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TRASTOCAR. INTERACTIVE ART-DESIGN TO MAKE VISIBLE ENVIRONMENTAL IMPACT

Ana Carolina Robles Salvador
Universidad Autónoma Metropolitana, Lerma. a.robles@correo.ler.uam.mx Av. De las Garzas, Lerma, México.
Rodrigo Rosales González
Universidad Autónoma Metropolitana, Lerma. r.rosales@correo.ler.uam.mx Av. De las Garzas, Lerma, México.

ABSTRACT

The purpose of this collaboration is to offer elements for discussion on the role of intersections among art, design, and technology in the socialization of environment problematic. To do it concretely, it is appealed the case of an interactive piece called *trasTocar* (to disrupt) exhibited in Zanbatha, the municipal museum in the inner state of México.

The exposure scheme starts with the environmental situation addressed, particularly from the Anthropocene Crutzen´s concept, to engage it with the pollution in the wetlands of the natural federal reserve next to the Lerma river´s in Toluca Valley. Later, it is described the interactive object proposal based on cybernetic Lotman´s communication theory which under the premise that human beings alter their environment use the digital art medium to participate in a dialogue through interaction. Finally, the results are shown.

Key Words: digital art, environmental impact, interactivity, reception.

1. ABOUT THE ANTHROPOCENE

The Crutzen and Stoermer (2000) concept it is set in the interdisciplinary interstice. Its elaboration was the result of a conceptual projection from geology to ecology. Also, its transit through biology, sociology, anthropology, philosophy, education, and art, and others have contributed with distinctions, applications, nuances, relevance, and sense to the concept. Each discipline scope reality from the premise that Earth´s crust has been transformed by humans.

The Anthropocene express qualitatively the human footprint in life´s Earth (Maldonado, 2016). In an energetic standpoint, it is a geological force. Since the beginning of the Industrial Revolution in the XVIII century, this force has been increasing under the belief in the limitless natural resources that capitalism exploits. From design, Anthropocene; represents a scenario where the development of products means responsibility for the past learnings and the future options. Consumption and its disposal are not any more dismissed. Humanity doesn´t need to dominate nature in a brute way but to control technological force to prevent damages and consequences of unthought actions.

Also, here art has something to say; rather to just represent reality in different modes, it is to highlight the theme, visualize the problem amid a super information landscape.

So, the Anthropocene transits in between disciplinary boundaries as design and art. In these two cognitive fields, its meaning turns towards questioning the span of human actions in future generations, but in different directions. In the design, the reflection focuses on the possibility of modifying the behaviours and imaginaries regarding consumption patterns that have impacted the environment on a global scale. For art, questioning focuses on rethinking humanity as a species that coexists with others rather than dominate them, and on reflecting the intelligent use of resources. The first focuses on actions, the second on its possibilities. In the mutual collaboration between fields and epistemes, the Anthropocene as an interdisciplinary concept leads us to observe this stage as a long and intense sociohistorical process with long-term consequences.

2. THE WETLAND´S DREAM

Around the Lerma municipality,1 there are several natural and potable water fountains. In the past, they satisfied the basic population needs set close to the shores of the lakes formed together with the runoffs of the surrounding mountains (Orihuela, 2011, pp. 26-28). Lerma is the same name for the river and these lakes that support diverse flora and fauna as well as villager since the indigenous epoch.

In the XX century the Lerma river and wetlands were stressed by two concomitants socio technological phenomena: the course of it was deviated to supply Mexico City´s water demand; and, the government favoured the setting of industry in that very same place taking advantage of dried lagoon bed for its dumping (Orihuela, 2010, pp. 54-55).

Nevertheless, the local population takes water from their dwells without certainty in its quality to be drinkable (Ramos 2017). Mass media and authorities emit contradictory messages about this matter, since the odors, garbage, and sewage spilled on it are increasing as do it urbanization.

In 1990 state authorities created a commission -Comisión de la Cuenca Lerma, (http://cuencalerma.edomex.gob.mx)- that takes care of the zone and make continuous studies and statements about it, saying that odours and water quality are due to natural reasons and are not risky for human living. However, other research centres give their own versions, particularly on the High Lerma zone studied since 2001.

So, the National Institute of Nuclear Research (ININ) has been reporting the existence of heavy metals in water that surpass the accepted minimum international levels to sustain agriculture and aquatic life. As well they have found the excessive organic charge in the river due to uncontrollable industrial and residential sewage and dumping systems. Likewise, the bird hunting season is allowed without a clear regulation.

Along with this complex scenario, there´s a biocultural component characterized by irregularities in land possession. Federal properties managed by communal interests have faced a gradual but continuous foreign invasion generating violence and pressures on land tenures, diminishing the wetlands area (Patrick-Encina 2016). As well, the bird hunting season is allowed without a clear regulation.

