

Review

## Framework for music improvisation and performance: Body/instrument and body/mind connections

Ana Luisa Fridman<sup>1\*</sup>, Rogério Luiz Moraes Costa<sup>2</sup> and Jônatas Manzolli<sup>1</sup>

<sup>1</sup>University of Campinas (UNICAMP), Brazil.

<sup>2</sup>University of Sao Paulo (USP), Brazil.

Received 16 June 2015; Accepted 1 February, 2016

**This study elucidates connections between the body and music presenting a proposal based on workshops and a theoretical viewpoint. Firstly it describes the main principles of the workshops that have been developed to work with music improvisation and group interactions. At the workshops the study approach music improvisation based on the dialogues and transformation of musical processes and structures extracted from non-Western music, which also include the strict relation of music and dance of some of those cultures. At the workshops the study use rhythmic parameters to reconnect the body of the performer to the music improvisation based on the concept of the embodied mind (Varela et al., 1993). The study also describe how to extend the workshop methodology with digital music instruments (Miranda and Wanderley, 2006) that will be used as gestural interfaces to interact with sound environments based on the rhythmic parameters developed at the workshops.**

**Key words:** Body/instrument connection, embodied mind, non-Western music, rhythmic parameters, improvisation, performance, gestural interfaces.

### INTRODUCTION

This article is based on a finished doctoral research where some workshops have been developed to evaluate how body and music work together in rhythmic context. The study focus was to elaborate proposals for music improvisation based on processes and structures extracted from non-Western music that were initially brought by Western twentieth century composers. As themes for these workshops, the study included the strict relation of music and dance of some non-Western cultures. In Africa and India, it is possible to observe that music is part of daily life, compounding rituals and their cultural identity. Therefore, music and dance are directly

related, considering that people from those regions always have coexisted with performance, improvisation as way of transmitting knowledge from one generation to another.

Starting up on this practical approach, this article presents also theoretical perspectives. Concerning to the multicultural view of this research, the study will be mainly based on writings of Schippers (2010) and Reich (1968). As a support to describe creative environments and improvisations, the study will mention Costa (2003). The study also elucidate our integrative view of body and music undertaking a cognitivist perspective supported by

\*Corresponding author. E-mail: [tempoqueleva@yahoo.com.br](mailto:tempoqueleva@yahoo.com.br).

Varela (1993), Bowman (2004) and Gibson (1979).

### The connecting idea: bringing “body” to the music

Differently from non-Western cultures where music and dance are much related, the Western didactics usually treats those areas separately. The study can relate this fact to the *holistic* and *atomistic* approaches in music education – according to the definition of these concepts cited by the musicologist Huib Schippers (2010) – and the possible benefits of each of them. When we think about non-Western music we can frequently observe the holistic aspect, where children are exposed to music on a daily basis and have to “catch up” the music as a whole. In opposition in Western music, the study has been segmented in topics such as form, harmony, rhythm and analytical aspects.

The pedagogical approaches associated with atomistic and holistic learning have been prominent in debates about education for almost a century now. An atomistic/analytical approach corresponds more closely to an emphasis on mono-directional didactic teaching of a “single truth”, while a holistic approach leaves more room for learners to construct their own musical knowing, leading to a more individual approach, even if the body of knowledge is quite closely defined (Schippers, 2010).

In the study viewpoint, when we propose to connect the performer’s body to the music produced by an improvisation process, we are also trying to bring some holistic aspects to this practice. Still considering the perspective of music education, music educators of the early twentieth century created new teaching methodologies involving the holistic thoughts through the body practice. Among them the study can cite Émile Jacques-Dalcroze (1865 to 1950), Carl Orff (1895 to 1982) and Murray Schafer (1933). These educators defended the idea of the use of the body to sensitize the student to learn music. Their work was focused on the close relationship between the body and the development of cognitive structures. Among those educators, Dalcroze was the first to initiate the thoughts about music and movement interactions, with the premise that body movement is an essential factor to rhythm development of the human being. His system, called *Eurhythmics*, is addressed to the development of the whole human being through music and movement, using the voice, spatiality and movement (Dalcroze, 1925).

