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Real-Time Composition as a Strategy for the 21st Century Composer

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Abstract

Real-Time Composition, despite being a term commonly used in computer music and free improvisation circles, is also one whose definition is not clear. This dissertation aims to, in seeking and attempting its conceptualisation, permit a deeper look at the core of the activity of western classical music making. By discussing the concepts and current views on composition, improvisation, musical work, interpretation and performance, we will propose a working definition that will later serve as a model for music making; one that involves both the composer and performers, influenced by their context, as creators. This model borrows heavily from Walter Thompson's Soundpainting technique. We will then analyse the outcome of three different concerts, of increasing complexity and level of control, that resulted from the previous discussion and end by concluding that Real-Time Composition is, in fact, fundamentally different from improvisation, and an extension of western classical music practice.

Keywords: real-time composition, improvisation, soundpainting

Abstract

A Composição em Tempo Real, apesar de ser um termo regularmente utilizado nos círculos da música electrónica e da improvisação livre, não tem uma definição clara. Esta dissertação tem como objectivo, ao procurar a sua conceptualização, perceber de forma mais profunda o núcleo da actividade produtiva da música clássica ocidental. Ao discutir os conceitos e entendimentos correntes de composição, improvisação, obra musical, interpretação e *performance*, será proposta uma definição operacional que irá posteriormente servir como modelo para a criação musical; este modelo envolve tanto compositores como intérpretes, influenciados pelo seu contexto, enquanto criadores. Este modelo é baseado na técnica de Soundpainting, desenvolvida por Walter Thompson. De seguida iremos analisar o resultado de três concertos diferentes, de complexidade e níveis de controlo crescentes, que decorreram da discussão anterior, e terminar com a conclusão de que a Composição em Tempo Real é, de facto, fundamentalmente diferente da improvisação, e uma extensão da prática da música clássica ocidental.

Palavras-chave: composição em tempo real, improvisação, soundpainting

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Chapter 1

Introduction

1.1 Motivation

My motivation for writing this dissertation comes, first and foremost, from personal experience. I have always had a very wide array of interests and, when it comes to music, this is particularly noticeable. Since I've finished my degree in Music Composition at Escola Superior de Música e das Artes do Espectáculo (ESMAE), in 2013, I have been involved in many different musical projects, with very distinct roles as a musician. Although I have been fortunate to see my *traditional* work[1] performed and recorded, by various groups, orchestras and soloists (often with electronics), and I believe that still is a very important, relevant and rewarding music making process, I have also found artistic and personal fulfilment working in unexpected contexts, with unexpected partners.

One of the activities that have had a major impact on my perspective on composition was working with communities. After attending a course on Workshop Leading under the supervision of Paul Griffiths, Pete Letanka, Sam Mason and Tim Steiner from Guidhall School of Music and Drama at Casa da Música, in Porto, and attending a summer course

[1]By traditional work I mean compositions written *offline*, that is, not in real-time, and notated according to the standards of western music notation.

in collaborative opera composition in an education context [2] at Stord, Norway, I became conscious of a different way of *writing* music in the 21st century, one that involves direct contact with the people who are going to perform it. Even though these people may not be professional musicians - in fact, I have worked with groups as varied as communities of homeless people, professional orchestras, prison inmates, community orchestras, Alzheimer's and dementia patients, music students, Down's syndrome and cerebral palsy dancing groups, and deaf people, among others - they've always had a deep desire and will to express themselves musically.[3] I find this close relation to the performers very inspiring, as it not only allows the composer to *write* specifically for certain individuals and groups, with their own expertise in mind, but it also brings him closer to the act of performing. Composing music in this context is also a social experience, integrated with the community and the audience - as it has often been in the history of western music.

In these last six years (that is, from 2010 to the present) I have also been working regularly in music education, not only in music conservatories, which follow the *conservative* programs and methods (with some notable exceptions), but also at Casa da Música's Educational Department, which brings new perspectives on music education and practice to the general public (including music students). I have come across many success stories but also some early school leavers, who fail to come to terms with the methods, processes and expectations from the school community, despite having a deep interest in music. I have found that improvisation, live composition and collaborative musical projects can generally prove helpful in discovering and developing one's own musicality and can be used as a very powerful tool in education.[4]

My experience in musical programming, electronic music and automatic music generation has also influenced me deeply as a composer. There is a saying that computers are very

[2]WASO - Write a Science Opera, a method led by Oded Ben-Horin, in the CREAT-IT project of RESEO - European Network for Opera and Dance Education.

[3]As, for example, in the case of Jorge - a 45 year old man with special needs - who, in a concert I was co-leading, was required to play only on a bass drum on the beat on a particular moment, but did so with such commitment and passion I have rarely seen in professional musicians!

[4]See Peggie (1985) and Burnard (2000)

dumb yet very obedient machines, so there is a lot to learn from computer programming. If you want a computer to articulate your musical ideas you need to communicate with it very efficiently. You need to break down your complex thought process into clear, tiny bits which articulate with one another. Trying to create music in this way allows you to dig deeper into the origins of our own musicality and to question what exactly *is* music notation. As a composer, I feel our activity is very akin to musical programming - establishing a particular set of instructions (traditionally, in the form of musical notation on paper). Those instructions are always subject to interpretation, with more or less degrees of freedom.

All of these practices have led me to rethink and question my role as a composer, which I believe to be very different now from the one I was trained for (although the study of counterpoint, harmony, rhythm, form and orchestration, among many others, has proven to be essential not only in writing a musical score but also when composing live, playing, teaching or programming). They have also left me with questions and doubts such as:

- What is (or should be) contemporary art music? Is it exclusive to music professionals? In an age of technological and informational ubiquity, which is also defined by the rise of interactivity, can non-musicians take part in art music performance?
- Are there any fundamental differences between electronic and acoustic music-making (other than the sound source)? Are machines capable of generating music?
- What are the differences between improvisation and composition?
- Can music generated in real-time have the same quality standards that western classical music's rich history imposes?
- Should the composer take any part in music performance?
- How can we embrace the use of creativity in music education? How can we build a school curriculum or syllabus that focus on creative learning?

These are very important questions, related to major issues in music making, and whose answers are not only difficult, but subject to individual opinion. I think they are

worth the discussion and, despite not being the direct object of this dissertation, they will be indispensable in orienting our thought process. In order to do so we will be using the concept and practice of Real-Time Composition as guidance.

1.2 Goals and Methodology

The concept of Real-Time Composition (RTC) seems a contradictory one. In the music theory circles, composition is often seen as an activity that takes place prior to performance[5]. There is a clear separation between composers and performers and they all take part in different stages of the assembly line that is the traditional music making process. If we accept this view strictly, there can be no Real-Time Composition.

At the same time, RTC is a concept widely used in other circles, such as live electronics (always involving a computer and an interactive system) and improvisation ensembles, often from a Jazz background. These opposing views (essentially, the [im]possibility of RTC) are worth further discussion. In fact, we can state the main question of the present dissertation as follows: how can we define Real-Time Composition and how does it compare to traditional composition and improvisational practices? To answer this question, we will begin, in section 1.3 by analysing a survey of existing literature: what examples and practices of RTC already exist?

After getting acquainted with the state of the art, and clarifying the current positions on the matter, we are setting the context for the theoretical discussion. As such, we will proceed, in chapter 2, with a reworking of the concept, taking into account the close relationship between composition and improvisation. In doing so, we will question some of the generally accepted ideas regarding musical composition, authorship, musical training and practices. We will see that, as B. E. Benson suggests, since a musical work needs to be *recreated* during performance, there is always some degree of improvisation involved, even in the most conservative of approaches (Benson, 2003). Even though we are dwelling into a

[5]This will be discussed thoroughly in section 1.3.

somewhat deeper philosophical discussion of composition, the goal of chapter 2 is to achieve a definition of Real-Time Composition that will serve as the basis for this dissertation's musical creation. Or, in other words, to give a possible answer to our starting question, which will then be tested in the process of music making.

In chapter 3, I will propose a model of a *performance ecosystem*[6], relying heavily on Walter Thompson's *SoundPainting* technique and method. This model, developed from the findings of chapters 1 and 2 - respectively, what do authors see as RTC, and my own definition of the concept - led to the creation of *Instant Ensemble - Ensemble de Composição em Tempo Real do Porto*, a Real-Time Composition ensemble created in early 2016. *Instant Ensemble* performed in three concerts, all of them using the techniques hereby described, whilst with an increasing degree of complexity in the interaction between myself, as a composer/conductor, and the musicians. Each one of them will be described in detail, in subsections 3.2.2, 3.2.3 and 3.2.4, respectively. We will see that, although this process takes place during the performance, it is heavily contingent on rehearsals, technique and regular activity, as it happens in traditional performances of classical music.

This analysis[7] - of each of the three performances, its pieces and context - will include a reflection on the strengths, weaknesses, possibilities and dead-ends of the RTC process, which will later be briefly stated and discussed on chapter 4. So, the outline for the present work can be summarised as follows:

1. State of the art;

2. Theoretical discussion and model

3. Applying the model in specific artistic creation

4. Drawing conclusions.

[6]This expression was originally presented by Eigenfeldt (2011).

[7]It is very important to note that this analysis will be made from the attached recordings, as there was no *score*.

1.3 What is Real-Time Composition?

Before we explore the historical uses of the term Real-Time Composition, as well as its different usages in literature, I find it helpful to discuss it first by itself, out of the context: what *could* it mean? Real-Time Composition is a term *composed* by two different ones: *Real-Time*[8] and *Composition*.

How can we define *Real-Time*? Most philosophers would ask a very unusual question: is time real? Defining time is one of uttermost important questions in music (since music takes place in time), but also one of the most difficult, as music itself shapes our own perception of time. As Jonathan Kramer describes it:

> Does music exist in time or does time exist in music? This question is not simply a semantic game. If we believe primarily that music exists in time, then we take time as an absolute, as an external reality, as somehow apart from the experiences it contains. I do not wish to deny absolute time totally but rather to posit a substantially different musical time. If we believe in the time that exists uniquely in music, then we begin to glimpse *the power of music to create, alter, distort, or even destroy time itself, not simply our experience of it.* (Kramer, 1988, p. 5).

Whatever our concept of time is (either in line with the Newtonian notion of absolute time, or the opposing view defended by Leibniz and Kant, which states that time is an intellectual structure which we use to perceive events), there is a necessary condition for it to exist, and that is an ordered flow of events[9], from the past, through present, towards the future. In the case of Newtonian time, this flow is real and takes place in a fundamental structure - time. If we follow Leibniz and Kant, the same flow is merely a matter of perception. However, in any case, we can place events on the past-present-future timeline.

[8]With *real* being an adjective.

[9]This definition is, actually, very alike that of music, in the sense proposed by, for instance, Edgard Varèse Varèse and Wen-chung (1966).

For instance, if we move an object from point A to point B, we can see time has passed because it has changed position (that is, events have taken place that have led the object to be moved).

So what is *real* time in this context? It seems to be related not to the status of time, but to the way we experience it, most particularly to a flow of information regarding the status of previously discussed events. We experience something in real-time if we have feedback about its status just as it is happening. The term was used this way in early computing theory. James Martin, on a book on Real-Time Computer Programming, in 1965, says: "A real-time computer system may be defined as one that controls an environment by receiving data, processing them, and returning the results sufficiently quickly to affect the environment at that time." (Martin, 1965, p. 4). So, the concept of real-time seems to require some kind of interaction, even if it is of information only, and a very short information delay from one element of the interactive system to another. It is no surprise, then, that the term RTC first appeared associated to computer music, as we will see: it was a major line of research in computer science.

Now that we have a basic understanding of what *Real-Time* is, we should now focus on the second part of the term, *Composition*. The New Harvard Dictionary of Music defines composition as "The activity of creating a musical work; the work thus created." (Randel and Apel, 1986, p. 182). According to this definition, composition is a general activity - we can argue that any process that results in a musical work is composition. We seem to find a contradiction when we look at the definition of improvisation, from the same source: "The creation of music in the course of performance."(Randel and Apel, 1986, p. 392). These definitions raise some questions: i) is an improvised piece not a musical work? If so, is composition the same as improvisation or, at least, improvisation a form of composition? ii) if a musical work is generated by a computer, does that mean that the computer is a composer? Or is the composer the person who programmed it? This discussion will be developed in chapter 2. We will look at Bruce Ellis Benson's contribution whom, on his book *The improvisation of Musical Dialogue*, distinguishes between eleven different shades

of improvisation, ranging from an interpretation layer all the way to musical works created as they are being performed (Benson, 2003).

We have seen that *Real-Time* seems to imply some interaction regarding the exchange of information about an event just as it is happening, and that the concept of *Composition* is related to the creation of a musical work. So, we can expect *Real-Time Composition* to be related with an interaction, involving an exchange of information about the state of some events (sound) as they are happening, resulting in the creation of a musical work. But, as we will demonstrate, the term has also come to mean some specific practices, especially related to generative music. Let us examine the two main areas that use it: computer music and improvisation ensembles.

1.3.1 RTC in computer music and interactive systems

Music has often been, throughout history, on the verge of technological development. If we think of the Pythagorean theory of Harmony and Math, the early printing of musical scores or the construction of deeply refined and complex musical instruments in the 17th and 18th centuries, just to give a few examples, we can see that music not only takes full advantage of existing technologies, but also serves as a driving force for innovation. As Jacques Attali puts it,

> Music, an immaterial pleasure turned commodity, now heralds a society of the sign, of the immaterial up for sale, of the social relation unified in money. It heralds, for it is prophetic. It has always been in its essence a herald of times to come. (Attali, 1985, p. 3-4).

It should be no surprise, then, that music has played a major role in the technological revolution of the 20th and 21st centuries. Ever since computers were able to output some form of sound, which happened in 1957, with the MUSIC software programmed by Max Matthews at Bell Labs, composers, musicians and technicians have been experimenting with the resulting compositional possibilities. As Matthews describes,

> It was immediately apparent that once we could get sound out of a computer, we could write programs to play music on the computer. That interested me a great deal. The computer was an unlimited instrument and every sound that could be heard could be made this way. (Chadabe, 1997, p. 108).

Since then, many people have tried the new compositional process that arises from computer interaction, but Joel Chadabe's work was ground-breaking in developing the concept of Real-Time Composition in the context of computer music, drawing influences from John Cage, Lejaren Hiller, Iannis Xenakis and his teacher, Elliott Carter. Working together with Robert Moog in the years 1966 to 1969, he developed the Coordinated Electronic Music System (CEMS), a modular synthesizer with the capability of automating controls, located (from December 1969 on) in the Electronic Music Studio at the State University of New York at Albany. This system allows for an interactive approach to composition, one in which the composer not only influences but also reacts to the computer's output. This interactive way of composing is also present in Salvatore Martirano's *SAL-MAR Construction*, built between 1969 and 1972, and was later developed by Chadabe. In 1977 he began experimenting with composing for (and with) synthesizers that, associated with a computer [10], interacted with him in *real-time* (Chadabe, 1977). This resulted in his works *Solo* (1978) and *Rhythms* (1980), handling with a very high degree of complexity in which the composer acts as a controller for the system's response.

By 1984 Chadabe was defining *interactive composing* [11] as "a two stage process of first creating an interactive composing system, then simultaneously composing and performing by interacting with that system as it functions." (Chadabe, 1984). There is a very important finding in this definition: being a two stage process, involving a design stage, where a compositional *procedure* is defined and created, and an operation stage, where the said process is set in action and where the composer/performer interacts with the system, it

[10] In some cases, when using a digital synthesizer (following John Chowning's work in the early seventies) this resulted in the first fully digital systems.