This information heterogeneity determined the course of data collection. As a first step, a street survey was done in Lerma de Villada city to identify the population perception of the ecological problem and to know about its wetland's imaginaries. In this sense, it was pick up people among 19 and 60 years old that inhabited the region since they were kids. They were asked about their knowledge, memories, and references on the Lerma river.

The survey was conducted on a drift scheme (Durán 2011, pp. 141-142; Debord, 1991, p. 17); a free walking that sketch a situation with the purpose to collect ambient information through different technics: fleeting interviews, unstructured interview, photography, daily entry. The people testimonies verified a progressive deterioration since they enjoyed their childhood amid that natural territory and how urbanization (rurban) changed it.2

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[1] See the location of Lerma's wetland clicking on the link https://goo.gl/maps/MbUf2cdK3eF2
[2] Galimberti addresses the differences between urban and rural by reflecting on the concept of rurbano. She updates the term in the relation between the transformations of the ways of living together and the surrounding infrastructure. See Galimberti, Silvina (2011)

3. WETLAND MEMORIES

The findings among youngest people are memories of a polluted river, sewage and occasionally, litmus, although referred their parents or grandparents' comments on a once unpolluted river; some others don´t know the wetlands or were there without noticing it or ignoring that they were a natural federal reserve. The older people remember a childhood with a river less polluted, with enough clear waters where they could play jumping on it either from a swing holding in a tree or from any border; one of them, an ophthalmology doctor, near 60´s years old, told that in those times you could see recreative fishing; Marie, a 56 years housewife remember to have seen "stunned" carp fishes because of the pollution river but not like that in the near wetlands. It is reiterated an idealized description of the past.

In the past. For those, once children, were distraction places, coexistence and in some cases, usufruct nature from hunting or grazing. The wetland was not only a plain landscape but a social and biological substrate for a living. Nowadays the picture is different, just some zones have been protected because of its strategic relevance: the maintenance of aquifers charge that supply water to the municipality. Even so, it is under continuous risk that kind of life.

So, the common sense is a Lerma river highly contaminated by garbage and sewage without any interest or visible solution; authorities, population, and enterprises blame each other dissolving responsibility and, in this way, individual actions are covered up just transferring the problem to a macrosocial level where they have not choices to intervene.

Hence, it´s relevance to communicate a state of things that emphasize the damages to nature due to human actions in a macro and micro social scale, questioning the local dwellers about the impact of their daily behavior. To meet this aim, it was explored a methodological pathway through a theoretical sieve of Lotman´s semiotic culture based on a systemic communication view. Consequently, the chosen categories to operationalize the ideas and actions within a methodological order are four: frontier, text, translation, and language.

4. THE SYSTEMIC SEEING

During this indagating in the surroundings of the Lerma basin, were identified elements that allow conceiving the referred space as a sociobiological producer of sense, in which collective memory linked to the place and its daily references produce a heterogenic deep-rooted tradition. Lotman (1996) names to this space, *semiosphere* (16).

The theoretical approach was solved considering to sustainability immersed in the cultural hybridity of the basin in systemic terms; namely, differentiating society in communication spaces and therefore producing sense. So, because the Lerma basin contains culture is regarded as a semiosphere and the communication forms in it get a nuclear role.

So, let´s work on the semiosphere constituted by these four elements. The first, is the delimitation, the *frontier* (Lotman, 1996, p. 12), where a set of points trace an inside and an outside. This is a filter whereby the text of other semiospheres crosses by. Here the translation operates combining different languages (Lotman, 1996, p. 13). It is a bilingual mechanism to translate texts external to the internal language. The interchange between subjects happens with texts and language sharing; because they are commons signs they can circulate and therefore are given form.

The second part is the *language*, a system of signs that is the ground for text creation. Obey to own rules based on a natural language. A language is a modelizer system that structures and organize text generation using the combination rules of signs (Lotman, 1982, p. 18).

The third element is the *text*. It functions as a message (Lotman, 1996, p. 54). Also, is the culture memory, since its forms´ construction is marked by semiosphere footprints giving heed to a hologrammatic principle; the text is the brick which builds texts, macro texts and finally culture. In this way, the participant semiospheres of culture (or macrosystem) are made of texts developed in secondaries languages; when they circulate in a semiosphere may produce avalanches of texts (Lotman, 1982, p. 18). Because the text is made for exchanging its condition in communication is the misconception, when every participant tries to de-codified it: every subject has its own interpretation, vary depending on the context in which is assimilated or actualized. Thus, the text is the medium to translate.

