

Swap-Project Cycle:

the body and its technological expansion (2000-2007)

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This article puts forward an assessment on the practice, insight and methodology of a set of projects developed between 2000 and 2007 by **Swap-project**, art collective founded by Rudolfo Quintas and Tiago Dionísio, from a **transdisciplinary perspective on performance art and new technologies**.

These projects were given shape in **interactive multimedia installations**, inscribed in the genre of performance art and in staged **interactive multimedia performances**, developed in collaboration with the choreographers João Costa (*Swap 2005*) and Andreas Dyrdal (*eDGe 2007*). During this period of time, interfaces and software in the frame of human-computer interaction were examined and developed, in the fields of computer vision, computer graphics and sound, **exploring a dynamic feedback loop occurring between a body and an interactive audiovisual system**.

In the installations, this technological practice has matured along with the attempt **to engrave the participant subjectivity within the work**, suggesting a new cybernetic set regarding the dynamic feedback loop that is created between participant and system. The aim of this set-up was **to turn the work into an integral part of the being, in an emotional and formal sense, and in direct confrontation with the participant's interpretational ability and contemplative dimension**.

The creation of visual or sound formal contents was pondered aiming to generate an expanded action and experience for the participant, where we have attempted to offer an endlessly

variable kinesthetic vocabulary, based on a flux between determinateness and randomness.

On staged performances, the technological practice has evolved towards what we might view as the **development of software modules inspired by a dramaturgic thought, capable of producing ideas, symbolic ideas indeed and not necessarily narrative.**

To summarise, the developed practice embodied, and implied, the understanding and expansion of concepts such as augmented reality, perceptually-motivated mappings, extratemporality, tele-physicality, transdisciplinary cybernetics, and adaptive composition.

Keywords: **augmented reality, perceptually-motivated mappings, extratemporality, tele-physicality, transdisciplinary cybernetics, adaptive composition**

Body as Setting

“... we should almost surely admit that discourses and practices operating on the body are, in reality, deliberate producers of the *body’s meaning*” (Bártolo, 2007: 5-6).

The body as *subject matter, support/medium, language or interface*, has been a critical element in the 20th century history of art. As a matter of fact, different art fields – such as performance art, new media (video-art and sound art), biotechnological art and interactive art (local/online) – have expanded the ways we understand and experiment the body and relate to it.

Swap-project explored the non-verbal stimuli potential and uniqueness, the actions developed led us to consider the body as a ‘living screen’ (Fig. 1), a support carrying a meaning in itself (Vergine, 1974/2000); as interface, the body has been often analysed and mapped through organic and intuitive procedures when interacting between physical or audiovisual cybernetic systems, in line with the commentaries by Marquard Smith on Stelarc’s work (Smith, 2005).

