Transdisciplinary Methodology: from Theory to the Stage, Creation for SICMAP

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ABSTRACT

The author's artistic practice as a composer and performer is transdisciplinary. The body as a vector associated with sound, gesture, video, physical space, and technological space, encompasses six essential elements. These give rise to works that stand between music and dance, between musical theatre and multimedia that, with the use of a motion capture system by computer vision, SICMAP (*Système Interactif de Captation du Mouvement en Art Performatif* –Interactive Motion Capture System For The Performative Arts) is leading to a new hybrid performative practice. In this paper, the author situates her artistic practice in the context of the three pillars of transdisciplinary research methodology. The performer-creator describes her path to the conception of SICMAP while, at the same time, she presents a reflection on her "dream instrument", followed by a technical description where, SICMAP is contextualized by way of three theoretical models: the instrumental continuum and the energy continuum, the "free-body gesture", and the typology of the instrumental gesture. Initiated by SICMAP, the "gesture-sound-space", a new expression used by the author, is subsequently put into practice through her work *From Infinity To Within.*

Author Keywords

performing art, multimedia, motion capture system, computer vision, sound-gesture, space, SICMAP, transdisciplinarity, music, dance

ACM Classification

J.5 [Arts and Humanities] Performing arts, I.5.4 [Pattern Recognition] Applications — Computer vision, H.5.2 [Information Interfaces and Presentation] User Interfaces — Theory and methods.

1. INTRODUCTION

Works that stand between musical theatre and multimedia, performances by musicians with new instruments, and events that reach beyond the limits of traditional concerts is what I create. I have dreamed about creating and venturing into new territories. I have chosen to invest myself in this new artistic practice with the same objective as in instrumental practice of percussion that is, to play music in a playful sense, and to create new modes of expression.

In this paper, my artistic practice which is based on the three pillars determined by transdisciplinary research methodology is briefly presented. Then, the course taken by the creator-performer, who goes from an acoustic instrument to the development and the conception of an interactive motion capture system by computer vision, will be approached while elaborating criteria for my "dream instrument" and for the appreciation of my own field of practice. SICMAP (*Système Interactif de Captation du Mouvement en Art Performatif* –Interactive Motion Capture System For The Performative Arts) will be described from a technological point of view, after which I will apply theoretical models with gesture and the "instrument". Finally, this new hybrid performative practice, initiated by SICMAP, will be the object of discussion on expressiveness, the "gesture-sound-space", and the creation of a work, more particularly *From Infinity To Within.*

2. ARTISTIC PRACTICE

As a creator, I envision a work without disciplinary borders. Through and beyond the disciplines, between music and dance, between gesture and movement, between art and technology, the convergence of these domains makes it possible to position my artistic practice in context.

The body, the vector, is at the centre of my approach. It permits me to be in a sensitive universe where the auditive, the visual and the proprioception unite. Transdisciplinarity is the methodology of research-creation corresponding to my performative hybrid practice based on six elements: body, sound, gesture, video image, physical space, technological space [6].

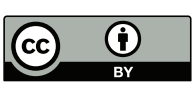
SICMAP is the answer to my transdisciplinary artistic practice. The concepts of this practice are founded on the three pillars of transdisciplinarity elaborated by Basarab Nicolescu: levels of Reality and perception, logic of the included middle, complexity. These principles support the practice of SICMAP, that of the gesture-sound-space [11].

The *levels of Reality and of perception* extend the theories and practices of each discipline by juxtaposing them and by creating new ones. These concepts establish new perspectives for the physical space of SICMAP. It becomes space-matter when physical space is added to time and to the body [6].

The *logic of the included middle* reveals the hybridity of the SICMAP practice which is the gesture-sound-space, a movement stemming from the "dance" discipline and sound from the "music" discipline [6].

As for *complexity*, it is the pillar that integrates these new concepts into a new performative practice and the ensemble of existing disciplines [6].

Research and creation are sources of evolution. They lead



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to new theories and most likely, to changes in paradigms and in practices. The known universe is transformed and becomes another Reality that entails a review of established laws and definitions, in other words, of known principles. Therefore, disciplines and vocabulary are extended.