[11] As he says, "*Interactive composing* is the name I have given to a method for using performable, real-time computer music systems in composing and performing music" (Chadabe, 1984).

necessarily means that part of the creation must take place prior to the compositional process *per se*. So, not all the composition occurs in *Real-Time*[12].

The programmed system can - and should - include some form of randomness, as A. Eigenfeldt says: "If instrumental improvisation was one model for interactive electronics, randomness was its method of control." (Eigenfeldt, 2007). I find this to be of particular significance, as it means that, for interactive electronic music, we can try to influence the system but we can't force it to take a particular path, as it is not deterministic [13]. But that doesn't mean that randomness, being a necessary condition, is a sufficient one, that is, one whose presence alone assures us that we are in the context of interactive composition:

> Neither improvisation nor composition (Cage and his followers notwithstanding) relies upon randomness as a structural determinant; therefore, in order to fully exploit the potential of the computer as a compositional tool of organized complexity, one needs to move beyond randomness. (Eigenfeldt, 2008)

Carlos Guedes gives us a personal definition of RTC as follows: "a compositional practice involving interactive musical systems, in which generative algorithms with a stochastic behaviour are used and are being transformed by the composer during the course of a piece." (Guedes, 2008).

The concept of RTC in this context comes directly from the practice of digital interactive systems and Eigenfeldt describes it as follows:

> Real-time composition is the application of musical agents to interact in musical ways, during performance. Each agent has the potential to control an independent musical gesture - either pitch-based or timbral - and the complexity of the interactions, along with the quantity of simultaneous gestures, cannot be controlled in any detailed way using existing performative actions. In other words, knowledge of how to interact musically must be built into the agents, and an

[12] As we will see in chapter 2, this is actually impossible.

[13] As we will later see, this is very akin to what happens in collective improvisation within humans.

> environment created in which these agent's interactions can result in artistically interesting and compositionally satisfying sonic artworks." (Eigenfeldt, 2011, p. 146).

So, RTC involves the exchange of information and reaction between different agents, who are *programmed* to act in musical ways. A musical work resulting from this process is heavily dependent on its setting, on (controlled) randomness, but also on the pre-established rules. So Eigenfeldt views it as an ecosystem, a community of living and non-living organisms or, if you'd like, of willing and non-willing agents. But is it really necessary to have computers involved? Eigenfeldt says yes:

> Composition, therefore, requires deliberation in order to achieve an organised complexity: this is seemingly impossible in real-time, at least amongst humans. However, through the use of computers, it is possible to create a musical work during performance that has a correlation between elements of the system. (Eigenfeldt, 2008).

Eigenfeldt also clearly distinguishes composition from improvisation, based on the complexity level of the outcome:

> Real-time composition is not improvisation, just as improvisation is not RTC. Although RTC has evolved from improvisatory interactive systems, the complexity desired by composers in RTC cannot be controlled through existing performative methods used in improvisational systems, nor through constrained random procedures. (Eigenfeldt, 2011).

Eigenfeldt's point is that the layering and complexity that features in western classical music cannot be achieved both by humans and in real-time. Composers working prior to the performance can, according to him, reach that desired level, but it is impossible to do it during the performance:

> It would seem that such complexity cannot be accomplished extemporaneously and collectively, at least not in the creation of organized complexity. (...)

> While collective improvisation can produce such properties, its goals will be simpler by necessity, and the interaction of its parts limited, as its participants can only react to surface features (sound), rather than any developing underlying structures, implicit or otherwise. (Eigenfeldt, 2008).

Eigenfeldt's point contradicts the purpose of this dissertation, but it is based, I believe, on a frail assumption, which is that humans alone cannot reach, by themselves, the degree of excellence that composition requires, in real-time. We will get back to this argument (which, as we will try to show, in practice, in chapter 3, is not true) later on. Let us now take a look at the practice of collective improvisation.

1.3.2 RTC in improvisation ensembles

Improvisation has played a major role throughout the history of western classical music, ever since its dawn: "[Ancient] Greek music was almost entirely improvised." (Grout and Palisca, 2005, p. 19). The first examples of medieval music, even after the appearance of the earliest forms of music notation in Europe, around the 9th century, were also improvisational by nature:

> In dealing with decorations or divisions, treatises such as *De diminutione contrapuncti* and the *Compendium* of *Petrus dictus palma ociosa* offer not instruction in composition, but exercises in how to improvise a decorated contrapuntal voice upon a plain, evenly measured cantus. (Fuller, 2002, p. 493).

Even the word counterpoint, a fundamental technique in classical music composition, may be linked to improvisation in its origin: "In some treatises, in fact, the word *counterpoint* refers primarily to improvisation." (Schubert, 2002, p. 503).

Even though we know for a fact that most of the great composers were also great improvisers [14], the emancipation of musical notation transformed the understanding of mu-

[14]This was the rule, not the exception, in the Baroque (e. g. Bach, Buxtehude and Haendel), Classical (Mozart and Beethoven's ability for improvisation is the subject of many anecdotes) and Romantic (Schubert, Chopin, Brahms and Liszt were all notable improvisers) periods. It is not so noticeable from the 20th century on, with some notable exceptions, such as Olivier Messiaen and Harry Partch, among others.

sical work. Allowing for a musical piece to be notated is also to enable it to survive beyond the scope of the performance, to be studied, analysed and reproduced elsewhere. As Karol Berger puts it,

> Writing was not absolutely indispensable for the separation between composition and performance to occur: many composers have been know to be able to do a lot of work in their minds rather than in writing, and it is possible to transmit a work orally to the performers[15]. The importance of writing resides, rather, in the fact that the written text makes it possible for music to become and object available for scrutiny independently of the real time of a performance. Thus, thanks to the written text, music can acquire the character of an object ("work" in the traditional sense of the term) distinct from its performances. (Berger, 2000, p. 117).

The ability to record music, in the 20th century, also changed our perception on the nature of the musical work, allowing for parts of pieces that were created in real-time, such as solos in Jazz, to live beyond the performance. Although this may seem a revolutionary technology, we can find similar examples in the history of classical music, some centuries ago. The work which we know as Allegri's Misere is actually somewhat different from the original source. It includes an embellished, improvised line, which was probably sang by an element of the Papal Chapel choir using counterpoint improvisation techniques and later transcribed (Byram-Wigfield, 2016). There is some evidence that some of Bach's works are transcriptions of his own improvisations, such as in the case of a *Ricercare*, included in *A Musical Offering* (Kivy, 1983)[16].

Even though western classical music has somewhat abandoned the practice of improvisation as a major driving force, due to its conceptions of musical work, authorship and pedagogy, as we will see in chapter 2, other musical styles have, perhaps not surprisingly,

[15]For example, in the case of traditional or folk music, where the oral transmission is also the source of musical preservation.

[16]Although this is controversial and there is almost certainly a process of refinement during the writing down, improvisation is still a major source for composition.

embraced it. Such is the case of Blues and Jazz (but not Rock, where, despite a general lack of musical notation, songs are composed and fixed in form, rather than improvised on), among may others[17]. This could mean that the desire for musical spontaneity and free creation, even from the part of the audience, is an essential aspect of music-making.

In the last 30 to 40 years, following the aftermath of the free-jazz revolution of the 1950s and 1960s[18], there have been some attempts in achieving some guidance and control among the (possible) chaos of collective free improvisation. This often involves having someone in control who makes the decisions in *real-time*, or having a set of non-musical rules established before the performance. One of the examples is *Soundpainting*, a technique developed by Walter Thompson for *live composing*, described as follows: "Soundpainting is the universal live composing sign language for the performing and visual arts." (Thompson, 2006). It is a technique that comprises more than 1200 gestures that are signed by the composer, called *soundpainter*, and then interpreted by the performers, who execute the signed material, according to its parameters[19].

Thompson developed Soundpainting around 1984 out of the need to communicate (non-verbally) with the members of his orchestra in real-time:

> During the first year with his orchestra, while conducting a performance in Brooklyn, New York, Thompson needed to communicate with the orchestra in the middle of one of his compositions. They were performing a section of improvisation where Trumpet 2 was soloing. During the solo, Thompson wanted to have one of the other trumpet players create a background. Not wanting to emulate bandleaders who yell or speak out loud to their orchestra, Thompson decided to use some of the signs he had experimented with in his Woodstock days. (...) He tried it and there was no response! But in the next rehearsal, members of his orchestra asked what the signing was about? and he told them. The orchestra

[17]Even DJ-ing, for instance, is fundamentally improvisatory in its nature.

[18]Where musicians such as Ornette Coleman, Pharaoh Sanders and John Coltrane took the creative freedom of Jazz to an extreme, with a strong emphasis on collective improvisation.

[19]For a thorough look at the nature and meaning of Soundpainting, see (Duby, 2006).

members thought it was a very interesting direction and encouraged Thompson to develop the language further. (Thompson, 2006, p. 12-13).

Thompson describes Soundpainting as a "live composing sign language for the performing and visual arts." (Thompson, 2006, p. 12-13). The leader of the ensemble, named soundpainter, serves as both a conductor and a composer. Traditionally, the conductor, either in Classical Music or in Jazz, uses a set of gestures to indicate when and how previously composed music is to be played. This is also true in soundpainting, but the soundpainter also decides on the content of the material to be played. This material can be created by himself, either previously or during the performance, or can come as a consequence of the free improvisation of the participants.

As mentioned before, the Soundpainting language consists of more than 1200 gestures that are generally grouped according to either syntax or function. The four syntactic categories (with five examples for each of them) are[20]:

1. Who? - Which performers or groups are these directions aimed at?
   (a) Whole Group - everyone;
   (b) Electronics - musicians playing the electronics, either tape or live;
   (c) Brass - musicians playing brass instruments;
   (d) Actors - the group of actors;
   (e) You - the person directly signed;
2. What? - An indication of either the material or an action related to it or the other members of the ensemble;
   (a) Long Tone - a long, sustained, pitch or sound;
   (b) Hit - a very short, staccato, pitch or sound;

[20]These examples can be explored further in the Soundpainting workbooks by Walter Thompson, which also include a visual description and a DVD.

(c) Minimalism - a continuous and rhythmically organised succession of sounds or pitches (i. e. a riff);

(d) Memory - performers memorize their current actions. They can later be recalled;

(e) Palette - a previously composed and/or excerpt;

3. How? - Gestures indicating the way of playing the material. This is, sometimes, optional;

   (a) Volume Fader - an indication of the volume, from *pianissimo* to *fortissimo*

   (b) Tempo Fader - an indication of the tempo/beat;

   (c) Density Fader - a measure of the activity, that is, the number of events to be played;

   (d) Classical Music Feel - in the style of classical music, on a broad sense;

   (e) Legate - with all the notes connected, in a smooth, even style;

4. When? - Defining the starting and ending points.

   (a) Play - start immediately at the end of the gesture;

   (b) Off - stop immediately;

   (c) Exit Slowly - find an end to your improvisation in the next 5 seconds;

   (d) Finish Your Idea - finish your improvisation in a conclusive way in the next minute;

   (e) Duration Fader - the amount of time you have available for your improvisation;

One of the most interesting things in Soundpainting, in my opinion, is that it effectively works as a language. It is possible to combine words, or, in this case, gestures, to produce phrases of varying complexity, allowing the Soundpainter to, if he likes, have a great deal of control over the ensemble. Here are two sample phrases to demonstrate this:

1. Simple phrase, where the whole ensemble plays a long tone of their choosing:

(a) Whole Group (who?)

(b) Long Tone (what?)

(c) Play (when?)[21]

2. Complex phrase, where the percussion continues improvising according to their instructions and the rest of the group starts, somewhere in the next 5 seconds, a pointillistic texture with little density using only the note C played softly using extended techniques:

   (a) Percussion (who?)

   (b) Continue (what?)

   (c) Rest of the Group (who?)

   (d) Pointillism (what?)

   (e) Density Fader [Low] (how?)

   (f) With (what?)

   (g) Note Mode [C] (what?)

   (h) With (what?)

   (i) Extended Techniques (what?)

   (j) Volume Fader [low] (how?)

   (k) Start Slowly (when?)

This second phrase, while allowing for greater control from the soundpainter's part, is still open to interpretation (in the same way a musical score is). Also, being a language, there are at the moment many different dialects being used, as composers and performers adapt the main language to serve their purpose, changing gestures, adding and removing others, and combining them in peculiar and characteristic ways[22]. This obviously results

[21]Note that this phrase does not include a *how* gesture.

[22]As we will see in chapter 3, in Instant Ensemble we adapted many of these signs to mean different things than their original meaning.

in different musical outcomes. It is a living and evolving organism itself, adapting to its circumstances.

As we saw earlier, on subsection 1.3.1, some authors defend that the complexity desired in western classical music composition is not attainable in real-time in improvisation ensembles or with humans. This statement may seem valid, especially when looking to the history of collective improvisation until recently, but, in my opinion, the inclusion of an outside figure that does not produce any sound (as the conductor in a classical orchestra), but has the responsibility of leading the ensemble and making compositional decisions regarding the material and form, clearly refutes it. This figure, that serves as the pilot Xenakis mentions in a case *for* computer music (Xenakis, 1971), in deciding, in real-time, where to lead the ensemble, is, in fact, composing, not improvising.

In the next chapter we will try to make the distinction between these two concepts - composition and improvisation - clearer, now that we have seen the different ways the term Real-Time Composition is used, its history and its aesthetics.

Chapter 2

Real-Time Composition as a Concept

In the previous chapter, after stating the motivation, goals and methodology of the present dissertation, we had a look at different conceptions of Real-Time Composition as a concept (i. e., the *state of the art*). These views ultimately depended on the authors' definitions of composition, musical work, and their relationships to improvisation.

In this chapter we will attempt to reach a working definition of the concept, one that will serve as the guide to musical creation. In order to do so, we will begin by exploring the nature of a musical work, then proceed to debate the role improvisation plays on the process of music-making. Finally, we will see that this process is, in its essence, fundamentally interactive, even in the case of traditional composition.

2.1 What is a Musical Work?

It is, perhaps, impossible, to provide a general definition of a *musical work*, as it is essentially contextual, across time and musical genres. For classical music (in the strict term, meaning the classical style of the eighteenth century[1]) it might refer to the interpretation of a musical score, the acoustic manifestation of the codified symbols on paper, but, for Folk musicians, it might be a melody passed from generation to generation by the means of

[1]Note that just two centuries before, what was considered a musical work might have been very different.

playing it. For Rock music, it probably means a particular recording (let's say, for instance, that Pink Floyd's *Time* is the musical piece that was recorded in 1973's *The Dark Side of The Moon* - not a particular transcription on paper or cover), and for Jazz, a Standard is not only the written (or recorded) music, but also its recreations by other artists[2].

So, for the purposes of the dissertation, let us focus on the musical work as seen in the main current practice of western classical music. This is important because, to quote B. E. Benson, "[due to it] we tend to assume that music making is primarily about the creation and preservation of musical works." (Benson, 2003, p. 3). In other practices, music making could be not about creating a work (i. e. something that stands the test of time, existing beyond the scope of the performance) but, very simply, about making music[3].

For Benson "there are two basic concepts that are particularly prominent in that practice, and thus in our thinking. They are (1) the ideal of Werktreue and (2) the ideal of composer as "true creator." (Benson, 2003, p. 3). *Werktreue* can be translated as faithfulness to the work, so it implies that the work itself is an autonomous entity (even, it can be argued, autonomous from its creator), almost in a Platonic sense of idealism and spirituality. Since music is a performative art, constituted purely by sounds, which must be *played*[4], the goal of the composer is to produce a set of rules and guidelines, in a visual form, that allow the performers to reach, as much as possible, the deeper inner truth of a musical piece. The performers serve as a medium who represent (and preserve) the meaning of a musical work, which exists beyond time and space. Particular performances are, then, a physical (*real*) embodiment of an ideal entity, allowing other people to experience it (through sound, which also serves as a mean of communication).