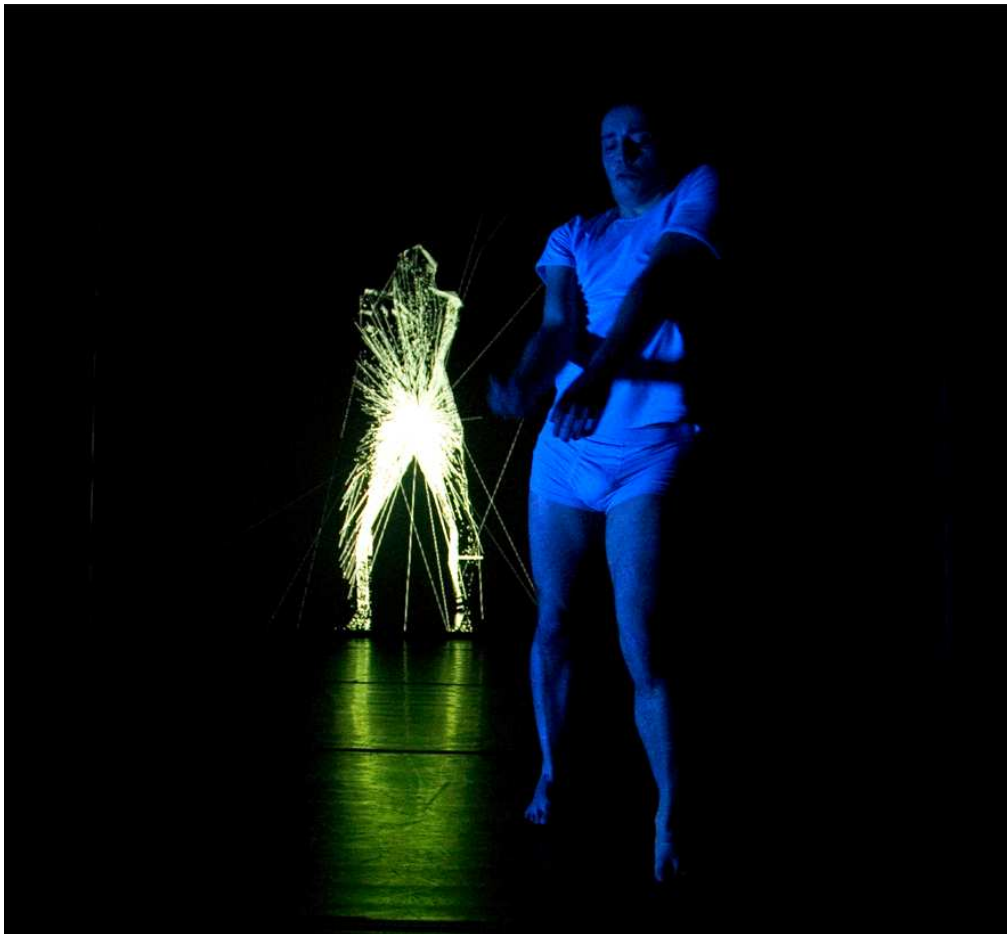


Fig 1: Photo by Susana Neves, João Costa in Swap – Rivoli Municipal theatre, Porto (Oct, 2005).

Artistic research on and with the body as a central issue, in several formats and supports, has contributed to expanding one's awareness on this subject. These approximate attempts have, thus, contributed to **a redefinition of the meaning of the body, from the perspective of its expansion, providing a renewed understanding and allowing new paths for its physical and imaginative exploration** (Fig. 2).



Fig n2 and Fig n3 form left to right: A group of persons in *Displacement* installation in front of the projection image and backwards to the lighting background. Right side image, a group of persons represented in the projection screen, Labirintho Gallery, Porto (Setp. 2004).

According to Valerie Steele, "the various forms of discipline we inflict on the body, mark it, shape it, torment it, and force it to emit signals". Within the set-ups created by Swap-project, the body, in need of understanding and adapting to that territory where it is being reformulated, emits signals that indicate a constant attempt to define the milieu where it sees itself in.

Swap-project background

Projects developed by the Swap-project collective took place in this specific realm – the realm of the body – in the sense that they have **implied simultaneity of the body as language and as interface, without directly having developed it as a theme**. In *Overlap*, for example, the body is both language and interface, although the theme is to be found in the range of non-verbal communication, and within **the learning and adaptation processes intrinsic to**

human being, thus, designing an installation that questions these very processes; in *Displacement*, the theme was connected with the **interpretational dimension**, translating the body as an audiovisual hyper-instrument; as for *Swap* we have strived to **radically question the limits of our perception and the borderline between outer and inner spaces of the body**; at last, in *eDGe*, **the contemporary dimensions of portrait and landscape were problematised** (Fig. 3).