3. INCEPTION

Choosing to play a musical instrument and the resulting sense of belonging are, for the interpreter, signifiers of the longevity of a professional or amateur instrumental practice. Certainly, the necessary daily practice for success must be repeated throughout the musician's life [9]; it is essential that the instrumentalist projects himself in the future with the instrument of his choice. Furthermore, the interpreter's intrinsic pleasure playing music and his attachment to his instrument will result in his mastery of the instrument [9].

In the pursuit of a "dream gesture", I have searched for a gestural interface corresponding to my vision. Dreaming the gesture –one of the methods proposed by the interpreter Jean Geoffroy who collaborated with Thierry De Mey on *Light Music*[1] –and "thinking in reverse, to see the movement and to dream that it can absolutely be done, this is the space of the power of suggestion in all artistic movements"[2] [4]. Thus, I began my research by observing gestural interfaces that utilized my qualifications as a percussionist, a methodology proposed by researchers interested in the development of gestural interfaces. In addition, the "dream instrument" must meet the requirement of an artistic practice, a vision, and must correspond to my corporeality (*corporéité*).

My passage from an instrumental acoustic practice to SICMAP stems from a long reflection. My aptitudes and qualifications as a percussionist were the points of departure to elaborate artistic and technical criteria for the conception of the "dream instrument".

3.1 Conception Criteria

As a percussionist and concert artist, I mastered a spectrum of gestures with many instruments of which the haptic feedback is unequivocal [13]. Percussion instruments have the particularity to show a clear causal relation between gesture and sound. By their nature, they necessitate imposing visual movements.

The percussionist possesses a well-developed kinaesthetic sense, an ability that allows her to situate her body in space [12]. These imposing visual movements form the premise of my artistic vision of the establishment of the basic criteria for the "dream instrument", a list of qualities corresponding to my sensitivity.

These characteristics were divided in two sections. The first is about artistic intentions whereas the second is technical order that rests on practical considerations of concert production and learning conditions.

Artistic criteria: gesture-sound without haptic feedback; clear gesture-sound relation; gesture at the frontier of music and dance; possibility to include scenography; polyphonic sound and gesture. Technical criteria: stage and ergonomics; accessibility to technological components; transportability and manoeuvrability.

These characteristics corresponding in all respect to my artistic practice are based on the six elements (defined in section 2) and they lead to the conception of SICMAP, a motion capture system by computer vision.

[1]Work created in 2004 using a motion capture system by computer vision with gesture-sound [5, 4].

[2]All quotes are translated from French by the author of this paper.

In addition to the criteria mentioned above, other notions have proven essential in projecting myself into the future: accessibility to technologies, possibility of collective practice, rich and diverse artistic possibilities and, eventually, transmission. These parameters play an indispensable role in artistic practice, in the development of this emerging culture, in insuring permanence of works and of the discipline. To achieve this, it is essential to value this practice.

3.2 Conception of the Dream Instrument

Beyond practical preoccupations, the vision to freely execute a gesture-sound in three-dimensional space without haptic feedback nor material constraints, has guided me along my path. Incorporating the notion of gesture-sound is what reveals my creative vision and corporeality to render visible the invisible and, to render sound matter tangible and manipulable. It is with this in mind that I have thought of the interface that would permit me to render visible the gesture-sound in space to mould and adapt it to the body. I then made the choice to use a motion capture system by computer vision and to develop an interactive ergonomic system for stage performance.

These choices allow me to demonstrate the mastery of my gesture and the ability to use my body in space as well as my development in the context of my practice as a percussionist. The self-imposed practice over numerous years necessitates concentration and physical control, essential requirements for the development of this new artistic practice at the centre of which is the body. SICMAP is my life time instrument of choice as any acoustic instrument would be for a professional musician.

4. SICMAP

SICMAP is my "dream instrument" that reveals my artistic vision vis-à-vis gesture as well as my kinaesthetic abilities. SICMAP's technological aspects will be discussed according to two modules: a) motion tracking system; b) sound. My aim is to better understand the theoretical models of SICMAP that will be presented in section 5.

