Ecossistema: Experimentações eletro-orgânicas como ferramentas para o cuidado ambiental e social em Sorocaba-SP, Brasil

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Resumo

Este trabalho relata o uso de experimentos orgânicos e eletrônicos como ferramenta de conscientização ambiental, na cidade de Sorocaba, São Paulo, Brasil. A pesquisa foi feita no SESC Sorocaba, na área livre de Internet, em um projeto chamado laboratório Livre: *Experimentações EletrOrgânicas*, entre setembro e novembro de 2012. As pessoas de lá 27 participaram, incluindo: 4 idosos, 9 adultos, 12 crianças e 2 adolescentes. Apesar do público heterogêneo, todos os participantes relataram o interesse no desenvolvimento de projetos semelhantes e que o processo tenha adicionado novos conhecimentos e perspectivas ambientais.

Palavras-chave:

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Ecosystem: eletrorganics experimentations
as tools for social and environmental awareness, in Sorocaba-SP, Brazil.

Abstract

This paper reports the use of organic and electronic experiments as tool for environmental awareness, in the city of Sorocaba, São Paulo, Brazil. The research was made in SESC Sorocaba, in the Internet free area, in a project called *Lab Livre: Experimentações EletrOrgânicas*, between September and November 2012. There 27 people participated, including: 4 seniors, 9 adults, 12 children and 2 teenagers. Despite the heterogeneous public, all participants reported interest in developing similar projects and that the process has added new knowledges and environmental perspectives.

Keywords: open technologies, environmental awareness, experiments, Sorocaba, Brazil

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Introduction

In 1983, the book *Systems Ecology: An Introduction* brought up the complexity of ecological interactions when it made analogies among living organisms and electric circuits, since both are interconnected and interdependent to the components of their systems (Odum, 1983). A year later, in January 1984, the advertising video of the first personal computer[6] to be commercialized by Apple Macintosh, was transmitted during the Super Bowl commercial break under the same thematic of the fictional work *Nineteen Eighty-Four*, which discussed years before, in 1949, an environment consisting of electronic telescreens and information of real-time social control (Orwell, 2007).

Almost three decades later, contemporary society experiences interconnected global environments, composed by petrochemical extraction platforms in Latin America and Middle East, industrial mass production in Asia and great electro-electronics waste deposits in Africa. The concepts of untouched nature or the future based in extreme science fiction are no longer adequate for the analysis and comprehension of the ecosystems of today (Mensvoort & Grievink, 2011).

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[6]   Available in: http://youtu.be/HhsWzJo2sN4

Figure 1: Tv Garden de Nam June Paik (Paik Studios, 2012).

The central objective of this work consists in analyzing the ecological perception of users of the Internet Livre from SESC Sorocaba, during the making of an experimental installation inspired in the T*v Garden* work (figure 1), of Nam June Paik. Created in 1974, the work aggregates working television monitors with flora species, as a critic to the Spectacle Society which detached itself from its natural environments (Paik Studios, n.d).

Entitled EcoSistema (ecological system), the installation will add the critical appropriation of electronic and organic technologies as tools for informal processes of socio-environmental education. This is an alternative and interdisciplinary proposal which involves the management and conservation of natural resources, not limited to elucidate the environment as a natural and static landscape, but approaching the complexity of connected networks, as well as the presence, the interference and the impacts caused by human populations (Gómez-Pompa & Klaus, 1992).

Materials and Methods

This work took place between September and November 2012 at the Lab Livre: Experimentações EletrOrgânicas, based at Internet Livre in SESC Sorocaba - 23º 30' 47" S e 47º 27' 40" W (Open Street Map, 2012). The lab activities initiated in September 2012 as an experimental initiative involving physical computer systems (*hardwares and free software*) to organic elements (fauna and flora). This study, of a qualitative and observational character, was accomplished in four steps as follows (Vietler, 2002):

- Step 1: Between September 29th to November 10th, the institutional communication[7] with the public from SESC Sorocaba took place, through printed program folders of the unity as well as on-line media (website). The activity was advertised as a discussion group about ecosystems and close-to-natures for the interested public. 16 openings were made available, per activity day, upon advanced registration. There were no established criteria or prerequisite for adhesion, such as: age group, gender or educational background. This was used as a way of recruiting the population fragment for the research.

- Step 2: October 6th, from 11am to 6pm: technical and bibliographical references

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[7]   Available in: http://migre.me/bObVv e http://migre.me/bObYH

research in order to set the experimental installation EcoSistema up;

- Step 3: October 13th, 20th and 27th, from 11am to 6pm, the development and preparation of the installation took place. This happened in parallel with the participant observation. The criteria for data collection were the following: 1) Initial adhesion/ Previous registration; 2) Spontaneous adhesion/ In loco; 3) Interaction / Time involved in the activity; 4) Knowledge re-signification; 5) Future expectations. Data analysis evaluated the social-environmental perception of the group each day;

- Step 4: November 3rd and 10th, from 11am to 6pm, the assembly and completion of the installation took place.