It was Émile Jacques-Dalcroze who first realized that musical rhythm depends absolutely on motor consciousness for its fuller expression. His researches led him to evolve a system of rhythm movement designed to develop mastery of musical rhythm. This system of music education uses the body as the interpreter of musical rhythm and is known the world over by *eurhythmics*— good rhythm. (Findlay, 1999).

Corroborating this idea the study can also cite the

recent studies on the concept of the *Embodied Mind* (Varela et al, 1993) where the body is an important vehicle to cognition processes, as quoted below: The body’s role, to the extent it has one, is that of a conduit for conveying lower-order stimuli and auditory sense data to the brain, where the real work of music cognition (transformation, processing, representation) is done (Bowman, 2004).

An important point instilled the concept of embodied mind is the idea that knowledge is acquired in a particular way, that is, each individual may have a body/mind different perception from a same concept. Each individual can incorporate, translate and express concepts in a unique way, such that the “embodied understanding is always the view from somewhere, and therefore always partial; yet it remains profoundly ours.” (Bresler, 2004).

With such considerations in mind, the study believes that by introducing the idea of embodied mind applied to creative processes as musical improvisation, the study could help to increase the involvement and interaction of the participants in this process. In this sense we can mention the John-Steiner idea of collaborative processes, who notes that “collaboration thrives on diversity of perspectives and on constructive dialogues between individuals negotiating their differences while creating their shared voice and vision” (John-Steiner, 2011,). Considering this approach and the idea of embodied unique understanding for each individual, the study intention is to enhance cooperation through movement and sound interactions in music improvisation proposals. It is also interesting to observe the different approaches to music and movement when we refer to the musician and the dancer’s points of view. Even not delving on that matter, the study could consider that the music and movement interactions (here focused on the rhythmical aspect) could benefit both areas at their creational processes.

### Dialogues with non-Western music and improvisation

When thinking about music improvisation, how could we approach non-Western music to learn more about this type of performance? And which contributions to the European world – or even to the world as an entire community – could transform our way of perceiving some aspects of music making? We can think about non-Western music knowledge also as a patch to help us find the essence of improvisation, creation and performance procedures. But why does the music of the East have enchanted the Western world?

Aspects such as the states of immersion in performance – often treated as a ritual – the notion of circular time in the practice of improvisation, expressive materials, rich timbre, complex rhythmic procedures and the body/music connections, among others, has drawn the attention of musicians and scholars of the Western world. Focusing

on the improvisational practice, there are several approaches to it, and this practice exists in many different contexts and periods of music history. In India, for example, where the music can be found in more traditional formats in the North (Hindustani music) and most innovative in the South (Carnatic music), improvisation is a vital element in these two regions. The structures of Indian music are malleable in nature and improvisation for Indians is a fact, a present element in their music.

In Africa we can also find the practice of improvisation, often based on rhythmic ostinato that forms the basis of the process. In Indonesia, Javanese music played in the instrumental ensemble called gamelan; musicians often improvise when they play small interpretative variations<sup>1</sup>. Even with less flexible structures of improvisation, the sonority of the music of Indonesia and – with other melodic and rhythmic non-Western structures – have influenced twentieth century composers like Claude Debussy, Béla Bartok, Olivier Messiaen and Steve Reich. Each of these composers incorporated such elements in a particular way, creating extended forms of using non-Western musical structures.

The question then arises as to how, if at all, this knowledge of non-Western music influences a composer. The least interesting form of influence, to my mind, is that of imitating *sound* of some non-Western music. [...] Alternatively, one can create a music with own's sound that is constructed in the light of one's knowledge of non-Western *structures*." (Hillier, 2002).

In the design of the workshops the study tend to follow Steve Reich's idea of not imitating sounds, but knowing structures, procedures and dealing with new musical approaches in a multicultural context of dialogue and transformation. Also citing Reich, the study can even consider Non-Western music formats as a venue to understand music processes much more than music itself as quoted: "I am interested in perceptible processes. I want to be able to hear the process happening throughout the sounding music" (Reich, 1968).