4.1 Motion Tracking Module

Kinect Kreative Interface (kinKI) is a motion tracking application. Starting in 2012, it was developed in the IACT laboratory directed by Jean Piché, with collaborator Partick St-Denis, a composer and musical engineer. The programming is based on OpenNI, NITE and SensorKinect[3] libraries.

The graphic interface kinKI was realized in C++ using the OpenFramewoks[4] artistic programming library. The OSC protocol used, allows the link of a performative gesture to a sound or creative visual environment. The most important elements that enable kinKI to distinguish itself from all other libraries and applications is its ability to recognize spatial three-dimensionality and the facility to rapidly separate the performance space into *objects*, rectangular prisms, in which Cartesian and spherical data are rendered active and ready for mapping. In the performance space dotted with thirteen skeletal joint points, kinKI recognizes the body represented by a linear stick figure in a virtual yellow rectangular prism on a black background.

Configured in this form, the application is innovative and much more complex. The musical and gestural options increase tenfold because of the multiple *objects* and the combination of numerous data with the musical parameters. This requires a high degree of accuracy on the part of the performer, hence the mastery to produce an expert gesture.

[3]https://github.com/gameoverhack/ofxOpenNI

[4]www.openframeworks.cc

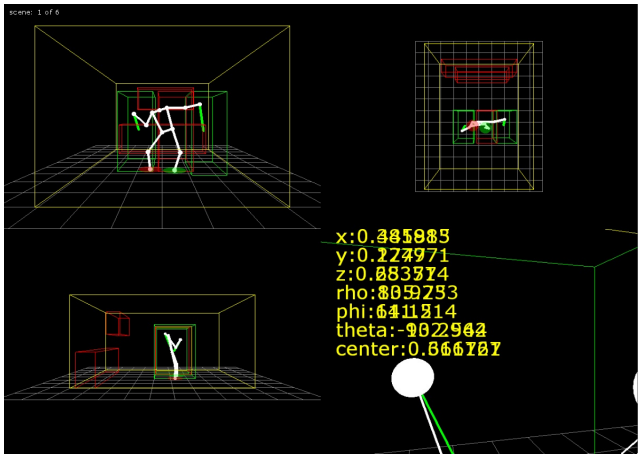

Figure 1: Representation of space showing four plans of kinKI 3D version, *objects* and values.

4.1.1 *Kinect Kreative Interface - functioning*

The kinKI user-interface is constituted of number boxes and slide potentiometers. It is simple to utilize, it has direct access to the delimitation of space by *objects* and only needs a simple assignment of information necessary to function.

It is possible to save up to 100 objects (0 to 99) per scene and up to 100 scenes (0 to 99) per program. The objects and scenes can be saved in text files. This indispensable option also permits to work with the data directly in text format without having to open the application, with the understanding that kinKI is not operational without being connected to Kinect.

In *edit* mode, the user determines the site and dimension of each object that can be superimposed and interlocked. It is possible to have objects fixed to the play area whereas in *body-related* mode, other objects can move with the skeleton.

In *performance* mode, the objects go from red to green when they are activated by the assigned skeletal joints. In the interior, the object's central point serves as the centre of gravity where an axis links the former to the skeletal joint once entered in the object.

Subsequently, seven values (or arguments) are sent simultaneously through: a) the coordinate positions (x, y, z) varying between 0 and 1; b) the spherical coordinate arguments (rho, phi, theta) varying beween 0 to 360; the last variable argument between 0 and 1 corresponding to the distance between the centre of an object and the skeletal joint, prior to its assignment.

The last value sent is a 0 when an assigned skeletal joint exits the object. This last function is equivalent to the on/off option which is essential. The performer must be able to stop the sound as he does with a traditional musical instrument; the instrument must not continue to produce sound by itself either. The gesture-sound relationship would then be incoherent.

The representation of space on four plans was added to facilitate the performer's tracking of objects: frontal view, side view, top view and first-person shooter view (Figure 1). The visual feedback is essential for performers to situate their body in the virtual 3D space.