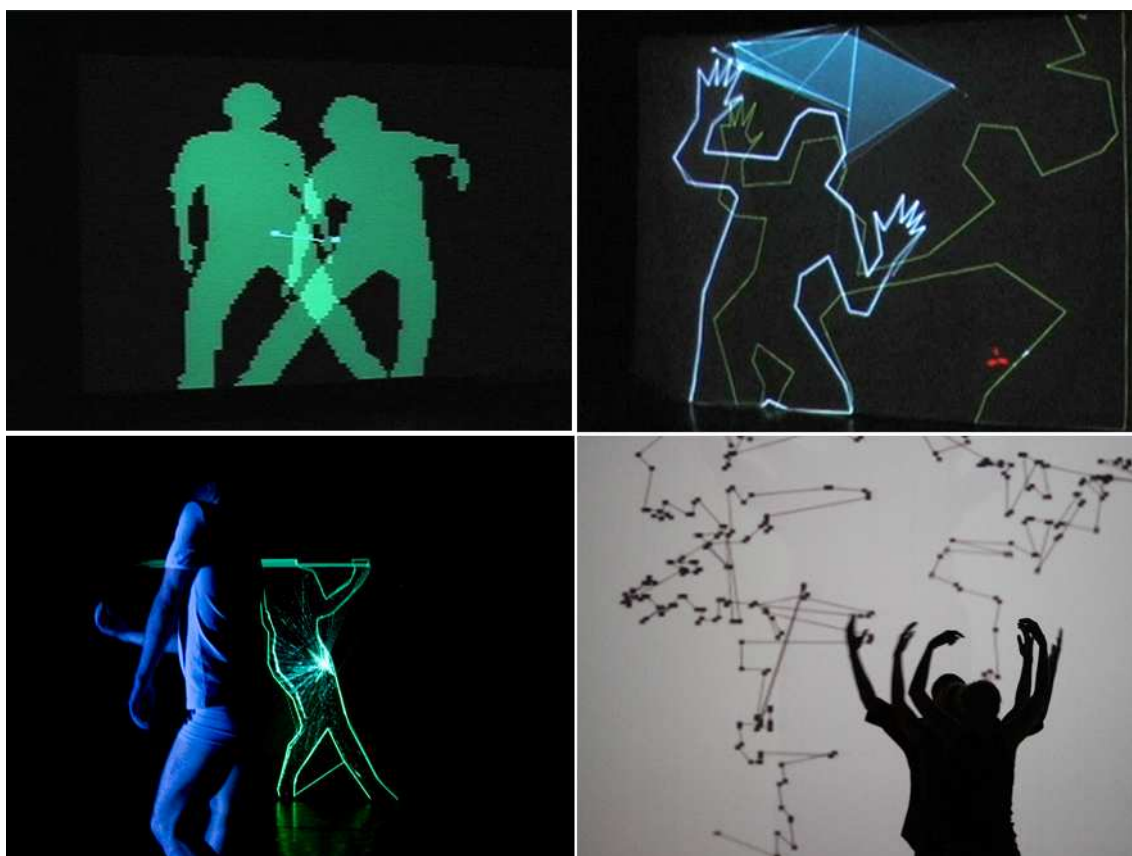


Fig n3 – From left to right and top to bottom: *Overlap* (2003), *Displacement* (2004), *Swap* (2005) e *eDGe* (2007).

While the practices developed by Swap collective are rendered into body-related concepts, the primary motivation was not directed to the study of the body. The body, nevertheless, is reflected on the process of creation in itself, particularly with relation to interface design and the system's interpretation of the body.

Within the scope of the Swap-project collective, the conceptual intermingling between body and technology was growing mature. The first experiment happened eight years ago with the interactive installation *Esquizofrenia e Capitalismo* "schizophrenia and capitalism" (Quintas, Rudolfo 1999/2000), wherein the body is mediation, interface and visual support, which adopted a thematic that leads the participant into confrontation with her/his multiple possibilities of being.

Over the course of the following years, the Swap-project developed towards the exploration of concepts and approaches which were only possible to materialise and experiment due to new technological accomplishments (Fig. 4).