Embracing the extended possibilities started from these composers, the study was inspired by structures such as modal scales configurations, asymmetric meters and the use of ostinato patterns, besides the use of movement and body connections with music to elaborate our framework. It is also important to highlight that – even influencing composers since the early twentieth century and extensively used in multicultural contexts at the current performance scenery – those structures and approaches are not totally absorbed on the music education in formal undergraduate musician programs. Dealing with those issues and thinking of adult musicians/performers on a multicultural perspective, the study have elaborated and applied some music workshops.

Considering that rhythm is the very first musical

element that connects body to music and also using the multicultural idea to offer a creative environment for music improvisation, the study will use some rhythm parameters of non-Western music to build those environments that culminates at the workshops described as follows.

### Improvisation workshops

The study proposal consists in building some experiences in a workshop format that raises the idea of music and body interactions through complex rhythmic parameters – such as asymmetric meters, cross rhythms and phasing concepts – in improvisation practices. The study also will create some hybrid environments, using materials and procedures extracted from non-Western music such as modal scales and its extensions and the cyclic idea for improvisation, among others.

The study workshops started with the internalization of complex rhythm parameters through body exercises and movement. Then gradually the participants are invited to improvise using movement, voice and their own instruments at the very end. We called the transition between the improvisation with movement and the improvisation at the instrument by *body/instrument connection*. Based on this proposal, the study workshops are mainly divided in the following steps:

Step 1: Body exercises associated with a first rhythmic parameter to establish a good level of concentration and a first group interaction.

Step 2: Improvisation proposals using body coordination and movement in space based on the rhythmic parameter that will be the theme of the workshop.

Step 3: Introduction of expanded modal and scales and harmonic hybrid contexts associated with the rhythm parameter studied before.

Step 4: Vocal and percussive improvisation based on the previous rhythmic parameters.

Step 5: Instrument group improvisation based on the previous work, using all the materials of the previous steps.

The workshops were applied at the congress PERFORMA, in Aveiro, Portugal (May, 2010); to undergraduate students from Sao Paulo Music University (October, 2011) and to graduate students of the Leadership course at the Guildhall School of Music and Drama, UK (January, 2012). In general, the workshops took place in classrooms spaces or auditoriums, with groups ranging from 10 to 30 people, with 2 or 3 hours lenght. In some workshops the study did not use musical instruments, in others, the participants brought their own instruments.

### Examples

First the study describes some warming up examples that

<sup>1</sup> It is interesting to observe that dance, music and improvisation are very connected at the mentioned cultures of Africa, India and Indonesia.

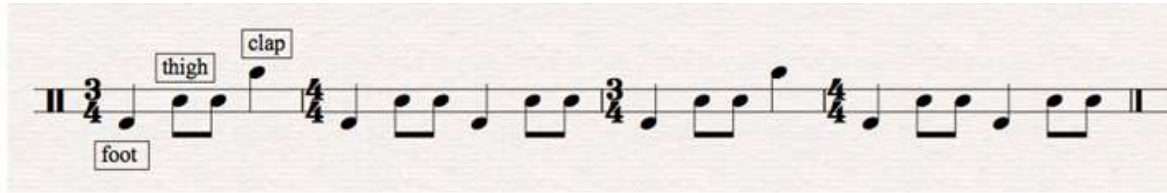


Figure 1. Warming up rhythm proposal



Figure 2. Ostinato pattern for voice warming up.

were used at the beginning of the workshops. With the example below the study proposed simple interactions between music and movement using some rhythmic patterns. Using an asymmetric element as the study rhythm motivation, the exercise consists in a pattern that is built by adding an extra pulse. The participants step forth and back, using the established beat and clap the written patterns as described in Figure 1. Depending on the group response, the study proposed the same warming up phasing the entrances in a canon format.

Another warming up example uses a body percussion ostinato in 7/4 (built in 3/4 plus 4/4), where the study proposed a voice improvisation. Participants walk using the ostinato pattern and sang freely, until they felt comfortable to coordinate their movement to their voice.

Next the study exemplifies some hybrid contexts created for the improvisation practice using movement, voice and instruments. As already mentioned, the study examples are based on the recombination of non-Western structures. The next two topics represent the steps 4 and 5 presented earlier.