4.2 Sound Module

The SICMAP audio processing underwent many changes during the course of its development. Firstly, a sampler was realized with the software Max/MSP which triggered sound only. This process allowed us to further understand the flux of data produced by kinKI. Secondly, a granular synthesis system was programmed with the software Max/MSP. Notably greater, the necessary calculation power limited gestures and sound possibilities. Going back to a simpler sampler concept, a program was created to use many small reading systems enabling changes of pitch, amplitude, fade-in, fade-out, crossfades as well as a few sound processing filters. Sound possibilities were rather good when the sound program was manipulated directly (without the motion tracking), but the functioning in a real-time performance was limited by data overload resulting in poor sound production.

Following these experimentations, the software Max was only used for mapping data. At the centre of this program, an object compiles the Csound5 language. This sound synthesis tool is a text-based language that can receive, process and produce sound in real-time. A program enabling sound synthesis with a sampling system was created for the purpose of allowing playback of as many sound files that the performer's gestural generate, hence, a polyphony of gesture-sound.

To begin this new process, the Cecilia4[5] audio processing modules served as models. The first module originated from additive synthesis, namely *ResonatorsVerb*. The efficiency of this method was promising. Indeed, the numerous musical parameters offered for manipulation increased the creative possibilities. Yet, due to the overload of the central processing unit (CPU), latency was greater and created sound artefacts during a performance. Simpler sound processing such as reverberation, flanger and diverse types of filters were the answer to a high-performance module that is permitting all types of mapping, low latency system and increased sound quality.

5. SICMAP CONTEXT

The paradigm brought about by the SICMAP conception lead to several questions concerning its description and associated gestural. The first question "Is the body an 'instrument'?". The second, "How can the typology of the instrumental gesture be associated and applied to 'free-body gesture' in the context of the motion capture system by computer vision?". To answer these questions, it is necessary to make an analysis of the sound production process.

5.1 Instrumental to Energy Continuum

The instrumental continuum is a concept proposed by Claude Cadoz who explains the process of sound production and traditional instrument from the instrumentalist's hand to the auditor's eardrum [2]. In this theory, he suggests that the analysis of the instrumental gesture cannot be made without comprehending this continuum (Figure 2). He also insists on the presence of a material object: "The instrument is conditioned matter to insure the transmission of a certain muscular energy to the eardrum." [2]. This theory is illustrated by the following schema:

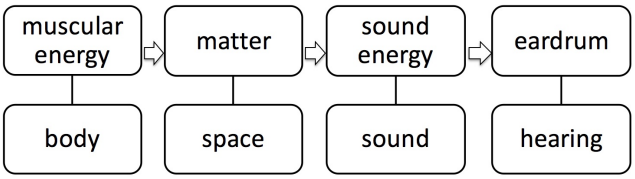

Figure 2: Representation of the instrumental continuum by Claude Cadoz.

[5]http://cecilia.sourceforge.net

And thus, the instrumental continuum is the action of the body with a solid matter (traditional instrument) inducing sound energy (sound wave) that flows in space and that is captured by the spectator's auditory system. Even if SICMAP was not a material object as defined by Cadoz, the concept of transfer of energy applies. Body, matter and sound are integral elements of SICMAP thus, are associated with the notion of energy. The transmission or channelling processes of this energy are made through different matter.

The transformation of Cadoz's instrumental continuum (Figure 2) applies equally to transdisciplinary concepts proposed here: the levels of Reality and perception (the body and space-matter) and the logic of the included middle (gesture-sound-space) [6]. So, the context of SICMAP initiates a new perception proposing this time a new terminology, that of energy continuum involving "virtual" rather than "solid" matter.

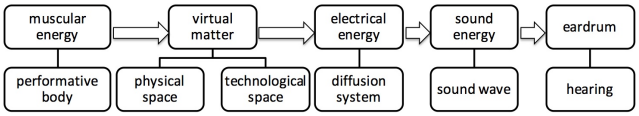

Figure 3: Illustration of the energy continuum of SICMAP.

In this state of perception, and according to the schema proposed, the energy continuum (Figure 3) is produced as follows: the muscular energy of the performative body in physical space induces decimal values to the technological space which are considered digital energy, which is then transferred to an electrical energy and then, to a diffusion system that produces vibratory energy towards the auditor's eardrum. This succession of energetic action as demonstrated by the theoretical schema determines the part of SICMAP that is the instrument.