---

[2]As a clear example, *My Funny Valentine* was composed by Rodgers and Hart in 1937. But when we think of it, it is almost impossible to not take into consideration the versions by Chet Baker, Frank Sinatra, Ella Fitzgerald or Miles Davis, just to name a few.

[3]Such is the example of aboriginal music, which deals primarily not with preserving works, but preserving a cultural identity from the past, a primordial relationship to the natural world (Bracknell, 2014).

[4]Berger argues that "(...) the musical work is constituted not by the written "text", the score, but by the actual sounds produced by the singing or playing musicians (or by the sound-generating or -reproducing machines)(Berger, 2000).

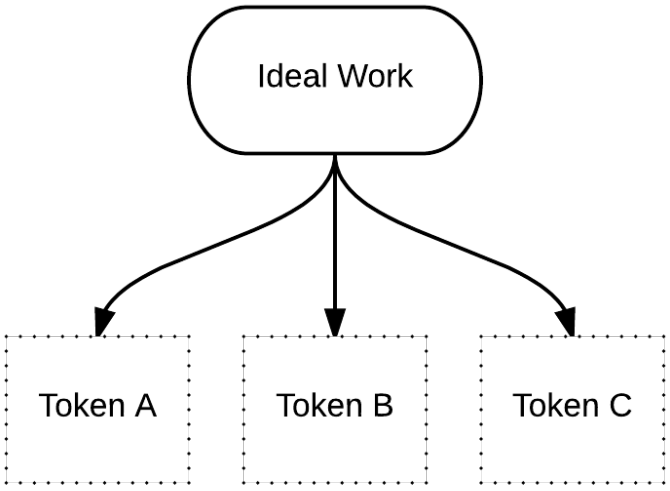

Figure 2.1: A diagram illustrating the type vs token dichotomy

This obviously has a consequence on musical pedagogy. Learning music is learning how to decipher the musical symbols present in a score (such as notes, dynamics, articulation and rhythm). But it is also much more than that, as we will see in section 2.3, it is to interpret the deeper meaning or truth they represent. This is a romantic, post-Kantian notion, as stated by Schopenhauer[5], and directly results in a need to honour the musical score, thus limiting creativity in the act of performance to those dimensions not directly represented in it.

The second idea that shapes our understanding of music, is that of the composer as true creator. As Bensons states, "(...) the way we conceive of the composing process minimizes the influence of tradition (not to mention the role of effort) and instead emphasizes the special "powers" of the individual composer." (Benson, 2003, p. 10-11). This is also rooted on the romantic ideal of the unparalleled genius of classical composers, which is, at times, very questionable[6]. This also has an ontological implication on musical performance: interpretation also serves to decode the will of the composer. In creating (and, particularly,

[5]See Schopenhauer (1844).

[6]Many of the stories we have come to know are actually not true. Byram-Wigfield deconstructs the mythical telling of Mozart transcribing Allegri's Miserere at age 12, for instance (Byram-Wigfield, 2016).

in writing) a musical piece, the composer is also dictating a set of the rules that future performers must comply with: they are merely an intermediate in the process of communicating the composer's (and the work's) will to the audience: "They are like priests whose prestige comes from being mediators between listeners and the great composers." (Benson, 2003, p.11).

Classical music, as a practice, exists as a very wide array of heterogeneous traditions, including schools of thought, styles and aesthetic approaches. Musical works (in particular musical *masterpieces*) are polysemic, that is, they have multiple meanings. These meanings are dependent on subjective factors, which are, in turn, influenced by said (heterogeneous) traditions. What is the criteria, then, to determine a work's true meaning? And what about the composer's will? Are they the same thing? As an example, let's take Léonin's *Viderunt Omnes*, a two part *organum* (in the style that came to be known as *ars antiqua* presumably written in the late 12th century at the Notre-Dame Cathedral, in Paris. The aural world in Paris, in the 12th century, was almost certainly very different from ours. How can we have a clear idea of the composer's will?[7]. The world we live in is different in so many ways that there is no way to be sure. What about the work itself? Hasn't it also evolved since its creation, with distinct interpretations throughout history? Does it have the same meaning now as it did then? In my opinion, these central questions really do value the performer's role - he is not only interpreting but also creating, as we will see in section 2.3.

For me, as a composer, even though I have the utmost respect and admiration for the traditional approach to classical music interpretation and creation, it is quite difficult to see myself as someone who creates *works*, rather than pieces, or as someone who imposes his will on performers. I tend to view myself as a part of a music making community, and I hope this sharing approach is a central aesthetic element of *my* music. We will continue this discussion in particular in section 2.4. Rather than focusing on producing musical works (to use Benson's terminology, an *Ergon* (Benson, 2003)), I argue that RTC focuses on the activity (the *Energeia*), making all the elements of the performance ecosystem a part of it.

[7]Even knowing if Léonin was, in fact, the composer, is not an easy task.

2.2 The Composer as an Improviser

As we have seen on section 1.3.2 some of history's great composers were also great improvisers. But could it be that improvisation is actually central to the activity of *all* composers? Arne Eigenfeldt, who, as we have seen, argues that composition is substantially different from improvisation, also states: "I have come to believe that the initial stage of composition is, in fact, improvisational." (Eigenfeldt, 2008). This refers to the initial act of first composing a musical piece: getting an idea, (for a rhythm, form, melody, harmony, texture, process...). Where does it come from? This initial creative spark has been the object of much debate, not only in the artistic world, but also in the field of epistemology, concerning the origin of scientific knowledge, but the case for unexplainable genius seems to be taking a downfall, as Joe Henrich, from the University of British Columbia, quoted by Tim Vernimmen, explains: "I think the idea that innovation depends on individual geniuses is misguided. History shows that inventions invariably build on earlier findings that are recombined and improved upon." (Vernimmen, 2016).

When looking for new material we, composers, generally take one of several approaches, depending on our personal method, but, in my opinion, they all share one thing in common: improvisation. We can, for instance, start humming a melody, improvising on a scale. Or we can start playing some chords on the piano, trying to make sense of the pitch collections, to order them in groups and sequences, improvising on interval relationships. We can sketch the overall shape of our piece, improvising (visually) on known forms and narratives. We can even draw a sequence of numbers from a poem, or from a pair of dice, and begin to assign pitches, rhythms or dynamics, improvising on mathematical relationships. But we will, surely, start a piece with some sort of improvisation.

The general focus of the traditional approach to composition is on what comes next: the craftsmanship process which articulates isolated ideas into coherent musical pieces, that is, the technique of development, orchestration, harmonization, phrasing, counterpoint. These are the *techniques* that are generally taught and reflected upon: the *métier* of the

composer, but, even here, improvisation still has a very important role to play. Orchestration, for instance, is not, by all means, deterministic. There is not only one true way of orchestrating a musical passage, and even the most experienced composers (Beethoven and Bruckner come to mind) often experiment with different results, even after a piece is *finished*.

Improvisation is rarely taught on composition courses and classes, but, as Hickey suggests, in a call for the inclusion of free improvisation in the school curriculum, it is important not to try and *teach* improvisation in the traditional sense, but rather to create an environment, based on deep listening and reaction to other elements, that allows for unbound musical exploration from the student (Hickey, 2009). I find this approach[8] to be very beneficial not only to improvisers but also to composers, *writing* music in the traditional way. Instant Ensemble, the musical group I created in the context of this dissertation, incorporates some composition students as performers, as I tried to build a space that allows for free expression and experimentation. In my case, the process was also very helpful in finding *inspiration* and ideas for *written* musical works.

In short, by dissociating composition and improvisation, we might be taking away the full potential for musical creativity and I argue that RTC is a context that allows composers to experiment, thereby creating a nurturing environment for musical ideas, which could even result in traditional *written* works. Furthermore, being the composer's instructions also subject to interpretation (and, as Eigenfeldt and Chadabe suggest, with randomness being a very important factor[9]), he is also forced to adapt and react, that is, to *improvise*. And since improvisation is always central in the practice of composition, a RTC environment that uses it extensively is merely an extension of the existing tradition.

2.3 The Performer as an Improviser

As we have seen before in section 2.1, the practice of classical music performance and interpretation is closely related to the idea of a musical work, its idealism and the will of

[8] As we will see, it is very akin to my model of RTC.

[9] See subsection 1.3.1

its author. The performer, then, is almost forced to submit his own will and creativity to a greater good. In the words of Igor Stravinsky:

> The idea of interpretation implies the limitations imposed upon the performer or those which the performer imposes upon himself in his proper function, which is to transmit music to the listener.
>
> The idea of execution implies the strict putting into effect of an explicit will that contains nothing beyond what it specifically commands.
>
> It is the conflict of these two principles - execution and interpretation - that is at the root of all the errors, all the sins, all the misunderstandings that interpose themselves between the musical work and the listener and prevent a faithful transmission of its message. (Stravinsky and Knodel, 1947, p. 122)

The score is, as we discussed, the main source used by the performers to know how to represent the work in question, by interpreting a set of symbols that, in turn, represent the crystallization of the composer's musical thinking. But setting the *work* to paper also carries two consequences: i) it makes the work itself autonomous, and therefore open to a wide array of interpretations, which can be very different from that of the composer[10] (Benson, 2003, p. 79); ii) since the score is itself more or less ambiguous, it allows the performer to add a layer of interpretation: "Thus, the score, for Ingarden[11], can best be described as a kind of sketch of what one hears in performance: it prescribes the basic contours of the piece and allows the performer to fill in the rest." (Benson, 2003, p. 80).

The performer, then, is always forced to make decisions regarding the musical text, even if he is not aware. These choices can come, themselves, from musical tradition: in the case of Baroque music, dynamic markings are generally absent from the score, but they must be played anyway, and there are conventions showing us how to. But the interpreter must, by definition, improvise at least something, due to the extreme limitations of the

[10]My personal experience also tells me that composers are not, most of the times, the best interpreters of their own work.

[11]Benson is actually reflecting on Roman Ingarden's view of the work of art, in *The Onthology of Music*, one which he shares.

musical score[12]: "Not only do performers have *room* for improvisation but also it is *required*." (Benson, 2003, p. 82)[13] This is very important because it means that improvisation is central both to composers and performers - and it is precisely this close relationship that is proposed later on in our model of Real-Time Composition.

Also, the performing activity is also paramount in keeping the musical work alive, so it is a kind of conservation. In doing so, and with the changing paradigms and new developments arising, we can say that the work itself also changes, leading to the reformulation of the type/token diagram as follows:

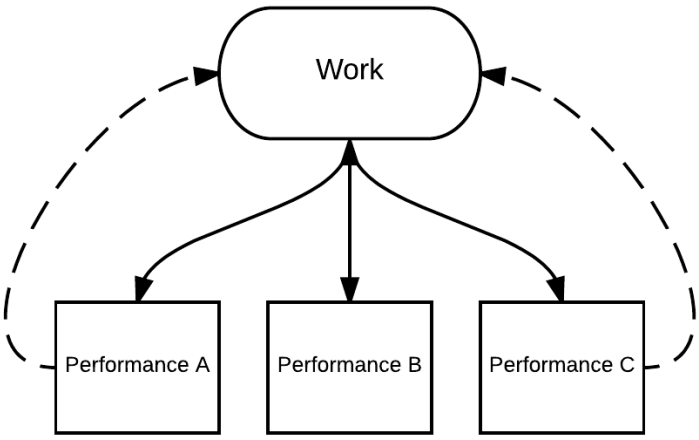

Figure 2.2: A representation of the cross-influential network of work and performance

Composers have always been aware of the limitations of the musical score, and have, sometimes, taken advantage of it aesthetically. The *New Complexity* approach and aesthetic statement relies precisely on these limitations and the new possibilities they, in turn, allow: "Beyond the notation lies a complexity of relationships that New Complexity composers are consciously aware of, and which is explicitly employed in their work." (Duncan, 2010). In creating works whose reproduction is very complex, technically challenging and involving

[12]In Stravinsky's words, " it always contains hidden elements that defy definition because verbal dialectic is powerless to define musical dialectic in its totality." (Stravinsky and Knodel, 1947, p. 123).

[13]Benson goes on to distinguish eleven different shades of improvisation, ranging from the subtle filling in of details not present in the score to free musical creation in real-time(Benson, 2003, p.26-29).

many different and ever-changing dimensions, New Complexity composers attempt to place interpreters in ever so difficult positions, allowing their musicality to come through.

Perhaps on the different side of the spectrum we have Stockhausen's concept of Intuitive Music. By giving the performers instructions in the form of words, phrases and graphical notation [14], Stockhausen challenges them to reach their inner musicality (curiously, he does not wish them to improvise! (Stockhausen and Maconie, 1989, p. 112)). It is the deep ambiguity of the musical text that, in this case, is the main source for interpretation.

Whatever the case, improvisation, even when not specifically called for by the composer[15], is essential to the performance of music. The difference between a historically accurate performance of a baroque instrumental suite and a piece created in real-time by signing different gestures to the players is not of status - it is of the degree of improvisation involved. Real-Time Composition, as I define it, then, is not a break from tradition - it is its extension, giving performers their rightful status of co-creators in musical pieces, something that has always happened but has not always been accepted.

2.4 The Music-Making Ecosystem

In the previous sections of this chapter we have briefly discussed how music making is an activity involving multiple agents, and focused on composers and performers. If we think of a symphony orchestra[16] as a model, there are many people involved other than the performers, the composer and the conductor. From the editor to the musical archivist, the stage technician to the people handing out programs, the designer to the box office, electricians, the architect who designed the hall, the concert assistant, the audience... It's a never-ending list! Living in society is being part of a vast and far-reaching web of inter-relationships and inter-dependencies, where knowledge is spread throughout different nodes

[14] As in the case of *Aus den Sieben Tagen*.

[15] A practice that has also grown since 1945.

[16] And Robert Flanagan provides an interesting economic analysis on the challenges orchestras are facing (Flanagan, 2012).

or different people. Making music is not different: it is, inevitably, a social activity, one that takes place in a particular community.

As composers we are part (and only a part) of that community, so the Kantian model of the artist as a lonesome creator, one that still finds expression nowadays is highly questionable. Developing that sense of community, sharing experiences, knowledge and values, incorporating and respecting difference and heterogeneous views on music is a central aspect of the present project. So composition, or in this case, Real-Time Composition, is in itself a political activity.

When we mentioned the community, let us not forget that we can define it in a very broad sense. As Benson says,

> Much listening to music today would seem to be in an individualistic context (...). Yet, even listening to music [alone] is an experience that includes an other, in an analogous way to reading a text. However far the other is away from us, however much we are unaware of the other and think of our musical experience as private, there is still a sense in which we are connected to others: to those who have made (or else are currently making, if it is a live performance) the music to which we are listening and the musical tradition to which they in turn are connected. (Benson, 2003)

In short, making (or even listening to) music is being part of a community. In the community we are also including traditions, as a set of practices, approaches, techniques and values developed throughout the history. In music, these traditions include musical instruments, music theory, instrumental technique, notions of form, style and even *taste*. In a concert, we are not only telling the abstract story of the music played, its composer and the performers. We are also telling the stories of everyone involved.