### African song *Kalêle*

After some warming up exercises, the study got to improvise based on an African chant from Tanzania named *Kalêle*<sup>2</sup>. After singing the original song excerpt the study presented a “compound” version of *Kalêle*<sup>3</sup>, that the

study built in two measures of 3/4 and one of 4/4. The study then proposed a group improvisation at a cycle that alternates singing the song and using the same amount of space to improvise. Participants first improvised using voice and body rhythms in a circle formation and moving through the room space. After this step they alternated the song and the improvisation at their instruments. The suggested scale to improvise will be Dorian F in a modal harmonic cadence using the I and IV grades, although other scales and harmonic elements were always welcome.

### *Tala* phonemes

Based on the mnemonic process of memorizing rhythm patterns in the Indian *tala*<sup>4</sup>, the study used some phonemes extracted from that music to establish an improvising structure. This was based on a diminished rhythm pattern formed by a combination of 13/8+13/8+10/8+10/8+7/8+7/8. At first the study used this structure alternating between vocal phonemes and percussion using clapping and foot stomps (Figure 2). Secondly, the study started to improvise at the percussive spaces to then improvise using harmonic and melodic suggested materials, always alternating the phonemes and instrumental parts of the study rhythm structure. When improved using vocals and percussive motives the study also suggested to the group to explore all the room space, moving and communicating with each other. This process was repeated at the instrument (in a circle formation), always using group improvisation.

<sup>2</sup> In a first visit to the Guildhall School in 2008, we participated on a collaborative compositional work with musicians of Tanzania, where *Kalêle* was taught to the group.

<sup>3</sup> Figure 3 was based on the song *Kalêle*, composed by Tanzanian musicians during workshops held at the Guildhall School of Music and

Drama in 2001.

<sup>4</sup> The *tala* consists in the rhythm cycle of Indian music.

### compound kalele



Figure 3. Compound version of *Kalele* used as a base to improvise.

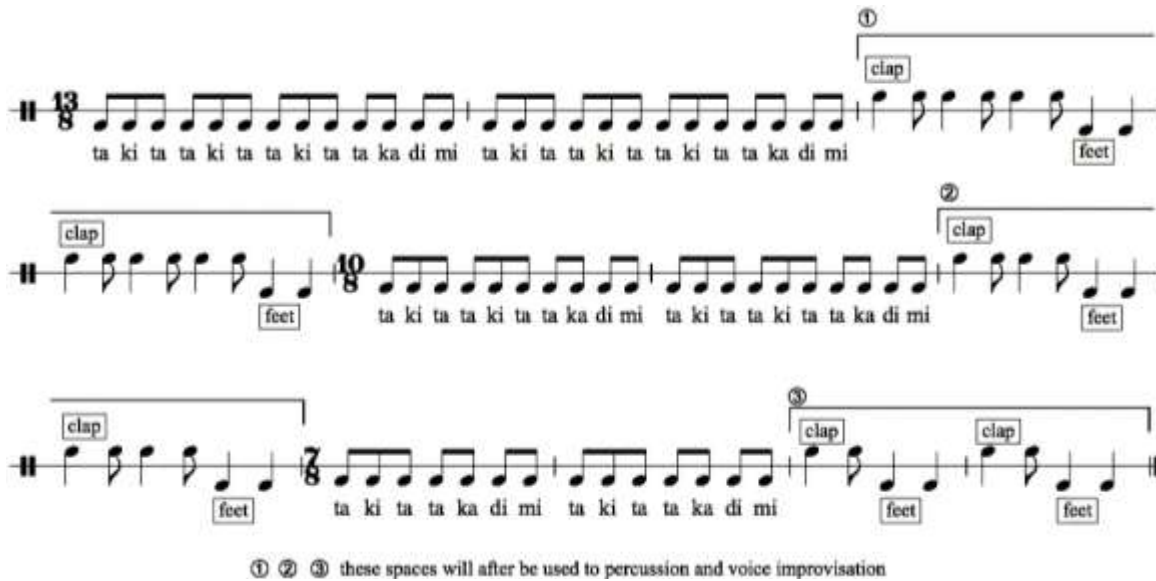


Figure 4. Improvisation structure based on *tala* phonemes(Nelson, 2008)

## RESULTS AND DISCUSSION

After each of the workshops were offered, the participants were asked to send by email their reports, citing their general feelings about the process and their views about the fact of using movement as a way to connect to music improvisation. We had a lot of interesting discussions based on the feedback of the participants and here we cite some of them.