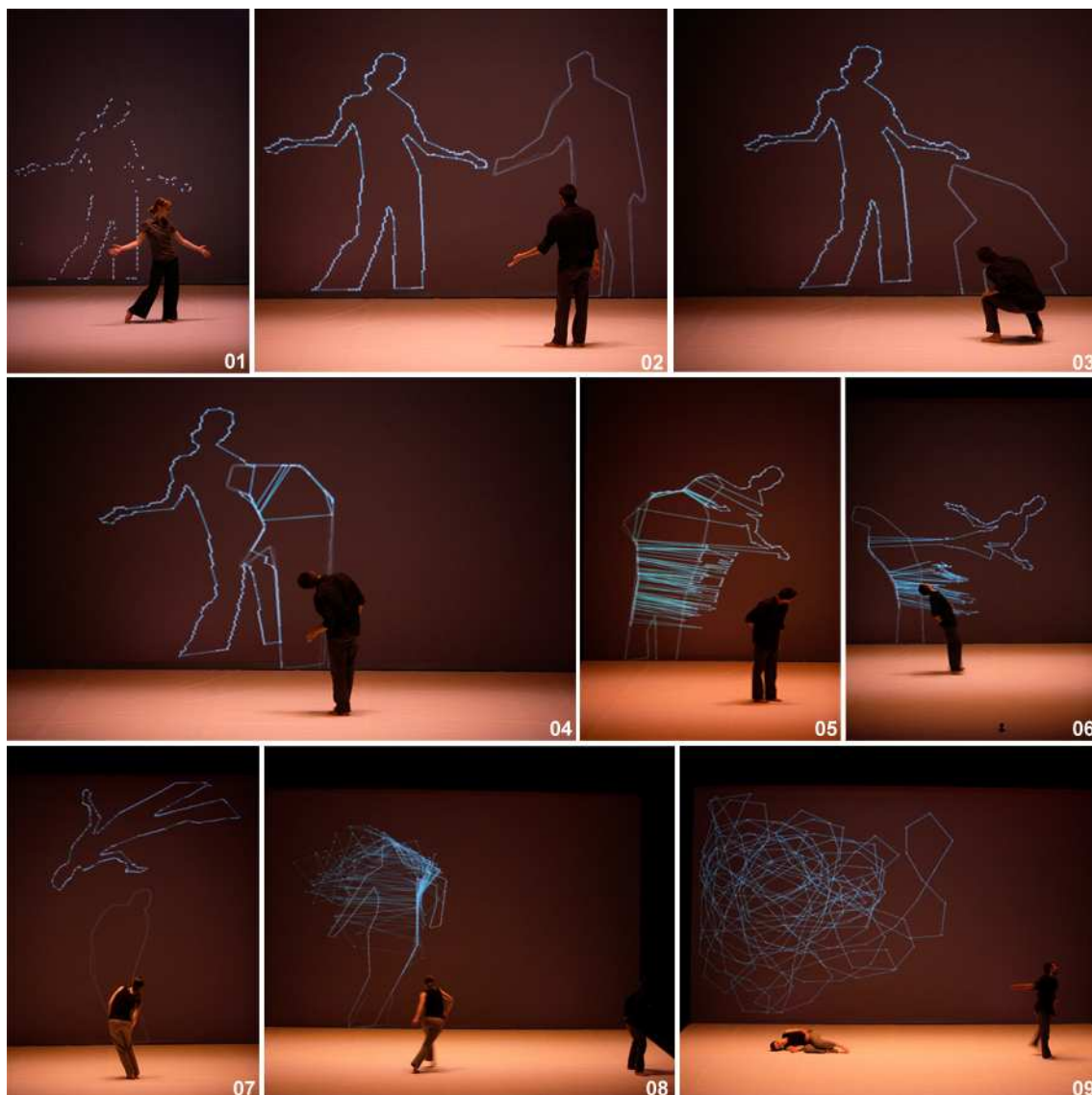


Fig 4- Sequence on eDGe (2007), photos by Susana Neves, from left to right and top to bottom: image 01 the performer Isabel Souto leaves her presence on the stage by the means of her visual representation on the projection screen; **image 02 and 03** – the performer António M. Cabrita gets closer to Isabel's image; **image 04, 05, and 06** – for the first time António establishes contact and relates to Isabel by the means of interacting with her image; **image 07, 08, and 09** – subsequently Mariana Tengner enters on stage and starts to relate with Isabel's image. By that moment, the image that represents Isabel's presence already has a behaviour affected by António. Teatro Nacional Carlos Alberto ("Carlos Alberto National Theatre") Oporto (May 2007).

Rudolfo Quintas and Tiago Dionísio have, in this way, developed propositions in the realm of contemporary art by causing distinct art disciplines and computer sciences to converge, **expanding the body's experience to the advancement of a new artistic language.**

Is there a Swap-project language?

The arising of a context, in which one notices to be working with a new language, happens the moment one feels the plastic universe of the existing languages overflowing, while prevailing composition models alone cannot adequately respond and act.

There is a formal and conceptual interdependence between the various languages employed in the projects developed by the Swap-project collective. By way of illustration, in *Displacement*, the body has to become an image so that a sound composition may exist, and **the production of such image is a performative act**. It is through a body language that a visual language (up)surges and brings about another one, a sound language. In this sense, projects that were developed are bearers of a transdisciplinarity, that is to say, a language that is formalised by the intersection of different disciplines.

This process is not new and may be understood historically through the term "intermedia" (Higgins, 1984: 138), a concept coined by Dick Higgins in 1966, a formal category to define a inter-relation between different representation forms that fuse to define a new medium.

In fact, this was a central approach in post-modern art, opposite to the historic tendency of modern art, which has organised itself around specialisation or purity – pure painting, pure music, pure dance, pure poetry – that, by the end of the 1950's, was broadly breached with the introduction of performance art (Kaprow, 1993).

Still, in reality, the worth of an art project derives from the pertinence of the concept and its corresponding validation. Transdisciplinarity is, thus, being debated at the formalisation level without a framing *vis-à-vis* the relevance of the consequent transdisciplinary concept.

Composition processes: cybernetics as transdisciplinarity

The transdisciplinary approach to the projects that were developed was applied in articulation with the concept of cybernetics. Cybernetics can be understood as the study of communication and control mechanisms, living organisms and organisations; this discipline implies a feedback process where A acts upon B and B acts again upon B, in a cyclic, autonomously regulated, process. It is precisely from this concept, of cybernetics, that one can explain the composition structure and process that occurs between body and system in real time. Based on this assumption, considering A as the body and B as the audiovisual system, we can understand the body as the feedback loop where A (body) acts on B (the system) and B acts again on A. The distinctiveness of the systems developed and their resulting expression is that B is not an agent external to A but it is formally generated by A as an emotional extension of the body language. In other words, A and B combine in one element that we can denominate as C. The Swap-project, then, grows upon the following equation: A (body) acts on C (B+A) and C acts once more on A, therefore, **creating a unique cybernetic system.**

Hence, **the concept of cybernetics also provides an adequate model for examining the organisation of relationships between different disciplines.** This model is based upon codification and de-codification of data from different media, focusing on building the matrix that best suits the project's concept. The relationship between data from different media is analysed not only in terms of sound/image, but also within the range of the relation between perception, content and body motion, and the action achieved through the way how the interface processes information.