In this sense, Real-Time Composition is no different from traditional music making. We are not breaking through with tradition: we are merely expanding it. But we are also putting this ecosystem directly under the spotlight and using this network of relationships (between composer, instrumentalists, the audience, and the *environment*) as an autonomous

creative force, according to the scheme that follows:

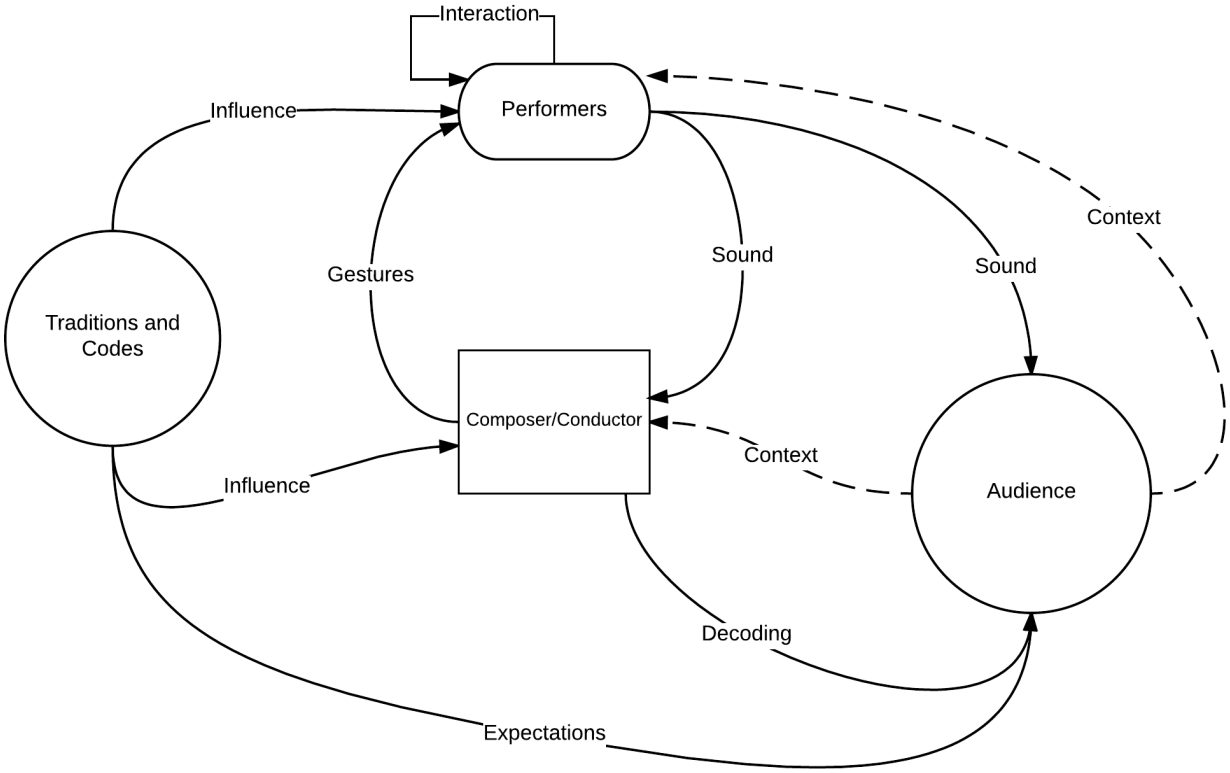

Figure 2.3: The RTC model/environment

In the model of RTC I am proposing, which resulted in the creation of Instant Ensemble, as we will see in the next chapter, I find it very beneficial to have an ecosystem as rich as possible, because it results in a more creative environment, which nurtures creative ideas, but also because it allows for more possible paths in the development of those ideas. As such, I have tried to include musicians with different backgrounds, thus resulting in a richer network of relationships between them.

2.5 Defining Real-Time Composition

In this chapter's previous sections, we have seen that Real-Time Composition is an activity that emerges from the classical western music tradition. We have briefly discussed

the role the conception of musical work, the composer, the performance, and the surrounding ecosystem, including traditions, affect it. In the previous chapter we have also seen some definitions of Real-Time Composition by other authors. It is now time to attempt to define it for the purpose of this project:

> Real-Time Composition in music is an activity where a composer/conductor interacts during the performance with a set of musical agents (either human or virtual) who sonically respond in the form of (restrained) improvisation, always involving some form of randomness.

Let us take a step by step analysis of the concept:

1. ...an activity... - as we have seen, RTC is concerned not with *Ergon* but with *Energeia*, that is, it intends not to produce a *work*, but, more simply, to make music. That is not to say that musical works do not exist, but simply that the focus is on the process and the activity, which may result in very different outcomes, albeit maintaining some identity;

2. ...where a composer/conductor... - this is, in my opinion, the major difference between RTC and free improvisation: the idea of having someone in control, taking the lead, although left out of the sonic process (that is, a *silent* leader). This figure works as a strategist with an outside view of the process, who takes decisions related to material and form: he is both a composer and a conductor: "*We could say that the composer is at the helm of a ship that sails the listener on a fantastic voyage*"(Roads, 2015, p. 29). In the case of Soundpainting, his body is also the musical score;

3. ...interacts during the performance... - interacting means that information flows back and forth throughout the system, that is, that the composer's instructions are interpreted and responded in *Real-Time*. The composer also listens to this musical feedback (and to the environment) and reacts, leading the ensemble in new paths;

4. ...with a set of musical agents (either human or virtual)... - this is one of the most versatile aspects of RTC: it can be used with any combination of musicians, from

any background (in fact, it can be used with any combination of artists, as it allows for multi-disciplinary creation in art), but also with digital interactive systems. Some authors[17] argue that the desired complexity cannot be achieved in free improvisation ensemble, only with computers, but, from my perspective, the inclusion of a composer/conductor (as in the point 2 of this list) challenges this assumption. It is both possible and desirable to incorporate the already rich tradition of algorithmic and generative music, as well as that of intuitive music;

5. ...who sonically respond in the form of (restrained) improvisation... - as we have seen in number 3, RTC implies and interaction. Performers respond with music improvised according to the restraints suggested by the composer. For instance, the composer can shape an ongoing improvisation to become more pointillistic, minimalist, based on long tones, incorporate extended techniques, and so on;

6. ...always involving some form of randomness. - RTC is not, by all means, a deterministic process. Although it is possible (and sometimes even desirable) to incorporate bits of previously composed material, its interactive nature implies that chance has a major role to play. When dealing with human players, this chance comes from the performer's own will[18]. When interacting with a digital system, some random number generator must be set in action, otherwise the "composer" would be simply triggering pre-established, deterministic processes. It is important to note, however, that randomness "*doesn't liberate the composer from its artistic responsibility*"(Essl, 2013, p. 298)

This definition, arising from the theoretical discussion in chapters 1 and 2, will be used as the guide for creating an ensemble constituted by musicians, resulting in three concerts at the time of the writing, each one of them with a different context. In the next chapter we will look into the details.

[17]As seen in 1.3.1.

[18]Shaping this intent is one of the key techniques involved in RTC.

Chapter 3

The Practice of Real-Time Composition

Having defined Real-Time Composition, it is now time to describe, in some detail, the artistic production it has triggered. In doing so, we will first begin by looking at some existing groups and pieces who served as an inspiration and have led the way. Then we will look at the context in which Instant Ensemble was created, its purpose and line-up. We will, then, proceed to an analysis of the three concerts that have already took place, and the "*pieces*" that were played.

3.1 Established Groups, Practices and Methods

As noted before, improvisation is central to some musical styles, such as Jazz, but for the purposes of this work, we are focusing, as much as possible, on the tradition of western classical music. Improvisation has always played *some* role in the music making process, but up until recently it has been almost entirely left out of the musical pieces themselves. Out of the multiple paths emerging on the post war, since 1945, some of them have changed this.

It would be almost impossible not to mention John Cage's seminal work on incorporating chance on his works from the 1950s onward, and the impact it had on other composers such as Earle Brown[1]. Curiously enough, these composers prefer the use of randomness and

[1]For examples of scores incorporating change and randomness, see John Cage's *Notations* (Cage, 1969) and Theresa Sauer's update on that, *Notations 21* (Sauer, 2009).

chance over improvisation[2], as the latter is usually related to the performer's preferences.

One example I find worth discussing is John Cage's *Imaginary Landscape no. 4*, for twelve radios, with twenty-four players and a conductor. In this piece, written in 1951, each of the radios is controlled by two performers: one controls the tuning, that is, dialling in radio-stations, and the other controls amplitude (the volume) and timbre. Even though it is very precisely notated, it is impossible to foresee the outcome precisely, as it depends on the radio waves being broadcast at a given time, in a given place. It is, then, deceptively simple and a fine example of how the same process can lead to very different musical outcomes: even though the composer has a great degree of control over how the piece is to be played, he doesn't control the sound result at all.

Shortly afterwards, Stockhausen also began exploring with indeterminacy and improvisation, following Cage, Brown and, notably, Morton Feldman[3]. Later the following decade, in the 1960s, Stockhausen developed the aesthetic approach titled *Intuitive Music*. One of the most representative examples is *Aus den Sieben Tagen*, composed in May 1968, a collection of 15 pieces whose *score* consists of a descriptive text[4]. Here is an excerpt of the text from *Set Sail for the Sun*[5]:

"*play a tone for so long*
until you hear its individual vibrations

[2]See Cage (1961).

[3]Whose piece *Intermission 6*, written in 1953 and played by David Tudor, was very important for the creation of the well-known *Klavierstücke XI*.

[4]In the case of *Unlimited*, it also includes a graphic sketch.

[5]Note that aside from the text itself, the type writing and setting on paper are also determinant, in my opinion.

hold the tone

and listen to the tones of the others

- to all of them together, not to individual ones -

and slowly move your tone

until you arrive at complete harmony

(...) "

As we see, Stockhausen gives each member of the ensemble *precise* indications, but these can be interpreted very differently from performer to performer, according to their feelings and experiences. As we discussed in section 2.3, Stockhausen also does not wish the performers to *improvise* but to follow his instructions as closely as they can, relying on their intuition: "I try to avoid the word improvisation because it always means there are certain rules: of style, of rhythm, of harmony, of melody, of the order of sections, and so on." (Stockhausen and Maconie, 1989, p. 113). This is not so different from the earlier example from John Cage, and it is very alike what happens during a Soundpainting performance: the soundpainter signals a particular message to a player or group of players and expects them to follow their instructions strictly, although he does not control the actual outcome. That is up to the performer's set of expertise, taste, technique and experiences. Again, I find this not to be that different from traditional western music practice. It is a difference of degree, not of status.

From 1974 on, John Zorn has developed a set of game pieces, the most well-known of which is *Cobra*, which consist of a system and a set of rules allowing for musical interaction[6]. These have become very well-known and played in many places and contexts. Although it may be argued that these are actually closer to the concept of an open work, or a work in open form[7], it also emphasises real-time decision making, interaction and restrained improvisation in a collective setting. All of these are fundamental to the practice of RTC as discussed in the present dissertation.

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[6](Zorn, 2008)

[7]Such as the already mentioned Stockhausen's *Klavierstücke XI* or Brown's *Twenty-Five Pages*.

Software development has also been extremely important in the dissemination of RTC, particularly today, when it has become almost ubiquitous. The seminal work (in musical software development) of Xenakis, Gottfried Michael Koenig and Barry Truax in the transition from the 1960s to the 1970s was followed by a very wide array of composers/programmers, supplying music creators with the tools needed for RTC in a digital context (Guedes, 2008).

When it comes specifically to collective live composition, and despite Instant Ensemble being one of the first groups of its kind in Portugal[8], instrumental live-composing groups already have quite a history. Walter Thompson created his orchestra, aptly called Walter Thompson Orchestra, in 1984. Since then, he has performed all over the world and produced some recordings, which include *Soundpainting Haydn*, a deconstruction of existing pieces by Bach, Haydn, Beethoven, Stockhausen, [Anthony] Braxton and Ives, and *PEXO - A Soundpainting Symphony*. These recordings (as with multiple video settings easily found online) allow the activity to result in musical works. Even though RTC is a practiced based on the activity of music-making, not on producing musical works, these eventually end up being an almost inevitable by-product.

Since 1984, a number of soundpainting Orchestras have been created throughout the world, mostly on the US and in Europe. Some examples[9], among many others, are the Danish Borderline Ensemble, French KLANGFARBEN ensemble and Tours Soundpainting Orchestra, and the German Berlin Soundpainting Orchestra. The multitude of approaches to this art, allowed for the appearance of a multitude of dialects, allowing the language to evolve and adapt. Including performers from other fields, such as actors, dancers, and visual artists, allows for the process to be expanded even further, exploring the common ground between these different practices: how can dancers, as an example, interpret a minimalist gesture? How can an actor represent a long tone? How will visual artists represent extended techniques? As a consequence, Soundpainting results in a creatively rich and multidisciplinary environment.

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[8]There is a Lisbon Soundpainting Orchestra, founded by french soundpainter François Choiselat.

[9]Although we are focusing on the soundpainting system, there have also appeared different practices, such as Norbert Stein's PATA, and Tim Steiner's signal method.

3.2 Instant Ensemble - Ensemble de Composição em Tempo Real do Porto

The idea for creating a live-composition ensemble here in Porto first came to me in February 2014, after taking part, as a performer, on a Soundpainting workshop followed by a film concert, led by french-portuguese soundpainter Philippe Martins[10], where several short animated films were scored live. Throughout the duration of the workshop, I remember being amazed at how easily some musical results, which involve a great degree of craftsmanship to score according to traditional music notation, and great skill to interpret as a performer, were achieved. As an example, creating a pointillistic texture of varying density with the whole ensemble only involves two to three gesture and the result is very organic. It can be interpreted by anyone, regardless of the degree of musical ability, whereas playing random notes written on paper takes years to master.

Furthermore, I felt that it placed the emphasis on the right things, particularly for a new ensemble. As a ad-hoc set of musicians and instruments who had rarely played before, we had to rely on musical interaction from the beginning and by default. If you have to read a score, your initial focus is on the paper itself and on the conductor but, as we were creating the piece collectively in real-time, we had no chance but to listen to one another and to try to figure out our role in the whole of the ensemble. This would have been very difficult for a new orchestra, as was the case, if we had been playing traditional western music. So I felt that live-composing in a collective setting is inherently social in its foundation, as is music.

One thing that still fascinates me from that time, two and a half years later, is how much in control the composer (that is, the soundpainter) was. Even though we were freely taking part in the process of creating music, he still could influence and change the whole musical outcome in a split second, so his intent still shaped the music making process. This is also noticeable for the audience, who, in most cases, can also see the soundpainter and its gestures, so they can still have a grasp of how the music is being made, and see it organically

[10]The concert was titled *Bandas Sonoras Instantâneas II* and took place at Casa da Música.

evolve from the set of instructions the soundpainter gives. As in the case of traditional orchestral music making[11], Soundpainting is implicitly multi-sensorial: the visual part is always present.

In the next few months, and following the advice and material Philippe gave me to study, I began incorporating basic forms of Soundpainting into my regular activity, in music workshops for children, but also in the orchestra and chamber music classes I was teaching. Again, I was astounded at the ease students and workshop participants showed in making music and playing together (often resulting in something that *sounds* like contemporary music - whatever that is), but also, and perhaps most remarkably, by how fun and inclusive the process was. My students were playing better and having a good time. But at the same time, something else happened: my own *written* music was changing. One striking example is the first movement of Terra: um Planeta com Vida (2015). Another example is the fifth of the Miniatures for Guitar and Flute (2014-2015)[12].

I had, looking back, always been somewhat conservative when it comes to musical notation but I was now, subconsciously, looking for the freedom and interaction possibilities my experiences with RTC had given me, so it was definitely changing me as a composer.