One of the contributions towards the implementation of the study proposal was the observation about the cognitive processes the study used, mentioned by a participant of the study first workshop. In those comments, the participant refers to questions about consciousness and unaware of rhythmic parameters by using the

corporeality as a way to reproduce rhythmic parameters. The study observes that this participant chose to leave the body aspect driving it, with no concern for rationally understand the proposed rhythmic parameters. That could reflect on the references the study did about the holistic processes. From this report, it was interesting to note the different allocations of the corporeal aspect from the point of view of the participants. This particular report shows the possibility of letting yourself go without the exact consciousness of the rhythmic parameter proposed. This means that corporeality makes this affordable rhythmic complexity, even without this rational mediation.

*“From the point of view of my personal perception, I felt that the process used has favored mean interaction/game*

*straight to the rhythm. I was not concerned about the structure, if it was five or four or three. I liked to project the movement of my body in the rhythmic pulses and let this natural impulse to take me.” (Participant 1 report)*

Regarding the process, the study described in the workshops relationship with the redefinition of expressive materials in creating processes, the study obtained an important contribution made about another participant. Among other observations, the participant describes the process that the study developed under the spotlights of the construction of attention, perception, and group interaction that merges from the proposed by moving in space based on rhythmic parameters. Another important aspect mentioned by this participant is the deconditioning factor which will be taken up by another participant as well. This report also mention the mediation of the cognitive aspect made by the movement proposal how that raises a redefinition of rhythmic asymmetry, bringing the idea that rhythmic asymmetry can be crafted in a more organic way when approached by the use of corporeality.

*“The perception of the individual related to the collective and the space sparked an open minded state; released from the incorporation of asymmetric rhythms from our bodies. Walking on the compass and the sense of direction contributed to the connection been established without the mediation of the rational aspect. The idea of asymmetry appeared to have a new meaning, as in the body appropriated the rhythmic gesture. The process of incorporation sparked a predisposition to deconditioning, created availability, which manifested itself both in the execution of a rhythmic gesture as the creative exploration of the proposed musical content.” (Participant 2 report)*

Another important report about the study proposal is that it can be permeable and subject to change. In this regard, the study must observe that the proposal was built to be open enough so that other professionals can adapt it to suit their needs, like suggested by this participant, who is also a music teacher:

*“I was very excited at the workshop with the dynamics of work and learning. I have noticed that the teaching of rhythmic aspects (simple and complex) is usually carried out through complex and boring exercises to be performed and studied. My feeling during the workshop was to be performing and working rhythmic improvisation exercises and complex studies in a very dynamic and fun way. I brought exercises and worked with my students in the discipline of rhythmic perception. I felt a great excitement of students during the exercises, even those who were with great difficulty to realize them. I felt the need during class and ended up creating and carrying out preparatory exercises. I think at the workshops it is*

*impractical because its a short time, but I think it could be thought of some more basic exercises to help students with greater difficulty.” (Participant 3 report)*

When the study applies proposals at the Guildhall School, the study was finalizing the process of developing and implementing the described workshops. This fact, coupled with the fact the study had spent more time with these participants (three weeks in this case, in other creative activities and with three workshops applied), contributed to the proposals in this institution reaching the goal of acquiring a greater fluency on improvisation in complex rhythmic parameters. In these proposals, the study "connection body/instrument" was more consolidated, and the result of this last stage improvisation can be seen in the testimony of the participants of the latter workshops.

Here the study highlights the creation of an environment at the same time safe and challenging for the practice of improvisation, beyond the observation that the introduction of this practice by the motion is a differential and efficient aspect in the study proposal. Still the study can cite the importance of the group process in which the collaboration of each participant and the receptivity to this collaboration are crucial to the conduct of the activities proposed in the workshops.