Gesture and Movement as Interface

Our understanding on the body's technological expansion is, then, a form of subversion, a quasi-intuition reacting against technologies that render our body obsolete, as Stelarc has been theorising and revealing.

Our motivation was to make the body that feels, experiments, shares and is shared, more visible, assigning it a questioning role. Such questioning takes place when **the participant has to decide whether he wants to experiment the work, that is, when the individual is confronted with**

his/her being-acting. It is the participant's decision that materialises the work; it is not the artist's decision. Decision that may invoke a myriad of distinct feelings and reactions: fragility, tension or a possibility of extroversion. Whatever the reaction, the fact that there is a direct confrontation with the self is what matters the most. And such confrontation is always positive. It is in this sense that our work on the body is political. Not as a theme but as an approach (Fig. 5).

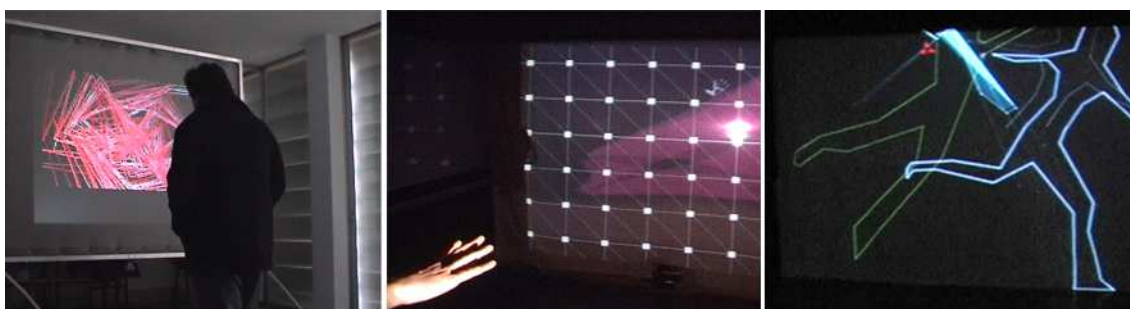


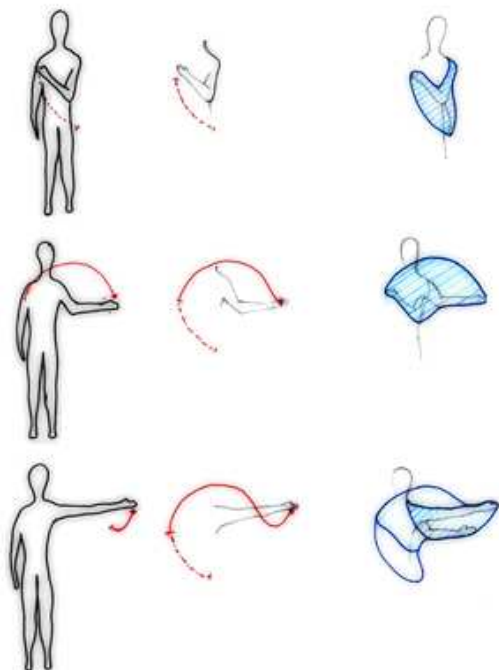
Fig 6: left to right: *Transfigurações* (2003), *New Media as Cyborg* (2000.2001), *Displacement* (2005).

In order that such approach would prevail upon the project, it was necessary to find methods and tools to accomplish it. Those tools and methods belonged to the realm of interfaces. The interfaces' development and maturing started at the Masters in Graphic Computer and Virtual Environments Engineering at University of Minho, where the fields of perception, psychology, anthropometry and kinesiology were studied within an empirical dynamics, so as to absorb and capture the body's implicit messages, which Hashimoto (1999) designates as KANSEI Information Processing (KIP). KANSEI, an emerging field of research developed at Waseda University of Tokyo, in 1997, although related to emotions it does not equate emotion, but refers to the ability to process data in ways that go beyond logic. According to this theory, two channels in human interaction have been identified: one conveys explicit messages (in binary yes/no language), while the other imparts implicit messages about the very people. Both multimedia technology and linguistics, throughout the past 20 years, have been investing great effort to understand the first, the explicit channel, whereas the second has not been subject to much study, only to be worth the attention over the last few years.

Understanding emotions is one of the tasks ascribed to the second channel, that of the implicit messages. In order to meet this objective, signal analysis and processing techniques should be developed and simultaneously consolidated with the psychological and linguistic analyses of emotions. Following this line, the developed interfaces explore computer models of gesture expression with the

intention of capturing the user's subjectivity, considered by some as "expressive content" (Camurri, 2004). Camurri states that "expressive gesture", as he endorses, is what Cowie and his peers designate as "implicit messages" (equivalent to the Hashimoto's KANSEI). It is important not to disregard the fact that 'expressive content' differs from one person to another and, in most situations, such difference is not connected to its potential meaning. The expressive content is related to aspects linked to emotions, states of mind, pertaining to the intensity of the emotional experience (Camurri, 2004).