On February 2015, I was asked to write three pieces (and conduct them) for Casa da Música's *Bandas Sonoras Instantâneas III*, a concert on the same line of the previous, also involving film-scoring, but now without the pre-requisite of using soundpainting. I decided to write two of them in a traditional way, for Walter Ruttmann's *Opus III* and *Spiel der Wellen*, but to compose another, Hans Richter's *Ghosts Before Breakfast*, live. The results were very satisfactory, from the first rehearsal on[13]. This was the moment I realised that there was, in fact, room for an ensemble of this sort in the musical scene of Porto. I had, at this point, wished to work regularly with the same musicians, as I find that, as in the case of rehearsing traditional music, the group really develops with time and experience. And with

[11]That is, where orchestras play live, led by a conductor.

[12]Both of these works were composed during this Master's

[13]I even considered, before presenting the score for *Spiel der Wellen* to the ensemble, to do a live-composition version instead of it.

these things in mind I started inviting people.

3.2.1 Setup and First Rehearsals

The extension of the the invitation to ESMAE's community of composers/performers was paramount for the project. This was not only because I noticed the impact that taking part in an ensemble of sorts had in me as a composer, but also because I feel that, despite not being the most technically proficient performers, composers have a sense of form, texture and even harmony more developed than some instrumentalists. And these were all good things! But apart from the composer community, which makes up the greater part of the ensemble, I also invited instrumentalists and people from Jazz, Rock and Electronic music backgrounds. This vision was because, as previously discussed, it opens up the potential for the creation and thedevelopment of ideas. For a full list of participants in each of the concerts, please check their respective appendices.

The first rehearsal was on March 15th, 2016, at ESMAE. As a starting point we began working on basic gestures, such as long tones, hits, minimalist patterns and free, unrestrained improvisation. The first goal was to create a shared knowledge of each person's place within the ensemble, so I decided not to give restraints related to notes, harmony and rhythm. As a result, we were soon working on generating textures and gestures, shaped by volume, density, and register manipulation, and the call for interaction in real-time. Choosing to leave out the choice of harmony, melody and rhythm to the performers could, at first, seem to generate more *coloristic* music, in the sense that Prendergast, in the context of film-music, terms *musical color*: "In a broad sense, musical color may be taken to represent the exotic or sensuous aspects of music, as distinct from musical structure, or line, which might be considered the intellectual side." (Prendergast, 1992, p. 213). Going to a rehearsal, and, later on, a concert, without pre-established material and knowing one could not control such central aspects of music making also, indirectly, places the focus on the actual development of material that would be generated. This was the main point during these rehearsals (and the first concert): asking the performers for seemingly random material based upon a

rough indication of gesture, developing and shaping it, while at the same time forcing the participants to listen and interact with one another at a very *primal* level, thus creating a solid sense of a musical group and musical identity.

Before moving on to the analysis of the first concert, there are some issues about the nature of rehearsals I find worth discussing:

1. By default, since RTC is concerned primarily with music making as an activity rather than with the production of musical works, the rehearsals are, themselves, a place for music creation, and so forcefully distinct from the rehearsals of previously composed music. In the latter case, rehearsals serve primarily to *polish* an interpretation of an existing strong and are strongly directed to a final performance - a concert or a recording - where the actual recreation of the musical work will take place. In the case of RTC, rehearsals serve mostly to work on the music making *process* and, therefore, always result in musical creation;

2. Another consequence of the previously stated is that, in *programming* the rehearsal, the composer/conductor should have two main goals: i) group building and the strengthening of musical interaction between members, because they are such valuable partners in the composition process; ii) redefining the system, forcing the participants to explore new material, allowing for their sonic palette to expand, or to produce a stronger process, one that more accurately results in the music he has in mind[14];

3. Sometimes it is difficult to have all the members attending the same rehearsal (or parts of it). This forces you to work with changing instrument combinations and to *practice* with a smaller set of instruments, reminding you that, in collective improvisation, sometimes not everyone *should* play at the same time, as Stockhausen would gladly agree: "*This is one of the most important criteria, that one must constantly remind oneself: "Do not play all the time", and "Do not get carried away to act all the time*" (Stockhausen, 1971);

[14]This is very akin to changing and refining the algorithm, in algorithmic composition or a digital interactive system.

4. Being subject to a great degree of variability, it is sometimes difficult to recreate in performance some very fortunate moments from the rehearsals. It is the composer/conductor's task to assure that the performance is optimal, which is quite challenging; *d*espite the obvious advantages that rehearsing has in creating a solid group to work with, and develop everyone's ability, it is, at the same time, crucial to not overwork, as it is very tiring and also generates tolerance from the performers' part. It will, in turn, result on a worse performance. This was the case with the first concert: it was the general opinion that the general rehearsal was far better than the concert itself.

3.2.2 A Memória do Tempo Presente

The premiere of the ensemble, still under the name Ensemble de Composição em Tempo Real do Porto, happened Thursday, 31st March 2016, by 21:30. There was a dress rehearsal during that afternoon, a general rehearsal the night before and a sound check and technical rehearsal the previous day. Attendance was around 35 people. See in attachment B a detailed stage plot and the program, which was handed to the audience. The dress code had two requirements: i) to dress relatively formally; ii) to bring a silly accessory[15]. The purpose was to enable them to play in character, and so to relieve some of the tension arising from the uncertainty.

This tension was definitely important in the setting up. During rehearsals the musicians were very curious about exactly *what* we would play. There wasn't anything planned that they knew of. This continued until the day of the performance. The program handed to the audience was also shown to the musicians after the dress rehearsal and it contained a division in pieces, each of them with a sentence or poem which would serve as inspiration. There was nothing else previously setup or agreed beyond that. I made a purpose for it to be so, in order to compare, in this dissertation, the outcome with that of a performance where there would be set instructions and bits of material the ensemble could rely on.

[15]As you can see in the attached video recording.

The program consisted of five *pieces*. Let's see for each one what I had in mind before the actual concert and analyse the outcome, which you can follow in the attached DVD[16]:

Mudança/Movimento 1 Using a reference from Rush's Tom Sawyer, the idea was to explore contrasts between textures and different groups, and to create something new out of it. Note that this was a piece I knew how to start, but had no idea how it would turn out. So the form and most of the material were created exclusively during the performance. Here is a detailed explanation of everything that happens[17]:

01:04 I signal the ensemble to play a pontillistic texture, with very high density and volume, thus resulting in a chaotic and agitated opening;

01:17 the violin player is told to play a long tone, in a high register. Shortly after, the rest of the ensemble is signalled to suddenly stop. After the chaotic start we are left with a single, fragile pitch in the high register;

01:31 a player is called to interact with (this can either mean imitate or accompany) the violinist;

01:41 the whole ensemble returns to the texture of the beginning;

01:50 the woodwinds (as a group) play a long tone in the high register. Shortly thereafter, the rest of the ensemble starts playing. This is a development of the texture from before;

02:05 plucked string instruments are asked to play a pointillistic texture with fairly low density;

02:16 woodwinds are asked to develop their material;

02:23 the piano relates to the plucked strings;

02:37 the singer is asked to improvise with long tones;

02:50 woodwinds begin shifting into a pointillistic texture;

[16]The time code, in the format *minutes:seconds* referes to that particular cut.

[17]This description will be centred on the givens instructions.

03:02 electronics start a quiet drone;

03:18 drummer starts improvising with extended techniques;

03:24 singer is asked to finish;

03:30 violin begins a long tone in the high register;

03:38 bass relates to drums;

03:49 electronics start shifting into a pointillistic texture;

04:11 strings increase density;

04:19 everyone starts playing louder;

04:28 singer sings high-registered long tone;

04:37 singer continues. The rest of the group gets louder then leaves;

04:40 violin relates to singer;

04:50 woodwinds start a long tone, whose pitch will then change;

04:58 woodwinds leave;

05:04 woodwinds start a long tone, get louder, then leave;

05:16 electronics relate to the singer;

05:25 singer stops;

05:42 strings play a quiet, low-density, pointillistic texture;

06:00 sax improvises with long-tones;

06:12 clarinet relates to sax;

06:23 piano improvises with long tones in the low register;

06:31 bassoon, and then accordion, relate to sax;

06:42 whole group develops their current material;

07:00 whole group develops their material even further;

07:13 whole group, slowly increase density and volume;

07:37 stop. End of piece.

As you can see, the original idea was somewhat respected, but the musical result also turned out to be fairly continues. I believe, in retrospective, because I found the long tone material in the high register very interesting so I started developing it and asking for short contrasts of a pontillistic nature. As we will further discuss in the conclusions, one of the greatest challenges when live composing is to take time itself into account, because our perception of time is deeply distorted when we become involved in the process. Looking back to the recording, the material seems to be well developed sometimes, but shortly lived in others. This may be because I set a personal rule, which was to change material well in advance, much before I began getting acquainted with it. During rehearsals I found it very easy to spend a *very* long amount of time developing a texture so I had to force myself to remember that the audience, not being so deep into the process, had a much different perception of time!

Passagem The inspiration for this one was an excerpt from a poem by Miguel Torga, about time itself. The idea was to create an introspective piece were material would flow from performer to performer, with a relatively low density and instrumentation (that is, using few instruments at a time)[18]. Here is a description of the process in order to illustrate how this was achieved:

00:18 accordion, improvise with long-tones;

00:32 Portuguese guitar, interact with accordion;

00:55 flute, interact with accordion (note that someone in the electronics began playing, although not requested! I decided to let it continue);

01:10 zither, interact with Portuguese guitar;

01:22 everyone continue, except the accordion (as some players were relating to the accordion, they are now free to continue as it seems appropriate);

[18]In the poem Torga mentions the passage and flow of time as *bitter*.

01:28 piano begins freely improvising;

01:44 mandolin, interact with Portuguese guitar;

01:54 prepared guitar, begin a repetitive gesture with low density;

02:05 strings continue, Portuguese guitar ends;

02:15 bass improvises with long tones;

02:25 electric guitar freely improvises;

02:36 clarinet relates to flute;

02:44 flute finishes its idea;

02:58 zither and mandolin finish their ideas;

03:12 electronics play a very quiet drone;

03:32 voice improvises with long tones in the low register;

03:38 clarinet finishes;

03:42 bassoon interacts with voice;

03:52 bass improvises freely;

04:11 accordion interacts with electronics;

04:24 voice finishes. Then piano decreases density;

04:36 prepared guitar finishes;

04:42 bass lowers volume and then finishes;

04:56 electric guitar increases volume;

05:02 bassoon finishes;

05:12 electric guitar finishes;

05:24 electronics begin finishing, one by one;

06:04 piano and accordion slowly finish;

The idea of having a continuous dialogue was kept, and we managed not to play *too much* at a given time. There ended up being even more diversity of material I had intended (such as the repetitive gesture on the prepared guitar and the drone in the electronics), as I felt it was necessary shortly after we started.

Pulsar Using a poem by Álvaro de Campos, the third part of the concert was about the common ground between different languages and styles, for instance, between Rock and Contemporary Classical Music.

00:16 bassoon, then bass, then drums and finally electric guitar begin improvising a riff with *techno* feel (that is, in *techno* style);

01:14 two chords in the woodwinds in crescendo;

01:46 electronic instruments start a very loud repetitive pattern with techno feel;

02:12 plucked strings join the pattern;

02:21 woodwinds repeat the chords in crescendo, with some changes in pitch;

02:46 violin joins the pattern;

02:52 vocalist starts a pattern with *rock* feel;

03:00 piano starts a pattern with rock feel;

03:07 start a guitar solo;

03:12 bass also starts soloing;

03:28 drummer stops;

03:43 drummer reenters;

03:57 loud chord in woodwinds;

04:11 loud sax solo;

04:32 only strings and sax. The rest of the group stops;

04:46 whole group back;

04:52 bass solo, the rest of the group gets louder, then guitar interaction with bass;

05:26 clarinet then accordion also begin soloing;

06:05 only electronic instruments stay. The rest stop;

06:17 prepared guitar joins the pattern, then the rest of the plucked strings;

06:38 the rhythmic section comes back on;

06:48 woodwind chords;

07:00 drummer lowers density;

07:25 bass leaves;

07:34 drum solo;

07:48 accordion solo;

07:54 drummer gets louder, then leaves;

08:16 piano and accordion continue, rest of the group gets quieter, then electronic instruments leave (one of the players misinterpreted the sign);

08:38 piano stops

09:14 only plucked strings. Rest of the group perform two hits;

09:30 remaining instruments get quieter then stop;

The way we ended up playing this piece was using *feels*, a how-syntax gesture from Soundpainting that lets you mimic a particular style. Usually, people end up using clichés[19] from the said musical style. So the end result was an almost *collage*-like *parody*. One thing I would like to mention on this piece is the fact that the woodwind long tone chords were inspired by something they played in a different context during rehearsal that day. The result was much better before, and I struggled to find a way for the voicings to be as good as they were. This was not possible with only this degree

[19]Note that this is not being used as a depreciative term. Clichés generally arise from good material - they work. And they are also key in establishing identity across genres.

of control. Also, being a pattern-based piece, it ended up taking perhaps *too* long, as the signaling process itself takes quite some time;

Continuidade Gérard Grisey's text implies a contemplative attitude: using sounds instead of notes, using their difference as the motive for evolution or non-evolution. This resulted in a seemingly continuous texture, made up of sounds fundamentally different.

00:31 woodwinds start a long drone in the low register and with a low volume;

00:47 portuguese guitar begins a quiet pointillistic texture (at this point the electronics also started playing sampled whisper sounds);

00:56 violin begins a long tone in the low register;

01:15 remember this texture - memory one, which will later be called;

01:27 plucked strings begin playing a pointillism with extended techniques;

02:00 voice starts improvising with extended techniques;

02:15 the electronics start improvising with long tones;

02:32 the woodwinds develop their material;

02:41 the piano starts a loud, low-density pointillistic texture;

02:56 bass and electric guitar start a low-density pointillistic texture;

03:08 woodwinds develop their material further;

03:16 all string develop their material;

03:21 electronics get louder;

03:37 everyone begins increasing density;

03:57 also start increasing volume;

04:17 go back to previously recorded memory one. This results in a sudden decrease of density and volume and allows for the form to be clearer;

04:31 voice starts improvising with extended techniques;

04:43 piano interacts with voice;

04:57 bass, then electric guitar begin slowly improvising;

05:22 electronics start playing a long tone;

05:28 instruments start slowly leaving - portuguese guitar, then flute, accordion, voice, clarinet, bass and electric guitar. The texture becomes much lighter and spaced;

06:11 plucked strings begin improvising with extended techniques, one by one;

06:43 other instruments begin slowly leaving - piano, then each of the electronic instruments, then violin. Only plucked strings remain;

07:10 plucked strings start leaving, one by one (note that once again the sampler sounds started inadvertedly[20]);

I would like to point out the importance of using the memory sign. It allows RTC to be used outside the real-time, that is, recalling previously performed material, and including it elsewhere. This is a very important formal device. In result, this piece almost has a classic A B A' ternary form, with B being a part of increasingly higher density, at the end of which there is a sudden return to the beginning.

Mudança/Movimento 2 With a title identical to the first *piece*, it turned out quite different. The purpose was to, as Frank Zappa's text suggests, deviate from the norms and expectations of a western classical music concert. And using humor in doing so.

