INTERACTIVITY AND RITUAL: body dialogues with artificial systems[1]

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Interactivity: body and ritual

Interactive technologies are providing us with dialogues between the body   and   artificial systems which allow the acquisition and communication of biological signals with machines signals. Interfaces and computers capture, manage and give back signals emitted by the body. Bodies connected to devices experience flows from electronic databases. To interact is to repeat some behaviors, much like we repeat during rituals. When connected, the body is swallowed by technologies and has a dialogue with artificial systems and their silicon brains. By interacting we amplify our capacity to think, to dream, and to understand our human condition enhanced by digital technologies. We can attempt propagations of identities mediated by technologies, receiving other powers as human beings.

Within interactive installations we inhabit technological environments in which behaviors have been previously defined to receive body actions. Different sorts of interfaces are prepared by artists in collaboration with scientists and technicians to offer interactivity as new forms of life. Within these environments, the body needs to act and to provoke the system. The whole working body sends signals, the system is activated and the responses modify the environment. The body presence connected to a computer by interfaces is responsible for the life of the environment. The body acts in a room and triggers the body's communication to system. The body's behaviors coupled with the system's behaviors determine the work of the installation which interactive system receives some sort of signal. Participants performances are concrete experiences to provoke, to grow, to change, and to advance into different stages of the "environment life" in which someone does something and the interactive artificial system responds. To break is to interrupt the communication. To start, to repeat, to vary some kind of behavior is to develop other systems response.

A new sort of life appears in an environment which is an interactive system. The whole of this world is created by the total performance from biological and artificial signals. It means that the life of the installation is created by the system connections. The art of the interactive installations is related to the complex process of the system and body performance. I am considering our flesh apparatus as an intelligent system that is linked to the whole cosmos. Mind, consciousness and spirit are the software of this intelligent body. By being part of the system confirms the body's holistic natural condition. In the heart of a system, the quality of the parts and their tasks disappear when they are working. The whole is more than the sum of

its parts.[2] The whole is comprised by the multitude of connections within. We are right in the ecosystem context and concept.

Interactive installations as open-ended systems are broadening our existential field and changing our cognition about the world. The interfaces are synthetic bodies, and like our sensorial apparatus, they receive, then give back to us the most incredible sensations. When we are connected our body experiences a complex process of mutations, unpredictability, and dissipations and thus giving us new identities. New technologies embody traces from the biological world translating them into computerized paradigms, such as plants, human body signals such as gestures, speech, breath, heat, natural noises, and water. Touching, breathing, walking, experiencing algorithmic paradigms, infrared sensors and electrical waves provide us with the power to manage invisible forces during many experiences of consciousness propagation. To see, to touch, to experience algorithms, infrared waves, to capture invisible forces giving them visibility and to check organic laws gives us many experiences of consciousness propagation in a symbiosis of organic/inorganic life. With new biological interfaces, such as prostheses attached on us and into our bodies, we are reinventing our lives and the ultimate nature of our species [3].

Each installation proposes a strong behavioral dimension of interactive art. The body immersed within the environment carries with it all of its cognitive activity and connects it to the complex cognition of the artificial system. The relationships are generated in the room and in the cyberspace through information processed within the computers circuits and networks. Flows are created by information circulating in the artificial architectures of networks and sub-networks connected to human mental architectures. Interactive installations are "living" environments where a system of acquisition and transmission of data allows us to immerse ourselves into virtual worlds. Interfaces and networks recognize some patterns and interpret signals from biological systems translating them into computing paradigms. By interacting we experience multiple data options.

People interacting give their body to technology because they intend to get the ideas stored in the silicon memories. In that way, they try to receive virtual power from database. By interacting and performing the body experiences a physical and psychic exploration of the environment [4]. During these dialogues we experience modified states of consciousness by the artificial/natural, analogic/digital, real/virtual symbiosis. The post-biological feeling is a symbiosis of artificial and natural life. Do we interact to get the machine's power? Do we interact to exchange identities? When our body is connected we share desires, beliefs, values, emotions, habits and behaviors [5]. Is interactivity accomplished by *"carnivorous machines"*?[6] Could this interaction be compared to cannibalistic culture attitudes where people eat pieces of human bodies to get their power?