Therefore, the central operation for understanding is the *translation*. This fourth element is characterized by mechanisms that ensure in time and space to produce sense during the messages exchanging. Normally, this happens in equal and reciprocal relations; in isomorphic terms; in each side, there must be twofold-looking, strange and familiar, noise and clarity. The untranslatable is treated as entropy to be selectable rather assimilable or disposable according to the understanding level achieved. The unknown has this same view: it is the extra-semiotic, the invisible in social life yet waiting for a form to be represented.

The four seen elements allow us to visualize our case presented as a complex problem, well demand to observe the biocultural polygonal like a web relationship intertwined by personal and collective experiences to communicability impact and disciplinary knowing's where design, digital art, and sustainability come together to produce texts problem.

Consequently, the proposal was to socialize a work of complex translation: the wetland data on an anthropogenic pollution basis directed to its local population supported in design and digital art to highlight this situation in a public space: the municipal museum.

5. ARTIFACTUAL TEXT

One step further was to elaborate a methodological pathway. To put it simply: to build a text for setting it in an exposition museum and to evaluate the translation the visitors did. This enterprise, of course, demanded the dialogue

of different bits of knowledge. The results were a kind of a secondary language that appeals to an incipient identity of an emergent semiosphere. Here, the recreation gives form to the frontier which is the junction place where language interplay and translation operates. Design and digital art working together to organize comprehension through text, bringing order to chaos and thus meaning to reality.

The shared inter and transdisciplinary knowledge based on discourse on the artefactual dimension is the digital art object. Clearly, this becomes the nucleus of the translation experience where individual, architecture and time find an identity and therefore a communication frontier. With the artefactual text, memory recreates daily life with the surroundings and the ambient theme in a reflexive moment. The distinctions inner/outside, intimate/strange, near/far, natural/artificial appear as a direct linking to a homeland origin and, finally defining a rurban culture.

So, the bet was to design an art object that could synthesize all the above ideas. The text to model the sense of translation through recreation. That implied a disrupting action, that is to say, a disturbance of the individual biocultural sphere to produce sense. This condition gave the name to the artwork: trasTocar (to disrupt).

The materiality of the corporal-visual text is a digital art installation in which the subject is asked along to interact with it. The factory is composed of two electronic screens fixed in the museum wall. Under it, there is a Kinect sensor that translates, thanks to an algorithm and a computer, the body movements of the person who stands up in front of it into a reflective image projected in the screens. On it, there´s a mosaic with binary pictures of the Lerma basin showing alternatively polluted and unpolluted images that are distorted as bodies move.

The algorithm used to disrupt pixels was designed with Processing for Debian GNU/Linux. As subjects interacted with the piece their body movement was recorded in computer memory when the most disturbed area was projected. (See figures 1 and 2) In the end, all the images collected gave us a repertoire of the different people bodies' deployment and gradient disruption when they recreated their museum experience.

Figures 1 and 2. trasTocar. Right: screenshot of the most disturbed frame. Left: disrupting the screens with body movements.
Source: Own file, Rodrigo Rosales y Carolina Robles, 2018.

The place for a location was the municipal museum of Lerma named Zanbatha (Moon´s valley, in otomí native language) inaugurated in 2015. It is inserted in the wetland concerned area and it has a diverse cultural agenda (http://zanbatha.lerma.gob.mx) attending since contemporary art, vernacular traditions, plastic arts, and craftsmanship's expositions among others. However, the constant texts appeal to the Lerma Valley life.

In this occasion, the frame event was the third edition (EAD.03) of the Digital Art career of the Metropolitan Autonomous University, campus Lerma, undertaken in autumn 2018 for three weeks. It was presented together with seven more artworks which were the final degree projects of the best students.

Once the exposition began, besides the programmed corporal register described earlier, other technics were used to collect data as questionnaires, guided tours and participatory observation to analyze, compare and interpret it. During the 21 days of the exposition, the artifact registered 1053 events (activations for a reading) noticing that a person could have activated it several times whether for accident or for exploratory reasons.

The questionnaires applied aleatorily picked up minimal sociodemographic useful data to identify visitor provenance, age, level of schooling, and knowledge background about digital art and museums. However, the guest book was known that most of the visitors proceeded from the polygonal proximities.

The "walk through" was offered by the investigator as a guide (participant-observer) to kids, adults and teenagers being the later who most demanded. But, speaking generally, there was a rejection of this accompanying.

From this experience, was observed direct conversations, expressions, movements, and behaviours, especially, around trasTocar that helped organize visitors' patterns of translation and interaction organized around their ages: kids and preteens, teenagers, adults, and senior adults. It was identified three moods of interaction adjacent to the text translation operation regardless of the grade distortion done to the landscape pictures: self-giving (kids and teenagers); reflection (adults and teenagers); and accustomed (adults). All of three giving form to a recreation mode.