00:23 bass player begins a pattern with rock feel;

00:39 as the bass player continues, the rest of the group perform a long tone, then leave;

00:53 drum player begins interacting with the bass player;

01:00 loud guitar solo;

01:15 vocalist begins improvising with extended techniques;

[20]This is something the composer/conductor sometimes has to deal with. One important principal discussed during the rehearsals was that the instruments were never wrong. If they started doing something they shouldn't, it's the composer/conductor's job to make sure they correct it,

01:35 sax/flute[21] begins a loud improvisation;

01:50 portuguese guitar interacts with bass, then bandolin, zither and prepared guitar interact with sax/flute;

02:15 all woodwinds and violin start interacting with flute;

02:29 all electronic instruments begin improvising with a rock feel;

02:43 piano starts improvising with pointillism;

03:11 bass, drums and electric guitar leave. At this point, all instruments were playing very loudly. This sudden disappearance allowed us to focus on a reality that was being hidden by them. From this point onward, a process of deconstruction begins;

03:34 piano begins improvising with extended techniques;

03:42 plucked strings get quieter then leave;

03:59 electronic instruments get louder then leave;

04:15 portuguese guitar and bandolin begin improvising with a pointillistic texture. Electric guitar joins with long tones, then bass interacts with it;

04:39 sax/flute prepares to leave;

04:46 violin begins slowly exiting, then the clarinet does the same;

05:05 zither and prepared guitar imitate the portuguese guitar;

05:25 bassoon, then sax/flute, then clarinet start interacting with piano;

05:39 accordion slowly exits;

05:48 electronic begins improvising with extended techniques (he chooses to play a sample from a humor sketch);

05:58 piano lowers, leaving more space as a result;

06:08 instruments start slowly exiting: samples, then bass, then electric guitar;

[21] At this point, Miguel was playing a sax neck on a flute body.

06:19 piano leaves even more space;

06:40 plucked instruments leave one by one, leaving the piano alone;

06:52 sax/flute solo over piano background;

07:10 flute leaves, then the piano. At this point the previous sample was triggered (without indication) by the drummer. He is then asked to stop.

The most interesting thing about this piece, in my opinion, was the transition from the rock clichés in the beginning to a chaotic middle section which was then slowly dissolved over the course of around 4 minutes. This was a very different outcome from what was originally thought.

After these 5 *movements* there was still a final piece conducted by ensemble member and composer Luís Neto da Costa, who learned the signs during the previous month of rehearsals and showed much enthusiasm in it. I invited him to conduct the final movement and he gladly accepted.

As a general analysis to the concert, although I was very happy with the result (being the premiere and using a very limited amount of gestures and signs), it was very clear to me that there was still room for improvement, particularly in the following: i) at times, I felt I needed to have more control over the harmony in order to develop the material and make it more interesting; ii) I felt that at times we were relying too much on clichés for the music to music to develop properly; iii) performers were, at times, very rigid in their improvisation, trying to comply as much as possible with the instructions they had, until further notice. One of the main things to work on from then on was making them feel free to develop their material according to the circumstances. This was done by deep listening exercise and improving group cohesion; iv) at the same time, although that freedom for development was desirable, I felt that the liberty to suddenly start playing was not. On the occasions it happened in this concert, it was very off-putting and completely made me change my plans.

3.2.3 A Memória do Tempo Futuro

Following the previous concert, *A Memória do Tempo Present*, we had a short break of around one month, before getting back to work. Rehearsals for *A Memória do Tempo Futuro*, which took place at Teatro Helena Sá e Costa, in June 8, with an attendance of around 50 people[22], started in May 2016 and included three major changes: i) working with concrete notes, harmonies, rhythms and meters; ii) working with previously composed bits of material; iii) working with film. The inclusion of film was crucial for me, not only due to my personal interest and experience in the topic[23], but also because it forced us to work with a different medium and with a fixed time-length. There was now a previously established form for some of the pieces, and the music had to serve the purpose of the images and their narrative.

Tríptico I: Ponto contra ponto The idea was to have a piece made up primarily of counterpoint. The motivation for having this was to answer the criticism from A. Eigenfeldt, discusses in subsection 1.3.1, who mentions that RTC could not possibly achieve the richness and complexity that decisively features in western classical music.

00:43 the piano starts a pointillistic texture with palette three (see attachment). This allows for greater harmonic cohesion between future interventions;

01:02 one of the synths begins a drone using the same harmony;

01:26 other synths follow;

01:45 bass begins a slow pattern with the same harmony (note that he initially mistakes the signed palette but is quick to correct it);

02:01 woodwinds begin a series of quiet long tone chords. Comparing these interventions to those of the previous concert (the long-tone chord in the woodwinds turned

[22]We were fortunate to work with the same technical team, which made the whole process easier, and gave us the chance to better integrate the ensemble's different sonic possibilities and realities.

[23]I was, at the time, reading Copland's (as mentioned in Prendergast (1992)) and Adorno's (Adorno and Eisler (1972)) perspectives on film music and trying to figure how RTC could be a solution for some of the problems they explored.

out to be a signature lick for the ensemble!), it is much more coherent, as note choice was not a problem anymore;

02:40 the violin begins improvising a melody using palette three. For the moment, he is soloing against a relatively static background;

02:55 the bass joins in on the solo, in counterpoint with the violin;

03:02 piano increases density. At this point I was trying to move the piece forward, following a two-minute static starting. As we will see, it did not happen, and I was forced[24] to respect the material and completely change my plans;

03:23 the strings play a quiet pointillistic texture using palette three;

03:35 the singer starts improvising a melody, using the same scale. Now the counterpoint is made up of three melodies: that of the violin, the bass and voice, who play against a background made up of long, drone sounds (in the woodwinds and the electronics) and textural pointillistic details, from the piano and the strings. These three layers are, themselves, contrapunctual;

03:56 drummer joins in with spaced out long tones;

04:14 woodwinds play a crescendo and then leave;

04:26 accordion starts a relatively loud solo, taking the spotlight;

04:40 synths develop their material;

04:55 the clarinet starts soloing. There are now 5 instruments playing melodies, so it has somewhat become a texture itself;

05:07 accordion finishes his idea. I felt the need to soften up the density, in order to bring out another timbre;

05:23 flute starts interacting with the clarinet;

05:41 the bassoon starts soloing. Then the clarinet leaves. As the bassoon and flute were interacting with it, they are now free to develop their own path;

[24] As we often are in traditional composition.

06:02 the piano starts improvising with extended techniques, getting closer to the timbre of the plucked strings. The piece reaches a moment of stability;

06:33 after contemplating the texture for 30 seconds and deciding to allow it to develop by itself, all instruments except the synths temporarily paused[25];

07:00 now the same happens with the piano, voice, guitars and one of the synths;

07:40 the bass takes the lead with another solo;

07:57 synths get slightly louder;

08:20 bass and drums start slowly exiting, starting the density release that will take the piece to its conclusion;

08:30 two synths follow;

08:40 all synths now exit. No more electronic sounds;

08:53 flute starts a loud solo. This was done to keep things interesting and add some new material even as instruments were starting to leave;

09:00 accordion and bassoon, and then the clarinet, who had been playing for a long time, leave;

09:28 all instruments are now out, except for plucked strings, piano, flute and voice;

09:39 flute leaves;

09:49 the bass starts a very low density pattern. This was done as a reference to the starting point, 8 minutes before, as the interaction between piano and bass was key then as it was now;

09:56 plucked strings slowly leave, and then the voice and the bass;

10:18 piano finishes its texture. Piece ends;

This was, in my opinion, one of the most successful pieces we played. I felt that the inclusion of harmony set the players free to listen to each other more deeply than they

[25]This is a very interesting gesture, one that I would like to use more often: silence.

had. It also allowed me to have greater control over material and its development. In terms of form, the result is also very coherent, with recurring references over a continuous development.

After the previous concert, although I was very happy with the final outcome, I still had some doubts that we could reach the level of complexity and refinement we can achieve with written music. This piece alone, in my opinion, proved we could. But it also raised a serious issue: if we want to play it again, we know for sure we won't be able to because, as we discussed, this is not originally a musical work, at least in the traditional sense. The work itself was created as a consequence from a musical process and activity.

Tríptico II: Linha contra linha The idea for this piece was to make usage of different metrics, which would naturally arise from the calling of palettes 6 and 7, both in 7/4 time. In an initial phase, different instruments were called out to start an improvisation on 7/4. This was complemented by the usage of extended techniques on the woodwinds. Around 2:05, when synth improvisation started being called, everything less clear, and that was what I as going for. To achieve this, I also started cueing instruments in the pattern in beats other than one, achieving a canon-like effect. After installing this confusion, that begins being very noticeable from minute 4:00 onwards, I made everyone develop their material further and further, resulting in the final crash, when it became unbearable. Formally, then, it is very straightforward;

Tríptico III: Plano contra plano the harmonic basis for this piece was the spectral analysis of a tibetan bowl, that you can find in the attached score, with the marking 1. Instruments were successively called out using this harmony, and, at times, and, sometimes, forced to change as a group, at the same time. At 03:44 I decided to include a regular beat behind the drony, spectral texture that was installed, and it completely shifted the narrative. At 07:32, only bassoon and accordion remain, after I called a pattern with a techno feel, which I had done the previous concert. I was attempting to lighten up the piece at this point, which was becoming quite dark, and, in doing so,

created one of the first *spectral techno* pieces, to my knowledge. The spectral part was very hard to come by, after the calling of the regular rhythmic patterns. The whole piece ends with a big crescendo;

Cine-Concerto I: Rhythmus 21 (H. Richter) as this movie's title suggests, it deals with different rhythms and different shapes on screen, which is precisely what I was trying to mimic using the music. As with the second piece, I called out the patterns using 7/4, but, at this time, also called 4/4, which creates a very wide variety of rhythms. Rather than using instruments arising one at a time, I was now trying to deal with groups and masses. The effect of a group improvising a pattern with the same beat in real-time is very peculiar and can be seen in here. Being a short, 3 minute film, and the material generated so complex, there wasn't much room for diversity, only for development, so the music ended up being very continuous in texture, with the exception of the big diminuendo at the end, that was controlled by looking at the film, which was being projected behind the musicians, in real-time, so it was fairly straightforward to synchronise;

Cine-Concerto II: Filmstudie (H. Richter) starting immediately after the ending of *Rhythmus 21*, in an attacca style, my premise for this one was that, due to its surrealistic nature, I would rely mostly on electronics and extended techniques from acoustic instruments, representing the pictures' *oddity*. Again, this excerpt's brevity resulted in a fairly continuous texture but, unlike the previous film, it ends up with a crescendo, that exactly coincides with the final frame;

Cine-Concerto III: Lichtspiel opus 1 (W. Ruttmann) this movie, one of the earliest examples of abstract animation, is made of varying shapes (and, later, colors), with very subtle changes. It is much longer than the other two, at almost 12 minutes in length. I tried to achieve a contemplative and introspective setting for the first part, allowing freedom of the movement of the shapes to be fully appreciated. There is a *leitmotif* associated with the triangles which arise at 04:02, 04:34 and 06:42, which is

using the plucked string playing a harsh pointillistic pattern with extended techniques. The repetitive oscillating movement that begins at 07:42 is prepared by introducing a regular pulse, thus contrasting with the first section, culminating in a long crescendo until the end. Note that the music ends shortly after the images because of the cycle we were in. Instead of ending it abruptly, I chose to end it at a more musically appropriate place, which was not the best of decisions, I think[26]. The length of this piece was also a challenge, being very long, placed at the end of a concert, and not having a lot of diversity in the material;

Bonus: Encore At the end of this concert there was an encore that, despite not being the subject of this dissertation, you can still listen in the accompanying DVD. It dealt with contrasting textures and dynamics, and ended with a *al niente* dissolution by lowering the density.

After the concert I was still very happy with the result, which I felt was much better than in *A Memória do Tempo Presente*, due to reasons already mentioned.

3.2.4 Concerto de Abertura

The third and final concert we will be discussing at this dissertation took place at ESMAE's Café Concerto, at Sunday, June 19 2016. I think this analysis is relevant for two reasons: i) we had little chance to rehearse since the previous concert, a week and a half earlier; ii) the whole performance was only 12 minutes long, as it was the closing act for a larger concert from *Interferência - Associação de Intervenção na Prática Artística*, who greatly supported the whole ensemble. This allowed us not to work on a previous division for our own organisation and the audience's, thus arriving with no idea related to the form. As in conventional composition, writing a 12 minute piece is very different from writing a 50 minute one.

[26]This is something that would be very easy to correct if the piece was previously composed, for instance with a Digital Audio Workstation, adjusting the tempo. In real-time, however, it is impossible.

Composition 190816 We had agreed, just before walking on stage, to use the pitch collection D - E - F - G - Ab - Bb - C, with the centre on the note D, as a reference. This was the only information we shared and I tried not to have a pre-determined idea on the form of the piece. Only after being on stage did I decide even how to start it, unlike the previous concerts.

01:08 Lucas, who is playing a synth, is asked to play a drone, which turns out to be very introspective and ambient-like;

01:26 the piano starts improvising with long tones;

01:37 the other synth players interact (in this case, imitate) Lucas;

01:49 the flutist begins improvising a melody. Note that his note choice, E flat, despite not being on the previously agreed collection, suits the moment very well;

02:10 the accordion quietly starts improvising with long tones;

02:23 the clarinet imitates the flute;

02:33 the mandolin starts imitating the flute;

02:45 the violin begins imitating the flute;

02:59 the synths get quieter;

03:09 bassoon starts improvising with long tones;

03:21 both percussion players start improvising with extended techniques;

03:40 the singer begins loudly improvising a melody. At this point all the instruments are playing, although the general feel is still quiet and with low density;

03:52 mandolin begins developing his material;

04:08 woodwinds continue, the rest lowers the volume, allowing us to focus on their particular sound. Note, shortly after, the tendency to increase density and volume, which I was trying not to. For this reason I felt the need to cue some players out;

04:30 both percussion players slowly exit;

04:40 synths and bassoon slowly exit;

05:04 both percussionists begin a pattern with low density;

05:44 Lucas, on the synth, begins a pattern with low density;

05:51 clarinet, and then flute, slowly exit;

06:03 bassoon begins a pattern with low density;

06:17 clarinet begins interacting with the bassoon. From this point on we will notice a slow but dramatic transformation;

06:23 violin exits;

06:30 accordion interacts with bassoon;

06:43 percussionists begin a clearer rhythmic pattern;

06:54 synths develop their own pattern;

07:20 bassoon and clarinet leave. Even though they were the ones who originated this shift, it has already spread out to the rest of the ensemble, so removing the source has no major impact;

07:28 mandolin stops;

07:36 Lucas and Helena, on the synths, begin imitation João, the other synth player;

07:48 synths get louder;

08:00 woodwinds play a long tone with rock feel twice;

08:25 loud clarinet solo;

08:38 on of the synths interacts with the clarinet;

09:00 flute plays a loud melody;

09:29 violin starts a rock-inspired rhythm;

09:45 voice starts improvising;

10:05 synths begin a drone;

10:15 accordion and bassoon improvisation;

10:28 mandolin starts a pattern;

10:47 piano and mandolin continue, the rest leave;

11:01 whole ensemble back;

11:20 whole ensemble begins a crescendo and density increase;

11:52 accordion and violin are left alone playing a quiet high pitched long tone. Shortly after, flute joins them. This begins the coda section;

12:05 mandolin begins a pointillistic texture;

12:28 violin and flute develop their material;

12:38 piano interacts with mandolin;

12:48 mandolin leaves after passing its pointillistic texture to the piano;

12:54 violin and accordion leave;

13:12 flute begins fading;

13:20 piano fades;

As mentioned earlier, the ensemble's intervention on this concert was shorter than on the previous ones. Together with the fact that the lack of intense rehearsals allowed us to keep things fresher and more spontaneous, it allowed for a very wide array of resources to be used. In a 50 minute concert, with relatively limited material and signs[27], we had to be very cautious with its usage, spreading it towards a longer time window. While this resulted in greater development and exploration, it sometimes cause it to become somewhat tiring, which didn't happen on this particular occasion.