I am reminded of this notion as I recall my last installation, TRANS-E , My Body, My Blood.[7] In it there is an electronic ritual in which people are intended to pick up artificial energy from technologies when connecting the natural energy of their bodies through sensorised carpet areas. The actions of the body feed the installation. The environment feedback requires the flesh as food. The body is swallowed by technologies and responds following the qualities of the body actions. In the installation TRANS-e, people try to eat the images and when the

images change they show a special emotion similar to that expressed during shamanic trances. To be an elephant, to experience anamorphosis, to be immersed in fire, to move, to interact and to exchange energies. People's displacements and going Oh! Ah! Oh! Ah! Ah!, people's concentration driving and provoking emotional stages.

What happens in this immersive environment? The technological invisible power from neural networks develops mental decisions when grating and tasting pixels qualities activated by the human flesh. The feedback provides spiritual moments through interactive art. The invisible phenomenon forces us to process poetic data from the artists' ideas. Interactive technologies give us power to manipulate phenomena in a spiritual constructive way. The body amalgamated to the system experiences a type of electronic trance.

Intervals of time are constructed by ephemeral mutations. The environment created associations inside the system stimulated by the body ritual. In that way, I propose the interactive art of an installation as a behavioral art in a ritual to be lived. An elliptical zone is set between the body amalgamated with the system in a sort of electronic trance by time intervals constructed when possessing that come situations from the system. Invisible powers move around as electricity and magnetism. The silent, abstract operation of mathematics calculations and energy waves go through the flows. On the other hand, artificial neural networks make mental decisions when chewing and tasting the qualities of the pixels activated by the human flesh. Digital creativity in this installation intends to reveal the artists' capacity and scientists' capacity to invent new worlds loaded with poetic visions. My installation offers stages of trance mediated by technologies.

The electronic trance and the interactions meaning: Content and context of TRANS-E: My body, my blood[8]

People say that the walls paintings of primitive societies are works by shamans whose altered states of consciousness would confer them powers to communicate with the world beyond us and to intervene in the world through a dialogues with spirits. In TRANS-E - My Body, My Blood, digital technologies provide us with an electronic ritual. Bodies connected by interfaces dialogue with computer electronic memories and can experience "virtual hallucinations" in real time.

I offer an electronic trance through digital technologies in a dark room simulating a cavern with lighted images on the wall where people interacting can give life to the environment. I simulate a cavern to offer a space where people can get "visions" with shamanic powers. The cavern is one of the rooms where shamans go to meet the spirits. Their visions are like images of light that appear over the walls. According to the researchers theories, shamans believe in that the stone has power. To the shaman the walls are alive and during the trance lighted figures sprout from the stone. The shamans consider the stone a "veil" between their world and spirits' world. In my "cavern" there are two screens. The second one is a transparent screen suggesting a boundary between the virtual and the real. In the back of the room, a big curved lighted wall shows metamorphoses from Northern Brazil's Ingá Stone's pre-historical inscriptions. To stimulate the ritual trance a drum sound repeats an insistent rhythm and the sound of heartbeats is altered by the actions of the bodies. Simultaneously, a red liquid within a bowl

moves according to the infrared waves effects from the heat of bodies. To Afro-Brazilian popular religions, the blood is an offerenda to life.

By interacting, people as shamans, dialogue with the world beyond through the responses generated in the invisible and enigmatic world of data. During the journey with the spirits, the shamans materialize their visions through the drawings, which provide for other visions. Interactive technologies "materialize" the invisible data in ephemeral connections with electronic memories. Participants have visions where the reality is distorted and they go into unreal and visionary worlds. People say that the shaman's goal is to avoid illnesses, to get rain, and mainly to establish the harmony of the group. In my installation, I stimulate several behaviors through digital technologies to go out of the real world and into interactive spaces which connect psychic energy during consciousness propagations in which new identities can emerge.