In the composition of the EcoSistema installation, organic and electronic material were gathered. 17 seedlings in different growth stages were used and the majority were native species from the Sorocaba region: 2 Guarapuvu seedlings (*Schizolobium parahyba*), 5 Araça seedlings (*Psidium cattleianum*), 4 Ipê Roxo seedlings (*Tabebuia heptaphylla*), 4 Ipês Amarelo seedlings (*Tabebuia crysotricha*), and 2 Coração-de-negro seedlings (*Albizia lebbek*), originally found in Asia. For the planting, 15 kilograms of soil prepared with organic substrate were necessary. Such items were donated by the Projeto Recomeçar, an initiative promoted by the Sorocaba City Hall, with prisoners of the city of Sorocaba for the production of seedlings for urban afforestation (Prefeitura de Sorocaba, 2012). Eight monitor housings were "transformed" in pots for the seedlings, and 4 old working monitors, were connected to them in order to externalize the captured data by sensors in real time. The monitors, donated by the Projeto MetaSorocaba[8] (which develops electronic waste appropriation actions for social-environmental projects in the city of Sorocaba), were painted with black spray paint, being necessary 7 cans to paint all the monitors.

Three recovered motherboards, donated by MetaProjeto[9] located at Parque da Juventude in São Paulo, were used for data processing and functioning of the installation. Three lamps, arranged in tripods were placed around the seedlings in order to artificially stimulate photosynthesis. Capacitive sensors were developed, with *free hardware*, to detect the people-plant interactions, through a sound interface based on free software Pure Data[10]. Thus, when a person touches a seedling, a sound is emitted. Also, an infrared camera was installed to detect the regions where more cell multiplication activity occurred, provided by

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[8] For more information (in portuguese): http://www.metareciclagem.org/esporo/MetaSorocaba
[9] For more information (in portuguese): http://rede.metareciclagem.org/esporo/metaprojeto
[10] Documentation can be found in: http://gypsyware.org/tazs/experimentacoes-eletrorganicas/

the photosynthesis process.

For the didactic signaling of the EcoSistema installation (figure 2) a presentation was made with the on-line platform Prezi[11], which was shown in a big LCD screen, provided by SESC Sorocaba. The final installation, as well as the documentation of the process are available under the free license Creative Commons CC-BY-SA.

Figure 2: EcoSistema (Picture: Ricardo Guimarães, in November 1st, 2012).

Results and Discussion

Despite the institutional advertising from SESC Sorocaba, the visiting public did not made early registrations for any of the activity days. We believe this might be due to the fact

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[11]　　　Presentation available here: http://prezi.com/obbwur1dd_k7/ecosistema/

that the unity had just been inaugurated (September 1st 2012), tied to the necessity of training of the Internet Livre public so they would participate in activities that would approach a critic appropriation of technologies and not only to seek access to computers and Internet.

However, even without early registrations, when the public notice the fuss around plants and electro-electronics equipment, people ended up getting closer and interacting with the installation of EcoSistema (table 1). After the three days, 27 people were registered, being: 4 elderly, 9 adults, 12 children and 2 teenagers. As a free experimental activity, participants were allowed to interact how and for as long as they wish. The average of the maximum time of participation was of 16 minutes, considering a period of three hours at each day of the activities. People participated longer on October 20th, when they could collaborate in a more practical way, by planting the seedlings in the monitors "transformed" in pots.

Table 1: Evaluation of Public Particiation a Internet Livre, of SESC Sorocaba.

CRITERIA DATE	1. Initial adhesion/ Early registration	2. Spontaneous adhesion* / *In Loco*	3. Average of the maximum envolvement time in the Activity	4. Knowledge Resignification	5. Future Expectations
Oct 13th	None	10 people (3 erderly, 4 children, 3 adults)	10 minutes	positive	Continuity/ Practical workshops
Oct 20th	None	10 people (5 children, 2 teenagers, 1 erderly, 2 adults)	30 minutes	positive	Continuity/ Practical workshops
Oct 27th	None	7 people (4 adults, 3 children)	10 minutes	positive	Continuity/ Practical workshops
FINAL RESULTS	None	27 people/ final results (4 erderly, 9 adults, 12 children, 2 tennagers) 9 people/day	16 minutes/ average	positive	Continuity/ Practical workshops

Despite the diversity of participants, they all have showed interest in developing future projects that relate the environment and technologies, as well as the wish to expand their knowledge toward the practical execution of correlated proposals. During the activity, the participants were conducted through explanatory dialogues that illustrated the complexity of the items and processes that would compose the EcoSistema installation: the issues of electro-electronic waste and free technologies, the native species donated through a social project with prisoners from the city of Sorocaba, the exchanges of an ecosystem and the importance of human populations in these processes.

Everyone declared to be very positive the participation in the process, which not only added valuable knowledge and unseen points of view around environmental themes, would also generated something concrete and visual, with the possibility to be seen and replicated by others who would have the interest.

Final Thoughts

The process of conception of the EcoSistema installation together with the public of the Internet Livre from SESC Sorocaba showed that electronic and organic experimental processes can be used with success as tools for informal socio-environmental education. Information, ecological and environmental education concepts are intensely spread out: from the educational institution syllabus to the advertising campaigns of oil companies. However, few people can access the kind of knowledge that provides the comprehension of the interrelations among different ecosystems and contexts (Almeida & Favetta, 2012). To use creative and spontaneous ways to enlighten the processes of interaction of people with their environment can enable the re-signification of their notions of place and space, forwarding new systemic ecological knowledges that, subsequently, might alter behaviors and actions of the public participating in activities such as this one.

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