5.2 Virtual Musical Instrument

According to the schema showing the energy continuum (Figure 3), the combined physical space and technological space becomes the "instrument". More specifically, once the mapping is programmed, the notion of expressiveness is added to the lexeme in order to qualify it as a musical instrument. As well, by adding the notion of the virtual nature of matter, then the designation of "virtual musical instrument"[6] becomes valid. This statement presupposes a negative answer to the question "Is the body an 'instrument'?". Merging the transdisciplinary concept of space-matter with virtual matter composed of physical spaces and of technological space, gives rise to the "virtual musical instrument". This is the perception of the individual performing on stage.

Yet, for the spectator, SICMAP and the energy continuum prompts a different perception. Sitting in front of the performer, the auditor is not conscious of the technological space and does not see the representation of the physical space on the screen. This adds a "magical" dimension in which the visible is invisible. Metaphorically, the body creates a sound-matter gesture in space. Under these conditions, and with this level of perception, the body becomes the instrument.

These two conditions are resulting from two levels of perception. The outcome is a positive one since the spectator forgets the presence of technology and directs his attention on the performer's action, the gesture-sound. Furthermore, both levels of perception reaffirm that SICMAP is indeed a musical instrument, premises that define the typology of the instrumental gesture proposed by Claude Cadoz [2, 3].

5.3 SICMAP Gesture

Before specifically addressing the definitions of the different instrumental gestures, the term "gesture" will be defined in order to propose solutions to specific cases in this particular field of research. Several categories of instrumental gestures will be proposed using a theoretical model describing SICMAP's gesture.

5.3.1 Free-Body Gesture

As stated above, the notion of "instrument" is associated with concepts, that of matter among others. Gesture cannot be analyzed separately from a continuum, be it instrumental or energetic; it forms an integral part. SICMAP is a case study anchored in a praxis that confronts the notion of "instrument", but the constitutive elements permit to link the instrumental gesture since the technological space and the physical space have already been identified as a "virtual musical instrument".

Not having a tool as solid matter, the "empty-handed gesture" [3] (*geste à main nue* [2]) is the terminology closest to the gesture of SICMAP without haptic feedback and without a tool. As this denomination infers, we are dealing with a gesture free of any equipment as in sign language, as opposed to one holding an object, such as an orchestral conductor with his baton, a concept associated with communication [2].

Cadoz uses another designation that corresponds more specifically to the motion capture system by computer vision, the "free-body gesture" (*geste à nu* [2]). This gesture is defined as a communication process which encompasses all domains, and which relates to the body in its totality, including the face and its expressions, the body as in dance [2].

A priori, SICMAP's performative body applies to this definition since all parts of the body are utilized. The designation "free-body gesture"[7] reveals the importance accorded to the body, not to those of space matter and technology as they are defined above. However, Claude Cadoz considers these gestures as non-instrumental since they are not associated with the domain of music. Ultimately, SICMAP is part of this domain, as it is in the case of the Theremin, one of the oldest instruments requiring the "empty-handed gesture".

The status of the Theremin as an instrument is unequivocal even if it uses the "empty-handed gesture". It can then be integrated in the instrumental gesture typology model. In the context of the same basic criterion, SICMAP equally adheres to these principles.

5.3.2 Typology of the Instrumental Gesture

After having defined "free-body gesture", it is clear that SICMAP does not use instrumental gesture as defined traditionally. The technological space and physical space, replacing solid matter, is a virtual musical instrument and warrants a new instrumental gesture typology for SICMAP.

Based on models proposed by François Delalande and Claude Cadoz, models equally studied and expanded by Marcelo M. Wanderley and Philippe Depalle [14], six gestures were chosen in order to create a distinctive model for SICMAP[8]. The selected gestures adapted to the motion

[6]Alex Mulder's research on the motion capture system by computer vision, designates as the author does, an interface using the same qualifiers. What distinguishes this research is the difference in the selection of process, theoretical models and artistic practice [10].