Shamans displace energies when interacting people exchange invisible forces with artificial systems. The mutations of the sequences of images and sounds result from the visitor's behavior which is captured by sensors installed on the floor. The dots in turn transmit the body signals to the machines. The variables determining the behavior of the network are the users' position in the space and for how long and how many people stand on the sensorized carpet. The carpet dots send the signals of the bodies in each sensorized stage and from that the neural networks learn some patterns of the participants' behavior. It then manipulates these data and provokes "visions" in the room for an enigmatic experience of TRANS-E. The network recognizes some patterns and interprets signals from biological systems translating them into computing paradigms. Neural Networks (NN) as an artificial brain receive and process the biological signals which it gives back and metamorphosizes them like simulating are managing powers of the beyond. Neural Networks (NN) deals in a non-linear way offering multiples associations or "virtual hallucinations" in real time.

What matters in this living environment it is to provide worlds that we cannot get without technologies. It provides ephemeral connections by the dialogue between artificial and biological systems. Interfaces and electronic circuits are programmed for receiving and transmitting data and the senses of the immersed body become digitized. Thus it experiences a a *trompe les sens* sensorial circuit. When interacting with the installation, the participants experience an intimate digital dialogue between their body and the machine. Through this, people inhabit in an "elliptical zone" or an "interstitial zone" during the symbiosis of the carbon-based life and silicon life.

The installation is divided in three environments simulating three different stages of the shamanic trance. Theoretical approaches concerning these three stages inform that the shaman can experience three levels during the trance.

In the first stage of the shaman trance, people only experience sensations of light and mutations in a neurophysiological way: brilliances, colors, scintillations, flashes of lights, dots and fadings. The mind is stimulated by those images and everybody has the same sensations. The images depend only of the biological apparatus and they have no symbolic or cultural weight.

In the second stage of shaman trance, shaman experiences images loaded with religious or emotional significance. In my installation the participant interacts with crosses, chalices, lilies, swords, snakes, and other symbols whose interpretation depends on one's cultural background. The images invoke personal and individual experiences stored along life. The mutations call out to data from religion, geography, ethnic, political and social condition and change according to habits, emotions and other individual experiences. Many worlds can appear in the participants' minds.

In the third stage of shamanic trance, the shaman experiences the deepest level of the trance. In this moment the shaman goes into turmoil. It is then when actual strong hallucinations take place. The shaman identifies with animals, is attracted by lights, and envisions natural phenomena such as volcanoes, water, sky, stars and the moon, which immerse the shaman in a kind of whirlwind. In my work these images appear mixed with visceral views and the participant can distort to ephemeral identities.

It's fascinating to be able to capture invisible forces and control physical phenomena when we define the "life" of the interactive work. Biological and artificial systems dialogue provoking an enigmatic experience of TRANS-E. Interacting people gain shamanic powers while inhabiting an elliptical zone in a symbiosis between analogical and digital, organic and inorganic, real and virtual.

The body and the unpredictability of complex systems.

Within this immersive environment, where the body is closed, the body experiments with unpredictable states originating from concrete experiences mediated by technology. The interfaces of interactive systems transform each locomotion into algorithms that the computer analyzes instantly using a program based on artificial neural networks.[9] In "TRANS-E, my body, my blood" the time, place and number of people determine what images appear on the big screen on the back of the room, which is similar to the wall of a cavern. The neural network receives the body signals and decides what mutations happen within the room. The body acts and the consciousness of the actions come back to the body which is not in total control of the environment. Bodies respond by a sequence of actions which construct the environment during some levels which are out of control. Different from other interactive works, the entire system is the response and not limited to free choice. The bodies converse with the emptiness of the environment and the computer combines and projects images and sounds picked up from a database. [10]The neural networks are mathematical models with the capacity to manage data, and try to simulate how the human brain works. Although they are quite limited, they develop several functions to learn to recognize data.

The main characteristic of neural networks is their capacity to decide, to learn and to give back the proposed problem. The neural networks give properties to this installation similar to an auto-organism. The NN works with genetic algorithms. During it work, a given input can generate different output. The environment is allowed to live emergency states. Within this environment, which is an auto-organism, we can verify the characteristics of neural networks in their capacity to adapt themselves to the conditions of the environment. The adaptive

behavior is characterized by the ability of an agent to interact and adapt itself to the conditions of the environment. In this way, the neural network uses an algorithm called backpropagation. The sequences of backpropagations become elements that stimulate new states of consciousness propagations connected to the machines.