*“I think you created a safe atmosphere and were open to our input. The exercises were on the right level (challenging but doable) and I enjoyed moving and dancing in combination with improvising on cheerful and catchy music” (Participant 4 at Guildhall School-GSMD)*

*“When I read that we would be improvising over time signatures such as 13/8 I didn't believe it would be possible in just one workshop. I was amazed at how easily one thing flowed to another and before we knew it we had done it. The use of body movements made the gaps between milestones in the music easy to work out and also freed us up for improvisation.” (Participant 5 at GSMD)*

*“The use of movement as an introduction to improvisation was fantastic, it took away focus from sounds and got us in a place of freedom to be expressive. I was really inspired by the use of rhythm as a starting point for the music. It gave the group a really great energy and allowed the music to go in any direction as the improvisations progressed.” (Participant 6 at GSMD)*

Ending the study taking considerations from the report of the workshop participants, the study returned to the theme of conditioning and deconditioning, taken up by another report. In his testimony there is also the idea of instability caused by the exit of the "comfort zone". In this report, the study note that the proposal provided a transformation not only during the event but reverberated

**Table 1.** The five steps of the workshop compared to five aspects that emerged during the activities.

| Variable | Concentration | Rhythm and sound accuracy | Body coordination | Group interaction | Improvisation in hybrid contexts |
|----------|---------------|---------------------------|-------------------|-------------------|----------------------------------|
| Step 1   | X             | -                         | X                 | X                 | -                                |
| Step 2   | X             | -                         | X                 | X                 | -                                |
| Step 3   | X             | X                         | X                 | X                 | -                                |
| Step 4   | X             | X                         | X                 | X                 | X                                |
| Step 5   | X             | X                         | -                 | X                 | X                                |

in a kind of thinking about a search for sounds, transposing the environments that were part of the daily life of each musician. The statement leaves a desire of continuity, which seems a fitting conclusion to what the study longed for.

*“The feeling at the end of the workshop was that this was not ended. As much as we have to return to the real world of raids and commitments, our body was still in a daze for the rest of the day. In shock at the time of irregular, disruptive rhythmic patterns. The workshop took us out of our comfort zone, turning into new parameters and ideas throughout the workshop. The fact that we use extensively the body in the exercises made us swallow, absorb through the skin and sweat, all that musical world of other accents, other emphases and other views. In me was awakened the importance of being out of our rhythmic and melodic patterns, and made me aware of how we are CONDITIONED (maybe even trapped) to the usual. And also aware of the fact that improvisation can be infinite and liberating.” (Participant 7 report)*

Based on the discussions earlier, with another student reports and observations from the video registers, the study could observe different reactions from the participants of the workshops. Some of them tended to be more intuitive and not exactly concerned about the metrical aspects proposed, like the study could verify in the reports mentioned here. On the other hand, some of them were extremely concentrated in being conscious of each rhythmic parameter proposed.

These two different states of consciousness were actually a good combination for the interaction the study observed at the end of each workshop. Mainly all the participants felt “safe” to improvise and some of them found it important to explore a different territory that uses movement as a preparation to play and improvise at their own instruments. The study could also find in different steps of the proposal the development of the following aspects that emerge from all the activities: *concentration, rhythm and sound accuracy, body coordination, group interaction and the practice of improvisation in hybrid contexts* as described in Table 1.

After comparing all the results, the study started to think of how to expand some of those aspects such as

concentration and rhythm accuracy applied to performance environments. For that, the study describes the actual stage of the research, now using a technological support.

### Further developments

With the results presented earlier, the study found out that it could be interesting to enlarge the workshop methodology using gestural interfaces or digital music interfaces (DMI) as presented by Miranda and Wanderley (2006). The study used research on gestural interfaces developed at the Interdisciplinary Nucleus for Sound Studies (NICS) to generate sound environments based on the same rhythmic parameters used at the workshops described earlier. By using the gestural interfaces, the study aims to expand the corporeal idea applied to improvisation, creating a deeper state of immersion in music improvisation.

At the actual state of the research, the study's overall goal is to create sound environments where the performer – a group of dancers and musicians – and the listener could both experience the environment exploring sound patterns through movement, interfering in real time on the sound result of the environment. To achieve these goals, a study group made up of dancers and musicians were created to be part of situations involving performances that occur during the research period, which will foster the emergence of poetic proposals and from interaction with researchers from the NICS, the development of technological support for instantiating and to study new creative processes from media support. The procedures studied in this research follow the value of physicality in cognitive processes related to music, with the idea of the body as the active medium for the construction of knowledge also under the concept of the *embodied mind*. In this approach to knowledge into action and reaction for a certain environment, the individual's body took on a role of utmost importance.

