women ages between 25 to 30 years
- Digital design software used: Grasshopper for Rhinoceros 3D version 5.0, V-ray 2.0 for Rhinoceros version 5.0.
- Material proposal:
- Jewelry specifications: Category (short pendants) measurement max 10 mm with earring stopper and max weight 4.5gr, according to (Carulla, Vallejo, 2002)
- Jewelry design aspects: continuously are shown on a scheme (Figure 4), essential considerable aspects on jewelry design.

PHASE 2. Morphogenesis

Inside the methodology this process is known as the creative phase, in here we establish and mix up the form composition and visual communication techniques principals refer by D. A. Dondis (1976). This principal was developed to emulate the idea or concept that allows the formal development that defines parameters and algorithm that were applied on the software of generative design.

Concept (Trend)

Enlarge and angular forms (rounds-curvilinear): This type of forms and combinations usually creates harmony, softness, perfection; with this enlarge form we'll have a wide view field transmitting the sensation of space.

Generative design and morphologic process

The next scheme (Figure 5) illustrates the method of generative design applied in the software (Grasshopper), which establishes the parametric system of a jewelry piece, and presents parameters and algorithms which are defined in: curves, fragments, divisions through points, measurements, arches, radii, tubes and randomness, to accomplish in forms of a previously

analyze design. The generative design system, being parametric, allows us to explore and experiment with the variability and interaction of forms until we obtain the desired shape.

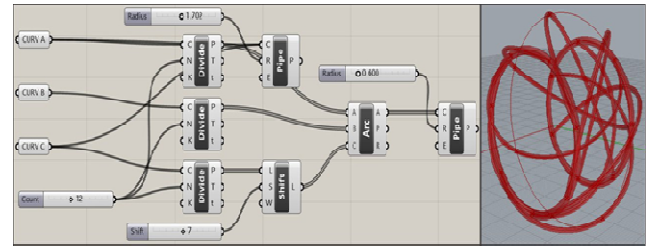


Figure 5. Design algorithm system for jewelry

PHASE 3. Metamorphosis

In this phase digital models have been reached and the shape variation has been explored in the previous defined system, we proceed to develop the render that allows us to visualize the finished precious metal with the help of rendering engine, as it is shown (Figure 6).



Figure 6. Deformation interaction of a piece of jewelry

RESULTS

Once the shape variations have been analyzed we proceed to select the final proposal which matches with the design aspects of each phase of the methodology.



Figure 7. One-piece digital prototype in generative design

The next image (Figure 7) is a digital prototype, where the precious metal is established as well as the incrustation of a stone as an auxiliary and balanced detail in the design in rendering quality. The proposal to be digital and parametric allows to accomplish changes and modifications that are adaptable even better to the user needs and requirements before the elaboration of 3D impression models which will allow savings on time and production.

DISCUSSION

Applying transdisciplinary methods such as generative design allows to encourage the creativity and innovation, reaching goals that accelerate the process of manufacture and guides the designer to experience strengths, opportunities, weakness and threats which came with advanced digital technology in traditional activities such as jewelry to obtain complex pieces that with the traditional way might be impossible to create, since the design seen in isolation does not offer efficient alternatives nor does it cover the needs of disruptive problems arising from prospective scenarios of Industry 4.0; which allows permeability in aspects such as social, cultural, economics and environment.

REFERENCES

- Agkathidis, A. 2016. Diseño generativo procesos para concebir nuevas formas arquitectónicas. Vol. I, Promopress Publication, Barcelona, Spain.
- Carulla, N., Vallejo, C. 2002. Programa Nacional de Joyería y Orfebrería. Vol. I, MINERCOL Publication, Bogota, Colombia.
- Dondis, D. A. 1989. La sintaxis de la imagen. Gustavo Gili Publication, Mexico.
- Farias, P. J. 2013. Diseño industrial formación, propósitos y acciones; Chapter 00;157-165.
- Kuri, J. M. 2017. Industria 4.0: una realidad a enfrentar. Available online at http://gadgets_mexico.mx/industria-4-0-una-realidad-a-enfrentar.
- López, I., Manchado, E., Sanz, R. 2016. Taller de Diseño Métodos y Proceso de Diseño, Vol. I, Prensas de la Universidad de Zaragoza Publication, Spain.
- Miklos, T., Tello, M. E. 2015. Planeación Prospectiva una estrategia para el diseño del futuro, LIMUSA Publication, CDMX, Mexico.
- Ricalde, G, E. 2013. Diseño industrial formación, propósitos y acciones; Chapter 00;17-27.