The environment capacity of regeneration

During the development of adaptive control, the neural networks measure, in a continuous manner, the state of the environment where they are working, compare it with the goal of the control, and use the verified difference to adjust parameters of the system, ensuring the performance of the environment. The adaptive control system is able to continuously evaluate its own performance and can modify its parameters. Consequently, the NN has characteristics of self-organization, causing the environment to live, to die, and regenerate itself. The NN manifests its capability of self-regeneration through backpropagation algorithm, which organizes the NN as amalgamated structures. This method of programming enables a limit of error similar to the physiological human system, which would not be possible with a traditional program because traditional methods are mathematically exact in their solutions.

With "TRANS-E, my body, my blood" I want to offer poetic moments of a metaphoric trance through interactive systems. Concerning to Edmond Couchot,[11] the trance I propose is to transform "*information that happens in real time, related to the speed of the computer and to the efficiency of the algorithms, giving the participant the impression of interacting immediately and without intermediaries - without media - interacting with the images and sounds produced by the devices. This is the reason of the multi-sensorial and entrancing experience*" .

Cognition and Concrete, Incorporated Experiences

Interactive installations bring up the idea of cognition as a concrete experiences. When the body is connected to technologies it provokes a process that incorporates the environment in which it is immersed and can experience "interstitial times". I take a metaphorical approach about electronic interactive rituals experienced in "elliptical zones", where human body's concrete actions elicit exciting responses in real time.

Concerning body, experience and cognition, I agree with Varela's theories about the body's capability to lead perception through actions.[12] I agree with his ideas about cognition as "*concrete, incarnated, in-corporated, embodied*" actions. Cognition is inside the experience of the body performance. Cognition is a guided action that implies on the environment perception and possession. Interactive Art proposes events. These events put us into the concept of the present time. Time is an immediate present to alive. A concrete present that puts us in connection with the living World. When we are connected with digital technologies, they act as agents separated from our bodies. By interacting we are connected and we guide and are guided by external agents. Artificial systems and biological sensorial apparatuses ratify the relationship with silicon networks and biological systems in connection with each other. Flesh and silicon. Blood and electricity. In this ecosystem, the whole regenerates itself into a mosaic of networks and sub-networks in complex relationships where the whole is more than the sum of its parts. The whole is the unpredictable connections.

In this way, the world is recreated by the stories of structural couples. Cognition, as stated by Varela, is "enaction" which requires a body to have an experience. Perception and action are inseparable. They work together to recreate a world through structural couples. This is Varela's "enaction." In my installation, the guided experience through constructed actions in one immersive environment allows the participant to reconstruct something pre-existing in the electronic memory. My installation requires for structural couples. It implies a complex and dynamic conception of ecosystem where a lot of microworlds are activated. It asks for biological disposition of being implicated and stimulates consciousness states generated by concrete actions. Interactive Art is composed of constructive paths offering cognitive moments related to the body and the way it behaves. Behaviors of bodies and behaviors of machines make responses which form the present time, thus interactive art is transit and ritual. In both of these situations the body is called to be used, and when the body is used it processes cognition as living experiences.

Behavior and emergency

Working with the interactive systems creates a physical situation which is determined by the presence of the body and by the presence of the computer system as well as the behavior of each. Complex behaviors can appear as a result of several simple behaviors. The central idea is the emergency state. The self-organization of the environment can only be determined by the total behavior of the systems and how that behavior appears in the relationship with the environment. A world emerges through cognitive agents and the action precedes the representation.[13] This means that the body connections work within the room and determine the emergency of new states of the installation. Cognition comes from the presence of the body which is not separate from the body, its language and its story. The body's action in this world make each participant an agent of the interaction. The cognitive system creates its own world that results from internal aspects and preexistent aspects that mutually or in co-determination define the world.

Feedback, phenomenon and elliptical zones

The living experiences received from the feedback of the environment provides spiritual moments through interactive art (IA). The invisible phenomenon forces the poetic data of artists' ideas. IA gives us the power to manipulate phenomena in a spiritual and constructive way. I highlight the new sensorial-perceptive field, which needs to be explored more through the interactive art. I look forward to possibilities of constructing our own mental process and subjective flows using the emergent properties and the unpredictability of digital art. Technologies like separate "entities" which we embody because they are more than sensorial extensions. Digital technologies work as synthetic bodies and immerse ourselves into cognitive stages. We inhabit propagations of consciousness in a symbiosis with externalized software minds. Our flesh body connects to interfaces enabling us to be in an "eliptical zone". Body *attimos* in these intervals is what results from the simbiosis of artificial and biological systems.