[7]The author has specifically chosen the term "free-body gesture" as opposed to "mid-air gesture".

[8]Alexander Refsum Jensenius designated other categories

capture system by computer vision are: accompanist, figurative, and effective gestures (Delalande); excitation, modification, and selection gestures model (Cadoz), the last three issued from the effective gesture.

Effective gesture is a trigger gesture; the object activates a sound file when the skeletal joint enters the object. *Excitation* gesture is the action sustaining the object's active function while still keeping part of the skeleton inside.

Modification gesture may be either structural or parametric. Hence, the modification structural gesture allows all gesture leading to sound file changes, as well as *objects* in space, whereas the parametric modification gesture makes sound parameters vary.

Selection gesture corresponds to the sound choices and their initialization parameters. *Accompanist* gesture concerns the expressive movements linking sounds from one *object* to the other. *Figurative* gesture is symbolic or communicative between the performer and the spectator, for example, the gesture of throwing sound while opening the hand; the figurative gesture can also be silent.

As stated in the section above, SICMAP proposes a new territory forcing the limits of already established notions. It has been demonstrated that the "free-body gesture" is more than a communicative gesture; it is indisputably instrumental. This observation has been made following the contextualization of the "virtual music instrument". Furthermore, establishing connections between "free-body gesture" and six gestures issued from the instrumental gestural typology, affirms the instrumental and musical character of SICMAP.

6. CREATING

SICMAP's conception and new models introduced in this demonstration are part of an interface development and will be, in the future, a source that brings more questioning, practices and theories. However, a better comprehension of the context must lead to the ultimate objective that of creation and performance which involves a series of components, expressiveness and gestural acquisition.

6.1 Mapping of the Gesture-Sound-Space

The first conception of musical parameters used with SICMAP makes references to the ones used with acoustic instruments: pitch, time and amplitude [1]. They are the basic elements of instrumental play. These three musical parameters associated with a gesture constitute a *one-to-many* mapping found in my instrumental practice. They are not only responsible for expressiveness since the artistic gesture must also plays a role. This mapping constitutes a point of departure to becoming familiar with gesture-sound. Yet, what makes a musical vocabulary rich is the manipulation of digital audio effects in real-time; this improvement must be one of the objectives.

Another parameter associated with acoustic musical instrument is the concept of localization [1]. It is the principle of identifying the sound source in space. This parameter is essential in gesture-sound-space. The sound is not diffused directly from the performer, but rather through speakers. At the very least, it is essential to use stereo panning.

This process allows the spectator to better understand the gesture-sound and its location in space. Also, the "gesture-sound-space" does not use any instrumental paradigms. The empty space does not change the concept when it comes to localizing the sounds according to pitch. The low-pitched sounds can be found as much to the left, right, down, up, in front or in back views, they are not constrained to follow traditional acoustic instruments. The sound and gesture can create unexpected contrasts, for example, when a descendent gesture is associated with an ascendent gesture. It has been with a great deal of freedom and with a creative mapping approach that the development of SICMAP was realized.

It is relatively easy with the gestural interfaces to create a system uniquely based on the trigger of only one sound sample. This method rests on the performer's responsibility to make the spectator "see" the gesture-sound. The synchronicity of gestures is essential for the spectator's perception, the credibility of the system, and of the work. This mapping strategy, *one-to-one*, was used with SICMAP first since the acquisition by the performer of the gesture-sound was at a rather preliminary stage. A complex mapping of *one-to-many* was adopted after months of development and practice to produce *From Infinity To Within*.

6.2 From Infinity To Within

From Infinity To Within[9] is the synthesis of my research-creation project *The Gesture-Sound-Space, Towards A New Performative Practice*. The first version of the work was presented at the *11th International Symposium on Computer Music Multidisciplinary Research* (CMMR) in Plymouth (UK), in June, 2015.

The initial inspiration for the work is a long red veil undulating in the wind. A deep red fabric. This visceral colour evokes the fluidity of blood, the interior movement of the body, a dispersive energy. This red silky fabric is also that of the shawl of a flamenco dancer, continuously twirling until a red circle is formed in space, a star in black matter. This matter of which we originate constitutes almost all of the night sky in which we distinguish a few stars.