A recent suggestion, researched during the course of Rudolfo Quintas's artistic residence at the Institute for Systems and Robotics of *Instituto Superior Técnico* within the program *Experimentação em Arte, Ciência e Tecnologia*, consisted in a formal model which brought about the development of a in-progress software application for **shape and dynamics analysis generated by a gesture spatiotemporal place. It is from this analysis that it is then possible to represent and augment a gesture under a new creative artistic concept (Fig. 6).**



"Gesture Space-Time Shapes for The Augmented Body"
Sketch Drawing by Rudolfo Quintas 2007

The gesture became, in this way, a privileged working field for interface development. That territory started to particularly attract our interest in so far as **the gesture displays the individual's unique features and, in my opinion, these are the foundation for the creation of a new plasticity.** Such uniqueness is not only reflected upon the gesture as body language, which dance and performance make use of, but also distinguishes our spatial writing's signature.

Fig n07: conceptual model for a gesture spatiotemporal dynamics and shape representation.

It is the implicit message that delimits the singularity between two signatures. It is that implicit facet, the way words are written, their rhythm and intensity, as well as

the individual's emotional state at a given point in time, which draw up the boundaries of the written signature and, as a result, identify the person.

New Plasticity: from mapping to body augmentation

It was within the described context that the use of the gesture in the developed projects had been evolving, from a starting approach where the gesture was viewed as an interface for manipulation of visual and sound forms, several mapping strategies between real and digital space having thus been developed (*New Media as Cyborg*), to a subsequent perspective that understood and explored **the gesture as originator entity of the very formal contents** (*Displacement*), **strengthening the aspiration of turning the individual into an object (artwork) and the object into an individual. The perception of the gesture as an originator entity makes that, *a priori*, there are no contents to be manipulated, forms being created through the body (Fig. 7).**