Interactions, *Attimos,* trance and ritual

The interactive system stimulates the biological system. On the other hand, the body as a living organism, in one's own way, stimulates the environment. The trance that occurs in the installation is provoked by concrete experiences in that very moment and place - in states of *hic et nunc* maximized by interactions which are enhanced by intervals or *attimos. Attimos*, in my installation, are present moments built up in the intervals of the simbiosis of the body and the system. The present time is only a present in itself that occupies an interval. By interacting, an interval occurs through the transit of the data which becomes a living and present time.

Interactive art is related to rituals and requires the repetition of actions through devices that respond in real time, simulating a kind of or ceremony mediated by technology. According to the Italian philosopher Mario Perniola, he says of trance and ritual that the trance state does not demand only to repeat something as a dynamic experience. [14] Trance means taking possession of the present time. He defines the present time of the trance as *attimos* and not instants. Instant is a mobile boundary between past and future with something always lacking, whereas *attimo* is a present time connected to an experience of time in total possession. It is in this situation of constructed time during a living experience of time totally possessed that interval zones are generated. In the installation the intervals are interstices between things placed close together at the same time by the connections between the body to the technologies. This idea of present time, which comes from stoic philosophy, permits the body to inhabit an unfolding physical and conceptual existence. The exchanges produce chains of meanings in a sensitive multiplication of experiences. The body exists on the measure of its connections. The stoic aesthetics of the ephemeral, of the mutant, of the indefinable is confirmed.

Interactivity and in-corporated entities

In interactive art, the body experiences the cognition connected to the external entities of networks and sub-networks of technologies. To interact is to incorporate subjective states stored in the database. To call those identities is to provoke the complex process of exchanging information related to habits, ideas, fears, believes and desires. In Afro-Brazilian rituals there are entities such as Ogum, Oxum and Iemanjá which a person can incorporate. The entities are called "guides" of our identities. To attempt this altered state of consciousness, the body is asked to spin round, smell, talk, sing, and do other participating actions. The set of actions determine the incorporation though the repetition of ritualistic structures that construct the present searching for the state of trance.

Ritual, cannibalism and identity

The metaphoric trance that I propose is not related to the sacredness of rituals. It is only an electronic ritual. In rituals, the body is offered during the ceremonies. The idea of sharing the body is common in several rituals of different religions. In Christianity, body and blood are offered to be eaten and drunk. "This is my body, this is my blood" implies an invitation to act as cannibals. The body is also present in other rituals and cults which offer the body and blood

of animals. Similarly, in my installation, I ask for the action of the body, and I offer blood. Something that looks like blood, not real blood, which keeps moving inside a bowl which is triggered by the heat of the other bodies captured by the infrared sensor. The bodies of the participants are also swallowed down by the electricity and sent to the machine.The participants don't know that there is a net of electricity connecting the body to the device. In my cavern, not one body can escape. I offer the flesh and the blood of the bodies and I return sounds and images to them. The dialogue of the bodies with the interactive systems gives to the participants my poetic intentions. With my ideas, I give the reverse side of my body as my sensorial apparatus and my cognition about life. During the interactions, people can collect sensitive moments and they revitalize the *"bricolage"*, in the anthropological manner of Lévi-Strauss.[15] The interaction in this environment offers the knowledge of scientists and artists in a mythopoetic way because when we interact we are recycling data in an open-ended way. By interacting we are immersed and we have experimental attitudes of scientists and *bricoleur* artists during epiphanic moments. By interacting, participants collect ephemeral ideas and processes their symbolical power which feeds the human desires to get to other stages of life. Interactive systems enable people to eat the artist's ideas and backpropagation neural networks place the human central nervous system into sensitive moments. The poetic substances implied in these exchanges result in several modifications to our previous state of consciousness. The unpredictable   phenomena project us into new paths of self-identity. Artists are leaders of subjective matters and are similar to the shamans who lead the spiritual life of their tribes[16]. Interactive art works with the body of people, putting them into a living spiritual process. Interacting people as cannibals try to incorporate other identities, getting their power. Interactive Art is a fertile field for artistic and scientific research to spiritualize humanity in the post-biological era.