The gestures of the work result from the union between dance and non-dance. The "non-dance" aesthetic –as opposed to dance –was proposed by Yvonne Rainer [8, 15]. This concept refers to the logic of the included middle: dance (A) and non-dance (non-A), when juxtaposed, create a new aesthetic (T) [6] combining super-stylized gestures and daily life communicational movements [15].

From the combination of these two aesthetics, I created gestures for SICMAP works. In this particular case, *From Infinity To Within*, the dance gestures are inspired by dance movements evoking flamenco varying between foot rubbing on the ground floor and forceful attacks, between lyrical hand gesture and staccato arm gestures. A wide range of polyphonic body gestures associated with flamenco-type movements prompt dominant presence and attitude. The performance commands an expressive body.

The typology of the instrumental gesture discussed above is used to describe actions and gesture, be it technical or performative, in order to communicate the gestural language to others in the field, and in general[10].

As for *From Infinity To Within*, a sound synthesis system was programmed using Csound language. The source of this programming is a high-performing sampler; it is based on the object *flooper2* equally used for the software Cecilia. The functions of the object are: variations of sound pitch by playback speed; mode file playback (forward, backward, back-and-forth); amplitude control; fade-ins and fade-outs; loop length, and crossfades; end and start points of the loop. Some of these parameters must be initialized before the sound file is read while others can be manipulated in

based on the researchers mentioned above which are more appropriate for the author's practice. [7].

[9]To see the full work and more, visit: `http://www.barahheonmorissette.com`

[10]Refer to demo video, NIME 2016 archive.

real-time. For this work many audio digital effects, of which parameters are manipulated in real-time, were added, such as a flanger effect, a delay, and a band pass filter.

During the programming of the sound synthesis system, a *one-to-many* strategy was attributed to several skeletal joints. Other mapping strategies have not been used yet. Presently, my conception of sound is including pitch, time, and amplitude, therefore, they cannot be detached as they are associated with one gesture. A number of gestures of different body parts can be carried out simultaneously, each one accompanied by a sound and its manipulable musical parameters in real-time. Furthermore, the audio motor allows the reading of as many sound files as there are programmed instruments. This important break-through made possible increasing polyphonic sound and gestures therefore, it opens up gestural possibilities of the body as a whole. Pitch, duration, amplitude, localization, and effects, all manipulable by gesture, have added a degree of freedom to the performance and to the process of creation.

Data flow was managed by the software Max via an object compiling the Csound program and permitted to visually show musical parameters and sound synthesis. The module control is the element setting the parameters of sound, video, and that allows mapping. Based on a clock, an automatic scene-change system was added and permitted the creation of a musical form to have a fixed duration. This option guarantees the musical form for the duration of each scene while providing liberty for musical phrase and yet allowing free reign to the performative act.

The work *From Infinity To Within* is the synthesis of the elements comprising my transdisciplinary artistic practice. The body in an evolutionary universe is stemming from transdisciplinarity. This work establishes the foundations of my creative process, the elements of the performative act, and it unites in a creative gesture the presence and the effect of presence, the expressive body and the artistic gesture. Furthermore, the technological space opens up several mapping possibilities propelling SICMAP to the status of a virtual musical instrument.

7. CONCLUSION

SICMAP is the response to my transdisciplinary artistic practice and is based on six elements. It results in a new theoretical model that can be applied to creation through the composition of works placing the expressive body at the centre of the process. The works add substance to this research-creation.

It is to be noted that the research carried out in the framework of my doctoral research has permitted to pursue creative work elaborated with a short, medium and long-term perspective at the compositional, performative and technological levels. As a first step, the evolution of the technological supports of motion capture will be explored to further develop SICMAP, and pursue the research-based creation.

The foundations having been established, in the near future, I will be perfecting the expert gesture for SICMAP while refining expressiveness of the gesture-sound-space. Collective practice with other instrumentalists will also be developed. These experiences will permit me to produce a corpus of works through which I will be able to refine a hybrid performative practice with this virtual musical instrument, and to contribute and be part of various artistic milieus.

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