### Conclusion

About the workshops described in this article, the study

intention was not to create an “ideal improvisational methodology” for musicians but a music experimental and immersive territory. That means the study wanted to create a permeable experience, which could be in dialogue with other improvisation formats and could be transformed by others.

About the body/music connection driven by a rhythmic point of view, the study could observe the many connections between those two areas, such as the ones the study found in Flamenco and Katak dance, among others. Also the connections between dance and music can also improve the communication of dancers and musicians in both ways by knowing how important and effective the connection with music and movement could be. The study can also observe that musicians can explore the movement at compositional works based on rhythmic parameters or even connect their bodies with movement when just playing or improvising at their instruments. Therefore, the exploration of the movement aspect as a learning tool, could be used to bring dancers and musicians to a closer territory permeated by *embodied minds*.

Regarding the proposed research deployments, the study believe that a musical performance environment can also act as a medium that involves perception, cognition, creation and corporeality, providing affordances that act directly and solely on each individual, whether performer or listener. This network of embodied perception can leverage interactive relationships between individuals who experience this environment. At this stage, the study aim to bring experiences that contribute to creating performance spaces with the focus directed to the integration between understanding embodied music through technological interfaces. This junction can reframe musical materials and procedures, and reintegrate more individuals to the artistic and creative environments, expanding the sound and movement perceptions in performance contexts.

## ACKNOWLEDGMENTS

Ana Fridman is supported by a post-doctoral fellowship from FAPESP no. 2014/09070-4 and the project infrastructure is supported by the CNPq project no.470358/2014-9, supervised by prof. Dr. Jônatas Manzolli. Prof. Dr. Rogério Costa is supported by FAPESP project no. 11/07678-7 and was the supervisor

of Ana Fridman previous doctoral research supported by CAPES. The authors are grateful all the participants of the workshops at the University of Aveiro (PERFORMA Congress, 2010), University of Sao Paulo (USP) and Guildhall School of Music and Drama, with special thanks to Dr. Sean Gregory and Dr. Sigrum Griffiths, coordinators of the Leadership Program at the GSMD.

## Conflicts of interest

The authors have not declared any conflict of interests.

## REFERENCES

- Bowman W (2004). Cognition and the Body: Perspectives from Music Education, in Bresler L. (ed.) (2004). *Knowing Bodies, moving minds: towards embodied teaching and learning*, London: Kluwer Academic publishers.
- Findlay E (1999). *Rhythm and Movement: applications of Dalcroze eurhythmics*, Miami, Summy-Birchard Inc.
- Gibson J (1979). *The Ecological approach to visual perception*. Boston: Houghton Mifflin.
- Greeno JG (1994). “Gibson’s Affordances”, *Psychological Review*, vol.101 (2), Washington: American Psychological Association, pp. 336-342. <http://dx.doi.org/10.1037/0033-295X.101.2.336>
- Hillier P (2002). *Steve Reich: Writings on Music (1965-2000)*, New York, Oxford University Press.
- Jacques-Dalcroze E (1925). *Ritmo, Música e Educaçaoe*. Milão: Ulrico Hoepli Ed.
- John-Steiner V (2000). *Creative Collaboration*, New York, Oxford University Press.
- Miranda ER, Wanderley M (2006). *New digital musical instruments: Control and interaction beyond the Keyboard*, A-R Editions, Inc.; 1st edition, ISBN-13: 978-0895795854.
- Nelson DP (2008). *Solkattu Manual: An Introduction to the Rhythmic Language of South Indian Music*. New York: Wesleyan University Press.
- Reich S (1968). “Music as a Gradual process” In: Hillier P. (ed.) (2002), *Steve Reich: Writings on Music (1965-2000)*, New York, Oxford University Press.
- Schippers H (2010). *Facing the Music: shaping music education from a global perspective*, New York, Oxford University Press.
- Varela FJ, Thompson E, Rosh E (2001). *The Embodied Mind: Cognitive Science and Human Experience*. USA: Massachussets Institute of Technology.