3.2.5 Future Projects

Instant Ensemble, being a very recent project, is still beginning its development. The main challenges ahead, and following some of the problems discussed on the previous sections,

[27]Which is what you would expect from a 4 month old ensemble.

would be to expand the vocabulary to accommodate new signs which bring a greater degree of control and more possibilities. Some of these could, perhaps, have been introduced some time ago, but, from a group building and also from a compositional perspective, I opted to try and develop and explore the existing possibilites before dwelling deeper into new ones. So the main focus for the future would be to rehearse in order to refine the process itself.

RTC is, or could be, as we have seen a multidisciplinary activity. Despite having already worked with film, we would very much like to work with drama and dance, as the real-time approach suits these media perfectly, allowing for very close interaction and reaction.

Another project that is planned is a small tour throughout nearby cities. This would be very helpful even for research purposes as it would allow the same group to play in different venues at different times, but with a sense of continuity that the distance we had between the three concerts here present wouldn't permit.

Chapter 4

Conclusions

We are now reaching the part of this dissertation that seeks to integrate the findings from the previous chapters, drawing conclusions and confronting our starting questions and the motivation for this journey. We will also try to, in identifying both the positive and the negative aspects, point toward future research and activity possibilites, ones that were not possible to deal with in the context of the present dissertation.

4.1 Main Findings

In chapter 1 we began by stating the motivation for writing the present thesis, which came mostly from my personal experiences. We mentioned that there were a series of questions I found very relevant and of the utmost importance for the activity of music making. We decided, then, to use the concept and practice of RTC as a guideline for possible answers. Most importantly, we decided to seek a definition of Real-Time Composition, which could be applied in practice, and to compare it with both traditional composition and improvisation[1]. At the end of chapter 1, when discussing the *state of the art*, we explored the already existent views on the concept of RTC, and noticed that there were two main currents: i) that which viewed RTC as a process only possible in the context of computer music; ii) that

[1]This was, in fact, our starting question.

which viewed live-composition as very closely related to improvisation.

In chapter 2 we then proceeded in a philosophical and aesthetical discussion of the concept, thereby engaging in a deeper debate: what exactly is composition, and what is music making?[2] We saw, in section 2.1, that the idea we have of a musical work shapes both the perception and the process of western classical music making. In conceiving a musical work as something ideal, that results of pure genius, and to whose own will the interpreters should *submit*, we are creating barriers that separate us, the classically-trained musicians, from the rest of the world, and possibly from our audiences. This is not the same as questioning the deep value of the masterpieces we can all recognize. But in creating an environment that, as I argue to be the case with the practice of RTC in ensembles, serves primarily for the activity of music making, and not for the production of musical works, we are in fact bringing music closer everyone, composers, performers and audience included.

In section 2.2, we argued that composition, even in its most traditional sense, always involved at least *some* form of improvisation. So the difference in a system that *relies* on improvisation as a generative force[3] and the traditional writing of music is not of status, but of degree. It should also be noted that, in this sense, composing music could be very alike the act of programming a musical interactive system. We also mentioned that improvisation *should* always be studied and practiced.

This is also true for performers, as we discussed in section 2.3. When (re)interpreting a piece of music, there is a great deal of *filling in the gaps* involved, so the performer must always make decisions and follow their own musical *intuition*. The point was to argue that, in a RTC ensemble, when the musicians must make their own decisions in real-time, this is not at all dissimilar to what they are already doing and practicing. It is merely taking that to another level. This finding obviously has a great impact on what music education *should* be, one that can not be properly addressed in this study. But I feel that the inclusion of

[2]And this was where we reached some possible answers to the questions that motivated this study, or, at least, some possible directions that could lead to their clarification.

[3]And embracing the fact that chance and randomness are always likely to occur.

free improvisation in music schools is of paramount importance, as Peggie[4], Burnard[5] and Hickey[6] suggest.

The next section, 2.4, served to show how we, music-makers, are part of a very large community, made up of our musical ancestors, the systems we share among ourselves, their current traditions, and even the audience. Ignoring the fact fact music is both a means of communication and a collective activity could (and, arguably, has) lead to misinterpretations and a dissociation between all these different groups. The practice of RTC in music ensembles is, by definition, communal, as all its participants are key in determining the outcome. It embraces, then, an interactive attitude that is very alike that of the current world, where we are all part of a network of interdependencies.

Following this discussion, we arrived at a definition of RTC, which is as follows:

> Real-Time Composition in music is an activity where a composer/conductor interacts during the performance with a set of musical agents (either human or virtual) who sonically respond in the form of (restrained) improvisation, always involving some form of randomness.

This definition was thoroughly discussed, according to the purpose of each of its parts. It implies that RTC is possible also with humans, not only with generative algorithms, and also that it is fundamentally different from mere improvisation. Computer programs are coded by humans, who establish the range of their possibilities. If more restraints are applied, this range is smaller, and vice-versa. The same happens with human players, perhaps with an important distinction: in the case of computers, the cause for randomness is a random number generator, whereas in human players, it is their own will. I see no problem with this. On the contrary, it has the potential for a richer musical outcome, when properly explored. This is where the distinction from improvisation must be made. In the case of free improvisation, the focus is on the performers' will and their interaction, whereas in RTC,

[4]Peggie (1985)

[5]Burnard (2000)

[6]Hickey (2009)

there is a very important (and silent) figure, that of the composer who, being an outside spectator, can deeply influence and shape the result. This has an obvious consequence in terms of authorship, which is, in my opinion, shared. Although the composer's intent is still crucial, he also depends on the other agents. Embracing RTC is also accepting this fact.

This theoretical discussion led, in chapter 3, to the analysis of its practical application, in our case-study example, Instant Ensemble. In section 3.1 we tried to make an overview of existing *pieces*, groups and methods that were a direct[7] influence in the creation of Instant Ensemble. We noticed, for instance, the similarities between RTC and Stockhausen's *Intuitive Music*, although the latter involves a previously composed piece of music.

In subsection 3.2.1, the details involved in setting up the ensemble, such as its line-up and rehearsal process were explained. Then, in subsection 3.2.2, the results of the first concert were analysed. We mentioned that, as the array of signs used, and their possibilities, were fairly limited, the musical result, albeit still interesting, had much room for improvement. These improvements had to do with the ability to control, that is, to turn the process less improvisational and more into composition, so it was necessary to make some changes, just as with changing the algorithm from a real-time piece in the context of computer music.

A Memória do Tempo Futuro, the ensemble's second concert, was analysed in section 3.2.3. Here we found the merits that arise from having more control and some degree of previously agreed upon material. In the end, there is always something that precedes the performance. If I walk on stage with only a single instrument, even if it is one I do not know how to play, I will still owe part of the responsibility to the instruments' creators, the process by which it was refined, musical tradition, my own influences, the whole history of evolution... It is truly never-ending. As Carl Sagan put it, "If you wish to make an apple pie from scratch, you must first invent the universe." (Sagan, 1980, p. 218). In my opinion, it doesn't take any merit from the process of RTC, just as having an inherited system of notation doesn't take any merit from classical composers. Another important addition to this concert was the use of film, which was scored live. By pre-establishing the form, mood and

[7] And the word *direct* here is essential.

character, it allows the RTC ensemble to be very creative. Exploring the common ground between different arts is a path I find very interesting and having great potential.

Finally, and before taking a look at possible projects that are arising at the time of writing this dissertation, in subsection 3.2.4, we analysed a shorter intervention from Instant Ensemble, lasting 12 minutes. We saw how the compositional process was forcefully different and the importance that not rehearsing exhaustively the days before had in maintaining spontaneity.

In the way of a general reflection, we can conclude that RTC in an ensemble context seems to be a very valid aesthetical approach, one that extends the practice and tradition of western classical music, building upon it. It is also very closely related to our current *lifestyle*, emphasising the collective and interactive aspects of music music, but also a state of *being* that is centred around the present and the current time - living in the moment.

4.2 Future Research Paths

It is, perhaps, natural that, having had a discussion on such deep and central topics, there were many investigation paths we had to abandon for practical purposes, as we had no way to deal with them at the moment. These include:

Music Education as we mentioned throughout chapter 2, challenging the assumptions we generally make, sometimes implicitly, about what a music work is, but also about composition and interpretation, results in challenging some fundamental truths of our conservatory-based educational system. This is a research path, in the field of musical pedagogy and education, that has much potential and could lead to some very relevant case studies and findings;

Multi-disciplinary approaches we have talked about the potential for integrating music and other arts, such as film[8], dance, drama and poetry. Exactly what the nature of these possibilities is could be the subject of further research and collaborative projects;

[8]This was briefly discussed in this dissertation.

Integrating machines and humans in RTC by including generative algorithms from the setting of computer music, this could force the composer to divide the decision making process with pre-programmed machines and could be a valid aesthetical approach. But it could also serve as a research subject in the rising fields of artificial intelligence and machine learning;

The aesthetics and philosophy of RTC I believe that RTC is also a philosophical attitude. By embracing chance, sharing creative responsibilities and forcing you to listen and experience the present, we are creating a mindful attitude. This could be the subject of a much larger dissertation, relating music and this creative journey with other aspects of life;

Software development developing software that could aid the composer/conductor in the process of real-time decision making and communication. Real-time musical notation is already an established research line, and one that is well represented in Portugal, with composers such as Rui Penha (*peripatoi*) and Filipe Lopes (*Do Desenho e do Som*) composing pieces and developing software in this area;

Narratological study as humans we have a great *need* for things to make narratological sense, that is, to create stories, and the same is true with music[9]. The organisation of musical material in real-time is the reflection of deeper processes of conscience and inherited traditions[10], which could be further elaborated upon;

Aesthetical discussion RTC is a very wide field, and, specially, one in which there is an almost infinite number of possibilities arising during the performance. As composers, our activity deals with choices. But how can we separate good choices from bad? What is a satisfactory musical outcome and what is not? How can we, objectively, pursue a path to artistic excellence in real-time musical creation?

[9]See Maus (1991).

[10]as Campbell's Monomyth suggests(Campbell, 1949)

Working with communities aside from being a great tool for working with non-professional musicians, RTC's collective and sharing approach suits this particular way of working and creating music very well. By allowing participants to freely express themselves, and to play before they think, it has the potential for a deep educational and therapeutic value.

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Appendices

Appendix A

DVD with the recordings

This is the list of the material present in the attached DVD

A Memória do Tempo Presente First concert

Track 01 Mudança/Movimento 1

Track 02 Passagem

Track 03 Pulsar

Track 04 Continuidade

Track 05 Mudança/Movimento 2

A Memória do Tempo Futuro Second concert

Track 06 Tríptico I: Ponto contra ponto

Track 07 Tríptico II: Linha contra linha

Track 08 Tríptico III: Plano contra plano

Track 09 Cine-Concerto I: Rhythmus 21 (H. Richter)

Track 10 Cine-Concerto II: Filmstudie (H. Richter)

Track 11 Cine-Concerto III: Lichtspiel opus 1 (W. Ruttmann)

Track 12 Bonus: Encore

Concerto de Abertura Third concert

Track 13 Composition 190616

Appendix B

Materials from the first concert

A Memória do Tempo Presente, THSC, March 31st 2016

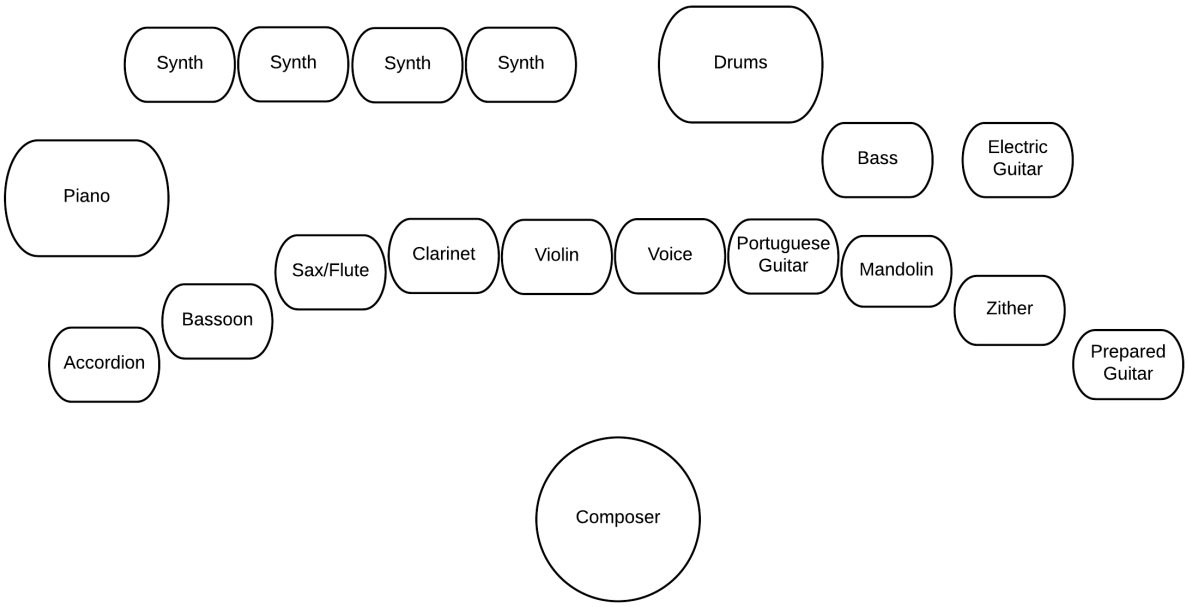

Figure B.1: Stage plot for the first concert

Escola Superior de Música e das Artes do Espectáculo
Teatro Helena Sá e Costa
A Memória do Tempo Presente
31 de Março de 2016, 21h30

Um concerto é sempre irrepetível. As condições do mesmo não podem ser reproduzidas - todos nós mudamos de dia para dia. Há uma energia muito peculiar gerada pela interacção de todos os participantes. Neste concerto a singularidade do presente - do tempo em que vivemos, aqui e agora - tem um papel ainda mais importante. Toda a música será criada durante o espectáculo, em tempo real, num limbo entre a composição, a improvisação e a direcção musical, através de técnicas como o Soundpainting (Live Composition) ou a música generativa.

Este concerto, realizado no âmbito da disciplina de Recital e Mini-Projecto do Mestrado em Composição e Teoria Musical da ESMAE, marca também a estreia do Ensemble de Composição em Tempo Real do Porto, composto por músicos de diferentes áreas, como a música erudita, o Jazz, o Rock e a música electrónica. Esta abordagem poli-estilística está na génese do projecto, resultando numa sonoridade muito particular.

Programa

1. Mudança/Movimento 1

> "No changes are permanent, but change is."
>
> - Rush (Tom Sawyer, in Moving Pictures)

2. Passagem

> "Tempo — definição da angústia.
> Pudesse ao menos eu agrilhoar-te
> Ao coração pulsátil dum poema!
> Era o devir eterno em harmonia.
> Mas foges das vogais, como a frescura
> Da tinta com que escrevo.
> Fica apenas a tua negra sombra:
> — O passado,
> Amargura maior, fotografada. "
>
> - Miguel Torga (Tempo, in Cântico do Homem)

3. Pulsar

> "Toda a manhã que raia, raia sempre no mesmo lugar,
> Não há manhãs sobre cidades, ou manhãs sobre o campo.
> À hora em que o dia raia, em que a luz estremece a erguer-se
> Todos os lugares são o mesmo lugar, todas as terras são a mesma,
> E é eterna e de todos os lugares a frescura que sobe por tudo."
>
> - Álvaro de Campos (Acordar, in Poemas)

Figure B.2: Program notes for the first concert - Page 1

4. Continuidade

> "No longer composing with notes but with sounds;
> No longer composing only sounds, but the difference that separates them (…);
> Acting on these differences, that is to say, controlling the evolution (or non-evolution) of the sound and the speed of its evolution."
>
> - Gérard Grisey (in Les Espaces Acoustiques, 2001)

5. Mudança/Movimento 2

"(…) in order for one to deviate successfully [from the norm], one has to have at least a passing acquaintance with whatever norm one expects to deviate from. (…) When a musician comes into my band, he already knows sets of musical norms (…) part of the fun in preparing touring arrangements is nuking those norms. (…) The place where one finds the least enthusiasm for norm-nuking is in the world of the symphony orchestra."