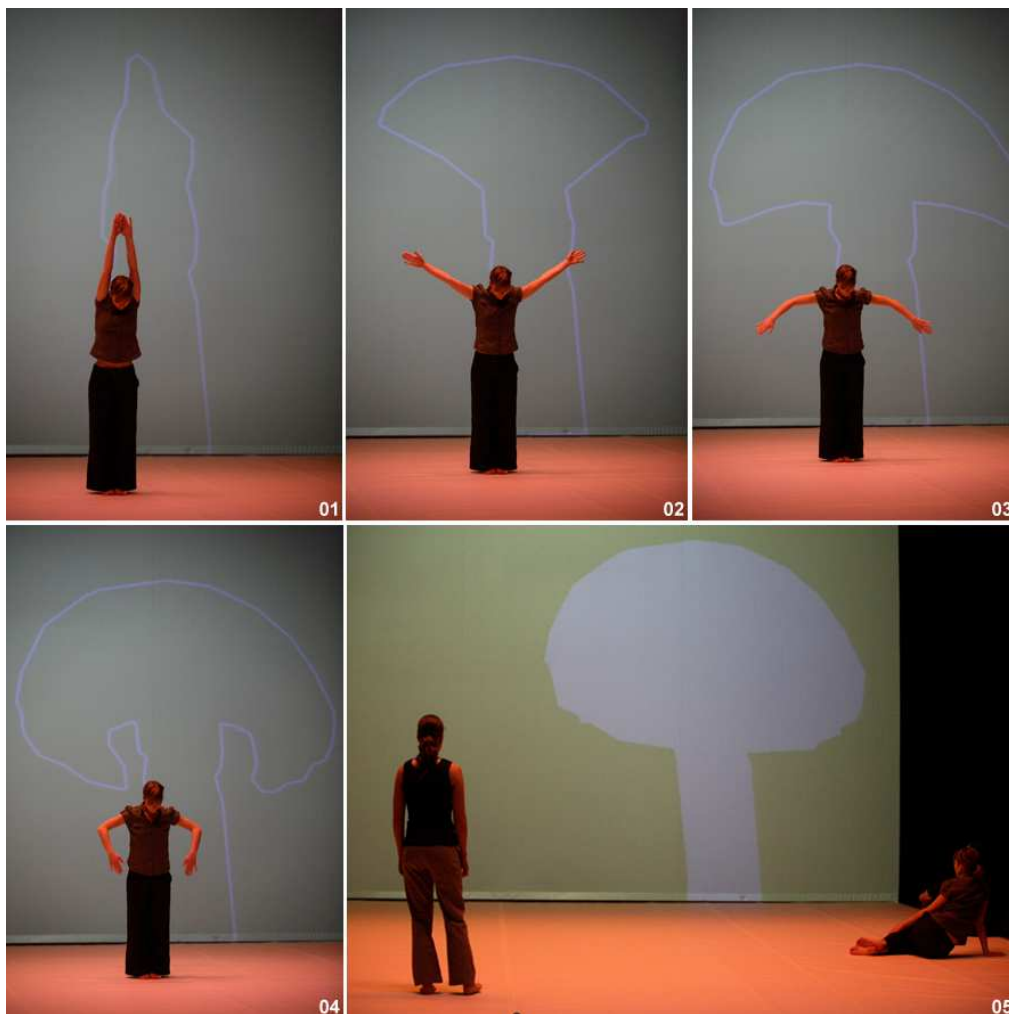


Fig. 7: Isabel Souto creating a shape that will be subsequently manipulated by Mariana Tengner

These insights on the relationship between physical and digital space are not independent poles, in as much as they can be seen in sequence. **We can then understand how the implicit side of gesture becomes a motivator for the discovery of new plasticity; the gesture carries the individual's emotional and physical characteristics and the transformation of these features makes the generated contents unique, as if the individual's audiovisual signatures.**

In this sense, **it is important that the interface does not impose on a certain type of gesture or pre-defined body motion; otherwise, it will constrain the individual's singularity and expression, in which case it would be felt as a device, a gadget or technological paraphernalia.** For example, an interface that makes people constantly perform the same kind of gesture or body motion would be using the explicit side of gesture, bringing the body near to a (on/of) switch. As a rule, an explicit interface would format people's bodily action, instead of expanding the limitlessly plastic possibilities intrinsic to bodily shape and action. We were, hence, interested in **augmenting corporeal experience in a technologically expanded dimension, technology being a process that drives people to rediscover themselves by using their bodies.**

At the same time, the ritual inherent to the contemplation of a piece was gradually reconfigured because the individual had begun to see himself interpreted and re-contextualised, becoming not only the subject who interprets, but also subject to interpretation by the art piece.

Artistic research to be developed will, then, be on the path to discover processes for analysis, representation and expansion of these unique characteristics, formalising them in such a way that **they may carry new meanings.** This underlying attitude was present in projects such as *Displacement* and *eDGe* where the very shape of the body is a definer of contents, beyond the mere manipulation of contents through gesture and motion. These contents are created through perceptually-motivated mappings; in other words, one observes the establishment of a cognitive relationship, which operates in the field of perception, where meanings are produced between the performed gesture and the animated figures and sounds – a semiotic approach to body and digital contents. These relations deliver synesthetic qualities that point towards an infinite variation, tremendous plasticity, and a formal imaginary of their own in the expression of an interactivity relationship (Levin, 2000).

Composition Methods: from improvisation to Adaptive Composition

The way these contents were composed, in the installations as well as in the pieces directed by a dramaturgy, **transcended the mechanisms of improvisation or those of structured composition**. At a first level, contents were composed bearing in mind the feedback loop and, while generated, they were activated by equations in which chance elements were inserted. **It is in the balance between control and randomness that the code takes on an aesthetical dimension as the parameters that were introduced are numbers which embody a decision pertaining to the sensitivity level**. This relationship initiates a new composition context since it is impossible to predict the dimension of randomness at the same time that significance is ascribed to that relation.