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[1] The presentation will be illustrated with a videodocumentary and CD ROM of Diana Domingues' interactive TRANS-E , My Body, My Blood.

[2] Domingues, Diana.**. "Mechanistic Baggage"** - In: Net Symposium FleshFactor, http://www.aec.at/fleshfactor/arch/ Ars Electronica netsymposium, Sherman, Tom, moderator, 1 Jun 1997, 14:43:33.

[3] Idem op cit 2

[4] Annick Bureaud said about that kind of experience: "une *exploration physique et psychique de l'imaginaire de l'autre dans une confrontation avec son propre imaginaire, ses peurs, fantasmes, désirs"*. Bureaud, Annick. **"La Pensée Électronique".** In: Sicard, Monique (Org.) CHERCHEURS OU ARTISTES? Entre art et science, ils rêvent le monde. Éditions Autrement – Série Mutations nº 158, 1995, Paris.

[5] Domingues, Diana. **"The Desert of Passions and The Technological Soul" -** In**:** Digital Creativity Vol 9. Swets & Zeilinger, UK, 1998.

[6] Piché, Jean. "Cyber Cerbère", in response to Tom Sherman's text, "Machines R Us". In: Sherman, Tom, "Personal Human CD", co-production Kunstradio and Ars Electronica 1977, ORF KUNSTRADIO, Vienna , 1997

[7] TRANS-E , My Body, My Blood, interactive installation, ISEA, The Eight International Symposium on Interactive Arts, Chicago, 1997. The installation is an integrated research that responds my interest and possibility in using scientific research in the field of art. It results from my situation of working in the group: NOVAS TECNOLOGIAS NAS ARTES VISUAIS in the Universidade de Caxias do Sul , Brazil where I work with people from computer sciences, industrial automation, and arts. Technical team: Software and Neural

Industrial Automation LTP/UCS Eng. Getúlio Martins Lupion Mateus Mugnol, Andre Luiz Bridi - Images/ multimedia production Tatiane Tschoepke Fonseca, Carine Soares Turelly,Lilian Maschio, Edson Salvati - Sound Maria Elena Soares Gallicchio, Edson Salvati, Roberto Mugnol Tatiane   Tschoepke Fonseca - UNIVERSIDADE DE CAXIAS DO SUL - Brazil - CNPQ - FAPERGS

[8] Text included in the catalog "TRANS-E , My Body, My Blood", interactive installation, Dominges, Diana, Ed. da UCS, 1998.

[9] Concerning multimedia production, sensorised system for the acquisition and communication of data and neural network, see the information stored in the reports of the research group and in our website: http://www.ucs.tche.br/artecno.htm (coordenação, installations, integrantes)

[10] See, Couchot, Edmond's text " *Entre La Transe et L'algorithme, 1998*, in the catalogue of the exhibition TRANS-E , My Body, My Blood, where he comments the trance states proposed by the installation related to the idea of digital systems.

[11] Idem op. cit 10.

[12] Varela, Francisco, "Il reincanto del concreto". In: Capucci Pier Luigi, " Il Corpo Tecnologico, l'influenza delle technologie sul corpo e sulle sue facoltà", Bologna,Baskerville, 1994.

[13] Teixeira, João de Fernandes, Mentes e Máquinas, Artes Médicas, Porto Alegre, 1998

[14] See Perniola, Mario, "Transiti, come si va dello stesso allo stesso", Bologna, Biblioteca Capelli, 1989

[15] Strauss- Lévi, Claude, La Pensée Sauvage, Paris, Librairie Plon, 1962.

[16] See Roy Ascott's theory related to telematic, consciousness and interactive art. Ascott, Roy, " Cultivando o Hipercórtex". In: " Domingues, Diana (org.), A Arte no Séc. XXI: A Humanização das Tecnologias, Ed. da Unesp, São Paulo, 1997.