6. RECREATION MODE AND INTERACTION MOODS

The moods or moments of interaction observed correspond with three kinds of corporeality identified within a sedimentary behavior museum canon since their creation as public spaces of art in the mid of XVIII century (Shin-

er, 292-293). While every actor has a different behavior respecting with the canon represented by the text "don´t touch", every mood was described by different attitudes. Thereafter, the norm has been followed throughout straight or suggested advising signs or rather the tour guide surveillance. In this case, the direct participatory observation of the guide modified the norm observance.

Either way, the three moods of interaction were recognized. The highest incidence happened with the reflexive one, which represents the midpoint between the accustomed and the self-giving moods. It is convenient to note that all the three together are based on the recognition of the norm; its performative action and even in its sliding. That´s why these three categories embrace a diversity of interactions during the translation within the context; the deployment variety can accommodate in any one of the three options.

The first step is the self-giving, characterized by a free attitude that is an introduction before the text-artefactual, setting a confidence value with the actor. Lotman develops the same category to treat the semiotic and social contractual link. From his viewpoint, self-giving corresponds to a cultural archetype based on an ethic calling to the own treatment or commitment involving confidence with others (Mandelker, 2007: 67). According to Verenich (2007), self-giving comes from the religious sphere where devotion is a condition to the path calling of freedom.

So, within the self-giving mood even that some adults and teenagers were brought about slowly examining and moving around to turn it on, others did it by accident and others playing. All the cases show an incremental discovering in the process of opening of actors and artwork. Few deployed the fullness of their bodies and the kids were who showed no doubt during the interaction and about the theme.

The opposite pole of self-giving in this triad around the canon it is the *custom* which is based on the imaginary contention of corporality to avoid risks or punishments. Despite there are no surveillance devices in the museum, touching is not allowed because is interiorized in the actors; it is a habitus normed trough repetition and custom, in-corporated (Bourdieu, 1980), a history made up a body (Foucault 2010). Meanwhile, for Lotman the norm is concerned by the contract. It is a bilateral conditional act expressed during translation. The self-restraint reflects the hidden canon.

Although the visitors in this mood could verbalize the theme of *trasTocar*, they were not able to translate the interaction until the tour guide assisted them. Most of these actors were adults and just a few youngsters.

In the middle of the triadic moment, it is the third mood: *reflection*. Convention and discovery dialogues trough the text-artifactual to express doubts, hesitation or curiosity whether individually or in a group. The interpellation varied depending on the link adults-kids, classmates, or in loneliness. From willingness or accident, all of them learned from actions for translating an artwork that incorporates different bits of knowledge to break the canon giving meaning to this aesthetic experience.

7. CONCLUSIONS

The socialization experience around the damaged environment through an artifactual text in a municipal museum was the result of the design + digital art practices conjunction: the aesthetic signals emitted by such experience communicating knowledge of science and technology.

The translation and its three forms to operate indicate different behavior according to age. The digital artwork disrupts the traditional contemplation stance of the public in a museum. However, this perturbation is associated with a close relation to an ecological problem. This happens in the frontier where semiospheres overlap: technology and science produce sense through an artifact which as well as a text makes, by isomorphism, identity. To sum it up:

a) Translation of *trasTocar* was successful due to the public recognizing their surroundings when speaking about the wetland and its threats.

b) The digital art-design partnership constitutes a device for intersemiotic translation dialogue; specifically, applicable to reproduce the socioecological emergency in contemporary communication.

c) The artifactual text throughout the capacity to recognize body deployment can dialogue with the public about the ecological theme.

It is also worth mentioning that the codes used in the municipal museum are different from others, like the ones used in science museums. The first mentioned has low resources to operate, that´s mean no to have hired people to attend and orient visitors during the exposition. So, the statements, set beside every artwork, although can be helpful, in fact, are scarcely used. In this sense, the translation operates in a recreation mode. Self-giving, reflection and accustomed moments are intertwined in the public behavior in front of the digital artwork.

The exchange of signs in transdisciplinary communication highlights the translation as a central operator in digital culture. The frontier becomes the channel through semiospheres overlap to produce alternative meanings of a reality dominated by conventional representations. In this way, art makes visible what is not existing; re-creates the world in relation to life bringing bodies to presence and present in the dialogical museum experience.

So forth, since the artifactual text (artwork) is conceived as an invariant structure to function as a data collector as well as a device for dialoguing between a nature problem and the public, then it is regarded as a product of design: the result of technological thinking. However, because it is deployed inside a museum and in a digital art exposition, it also is an aesthetic symbol for cultural identity.

The beforehand tells us that the frontier drew upon transdisciplinary knowledge and practices land over praxis.

It means that this experience calls us upon a close relationship between design-art/science-technology not only to enunciate novel ways to see reality but rather, an imbrication between theory and technic that design organizes to change it through education research, including other forms to inform as might be with popularization science.

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