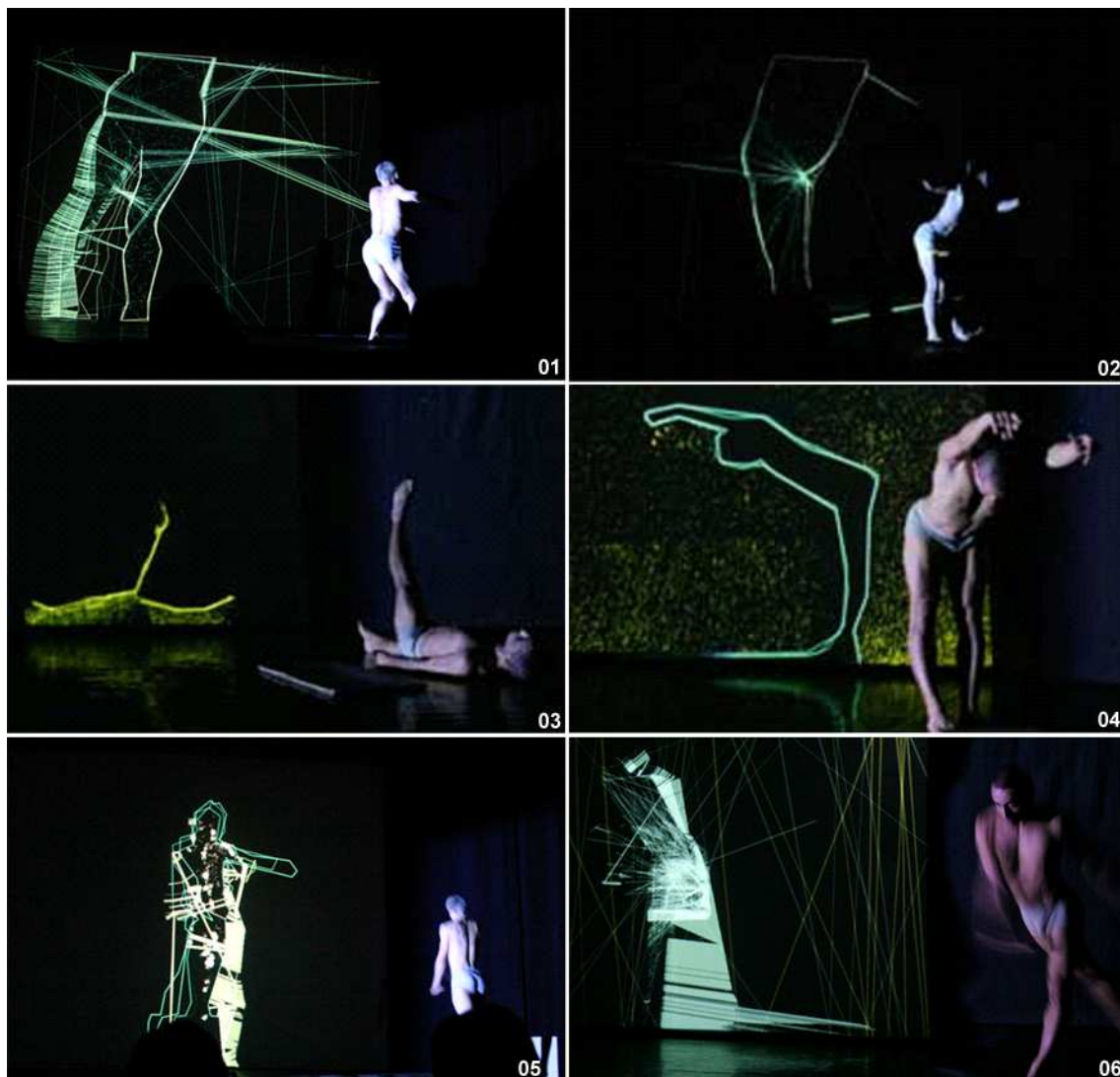


Fig 9: Sequence that represents different moments in Swap performance where the performer João Costa is in constant adaptation and dialog with the image generated from the intersection of his movement and silhouette with the particles system.

In *Swap*, improvisation is no longer a satisfactory concept to explain the composition model. **The performer does not improvise, he adapts. He adapts to the aleatory context in an attempt to convey the previously structured meaning.** Significance that does not arise from an inner, emotional, decision, growing deep down inside, but it is an adaptation, also cognitive, that, live, forces it to adapt to the moment's randomness, in the pursuit of the most appropriate movement for the transmission of the previously structures' meaning.

Therefore, it is as if it were an adaptive composition, a hybrid composition between a defined structure and the sense of improvisation, influenced by the performer's behaviour expansion in the digital realm, with which he interacts (Fig. 8).

On the pathway to a new perspective on Augmented Reality

According to the perspectives described earlier – study of interface, generated contents, and composition methods – **we are heading in a direction where reality is expanded into a new path.** With technology as support, it is possible to transgress the boundaries of physics when setting an action. Steve Dixon (2005) speaks of 'extratemporality' to denominate the actions and contents that are simultaneously and interdependently created between two or more times and spaces.

By digitally augmenting time and space, one may connect remote places in simultaneous actions; at the same time, the manipulation of digital contents modelled by the body's physicality – as is the case in *eDGe*, *Swap* or *Displacement* – expands the individual's perception, favours synesthetic processes between touch, vision and hearing, and puts forward what we could conceive of as 'tele-physicality'. Tele-physicality would then be the term analogous to the concept of telecommunication, in the sense that this word defines communication at a distance, as happens for example with voice or vision 'projection'. In tele-physicality, the individual alters a visual object at a distance through his/her physicality – which is spatially located and spatially expanded. Thus, for instance, a gesture's intensity and expression may correspond to the colour or visual path of an object. Such experiments, achieved thanks to synchronous and asynchronous processes that modify our perception and understanding of the world, as well as the way we relate to it, call forth a reformulation of the context and also of the role we may play in it.

In brief, although technological processes were used and researched in the projects that were developed, **reality was expanded in order to question, understand, and feel the body and the world – and this is the research that matters the most in the field of art.**

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