- Frank Zappa (in The Real Frank Zappa Book)

6. Variações de tempo de género (direcção e autoria: Luís Filipe Neto)

Esta obra poderá ser um pós-modernismo híbrido, poli-estilístico ou até irónico. Tenderá mostrar um pouco do pluralismo musical de gente eclética. Principalmente a existência de conhecimento musical tão distinto. Um género contra um género lutarão em forma de estratos, com várias variações de tempo e com a possibilidade de aparecem camadas. Por exemplo, rock versus clássico ou mesmo até techno versus Sciarrino.

Músicos

Catarina Vieira - Cítara
Carlos Semedo - Guitarra Portuguesa
Helena Restivo - Teclado
Isabel Rocha - Voz
José Tiago Baptista - Violino
Leonor Abrunheiro - Clarinete
Lucas Rei Ramos - Teclado
Luís Filipe Neto - Guitarra Preparada
Luís Rodrigues - Bandolim
Manuel Brásio - Percussão, Electrónica
Miguel Bastos - Flauta, Saxofone
Nuno Areia - Piano
Nuno Lobo - Fagote
Nuno Loureiro - Guitarra Eléctrica
Rafael Silva - Baixo Eléctrico
Ricardo Vieira - Synths
Rui Paiva - Synths
Tiago Candal - Concertina

Direcção artística: Óscar Rodrigues

Nascido no Porto em 1986, estudou Guitarra Clássica e Composição no Conservatório de Música do Porto. Licenciado em Economia (FEP - 2009) e Composição (ESMAE - 2013), encontra-se actualmente a terminar o Mestrado em Composição e Teoria Musical na ESMAE. Para além da actividade enquanto compositor, é professor do ensino artístico desde 2009 e membro do Serviço Educativo da Casa da Música (e do Digitópia Collective) desde 2010, onde tem desenvolvido projectos de workshop-leading, criação colaborativa e trabalho com comunidades.

Apoio: Interferência - Associação de Intervenção na Prática Artística

Figure B.3: Program notes for the first concert - Page 2

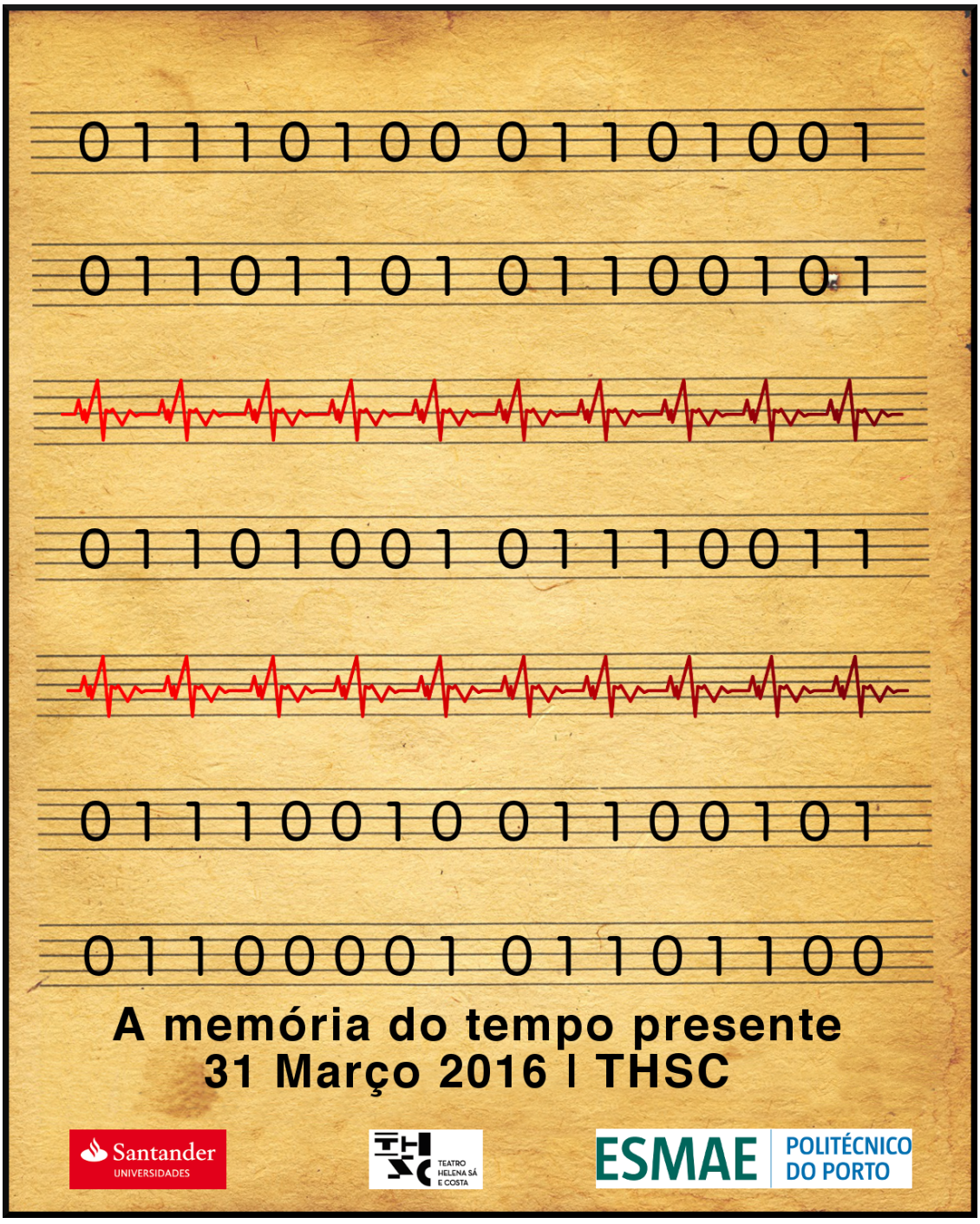

Figure B.4: Poster for *A Memória do Tempo Presente*

Appendix C

Materials from the second concert

A Memória do Tempo Futuro, THSC, June 8th 2016

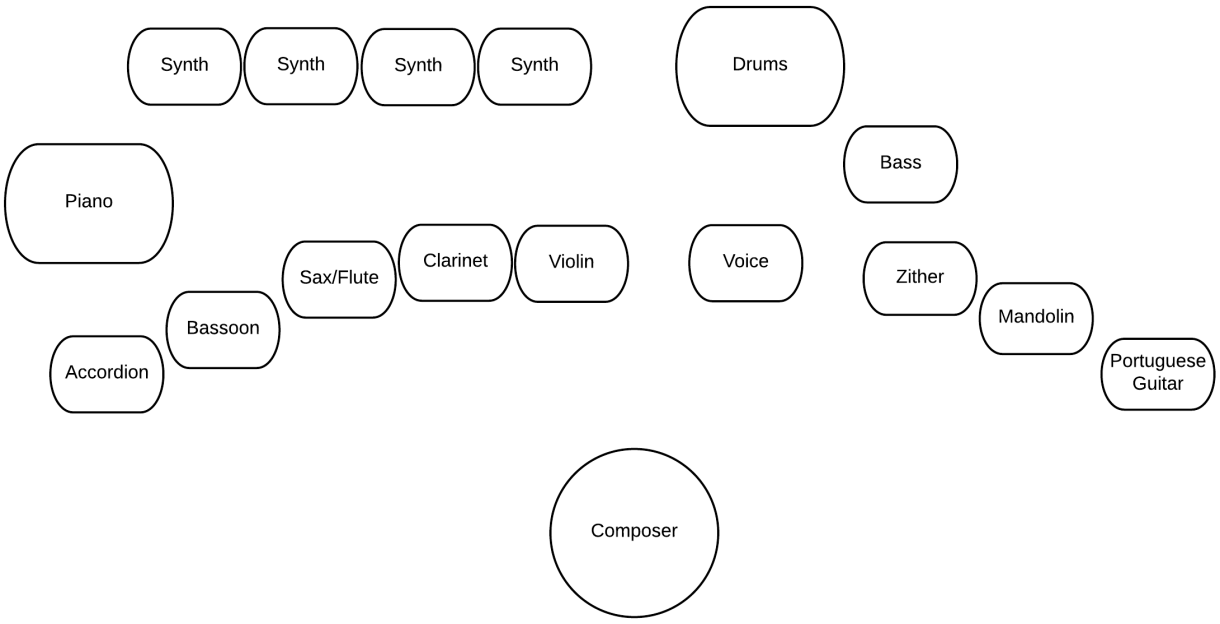

Figure C.1: Stage plot for the second concert

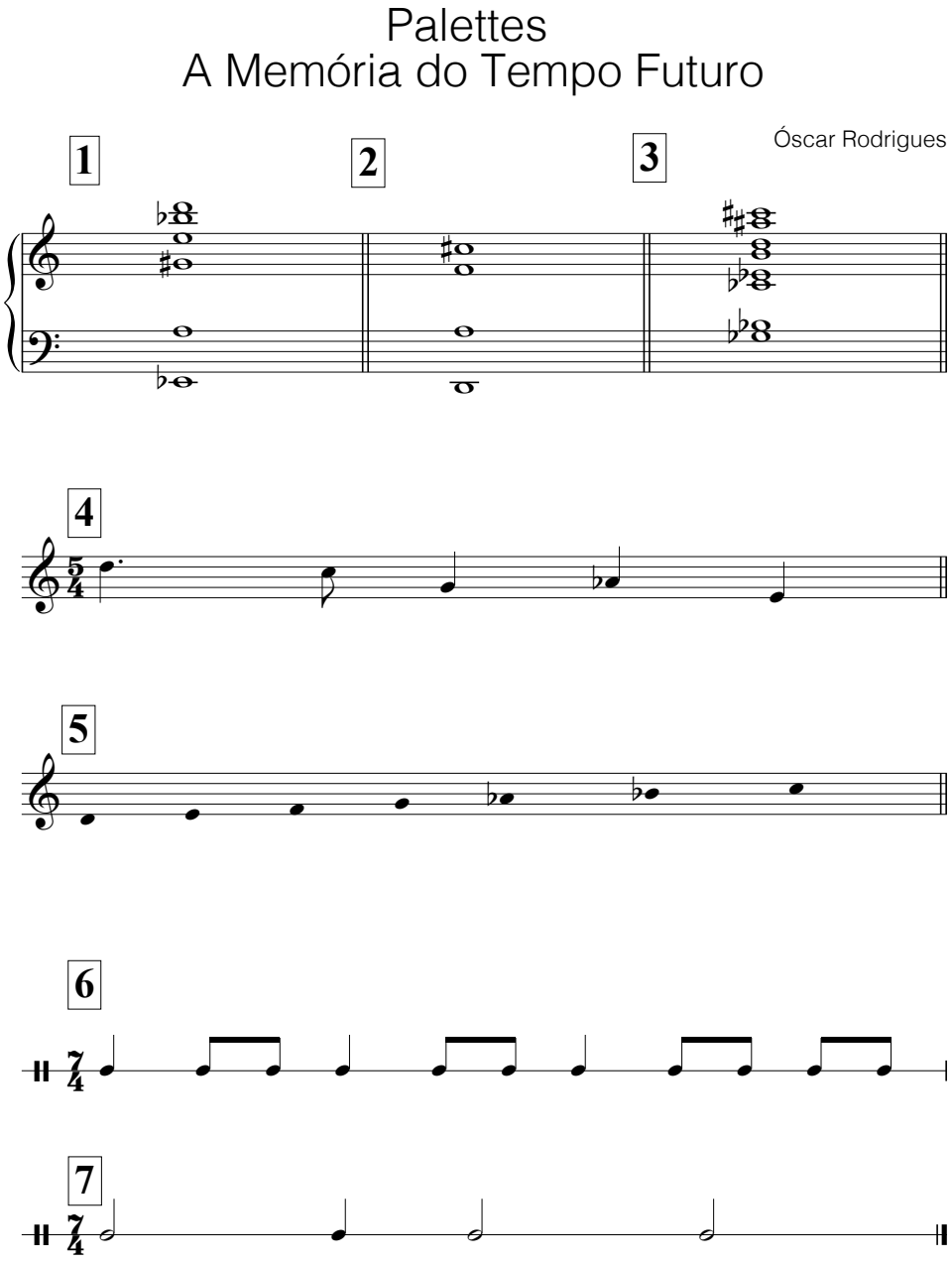

Figure C.2: Palettes for the second concert

Escola Superior de Música e das Artes do Espectáculo
Teatro Helena Sá e Costa
A Memória do Tempo Futuro
8 de Junho de 2016, 21h30
duração: cerca de 50'

Instant Ensemble - Ensemble de Composição em Tempo Real do Porto

O Instant Ensemble é um grupo constituído por músicos de diferentes áreas (música clássica, jazz, rock, música electrónica) e com diferentes experiências e abordagens, especializado na composição em tempo real/improvisação guiada. Toda a música que será apresentada neste concerto será criada em tempo real, isto é, durante o momento da performance, sendo por isso única e irrepetível. Esta música nasce do diálogo e das características de todos os intervenientes - intérpretes, compositor(es), técnicos, público. Na segunda parte serão musicados em tempo real três filmes, dos realizadores alemães Hans Richter e Walter Ruttmann.

Programa

I. Tríptico
   1. Ponto contra ponto
   2. Linha contra linha
   3. Plano contra plano

II. Cine-concerto
   1. Hans Richter - Rhythmus 21 (1921)
   2. Hans Richter - Filmstudie (1926)
   3. Walter Ruttmann - Lichtspiel Opus 1 (1921)

Músicos

Carlos Semedo - Guitarra Portuguesa
Catarina Vieira - Ukulele
Helena Restivo - Teclado
João Grilo - Synths
José Tiago Baptista - Violino
Leonor Abrunheiro - Voz
Lucas Rei Ramos - Teclado
Luís Filipe Neto - Clarinete
Luís Rodrigues - Bandolim
João Rodrigues - Percussão
Miguel Bastos - Flauta, Saxofone
Nuno Areia - Piano
Nuno Lobo - Fagote
Rafael Silva - Baixo Eléctrico
Rui Paiva - Synths
Tiago Candal - Concertina

Direcção artística: Óscar Rodrigues

Nascido no Porto em 1986, estudou Guitarra Clássica e Composição no Conservatório de Música do Porto. Licenciado em Economia (FEP - 2009) e Composição (ESMAE - 2013), encontra-se actualmente a terminar o Mestrado em Composição e Teoria Musical na ESMAE. Para além da actividade enquanto compositor, é professor do ensino artístico desde 2009 e membro do Serviço Educativo da Casa da Música (e do Digitópia Collective) desde 2010, onde tem desenvolvido projectos de workshop-leading, criação colaborativa e trabalho com comunidades.

Apoio: Interferência - Associação de Intervenção na Prática Artística

Figure C.3: Program notes for the second concert

Figure C.4: Poster for *A Memória do Tempo Futuro*

Appendix D

Materials from the third concert

Concerto de Abertura, Café Concerto, June 19th 2016

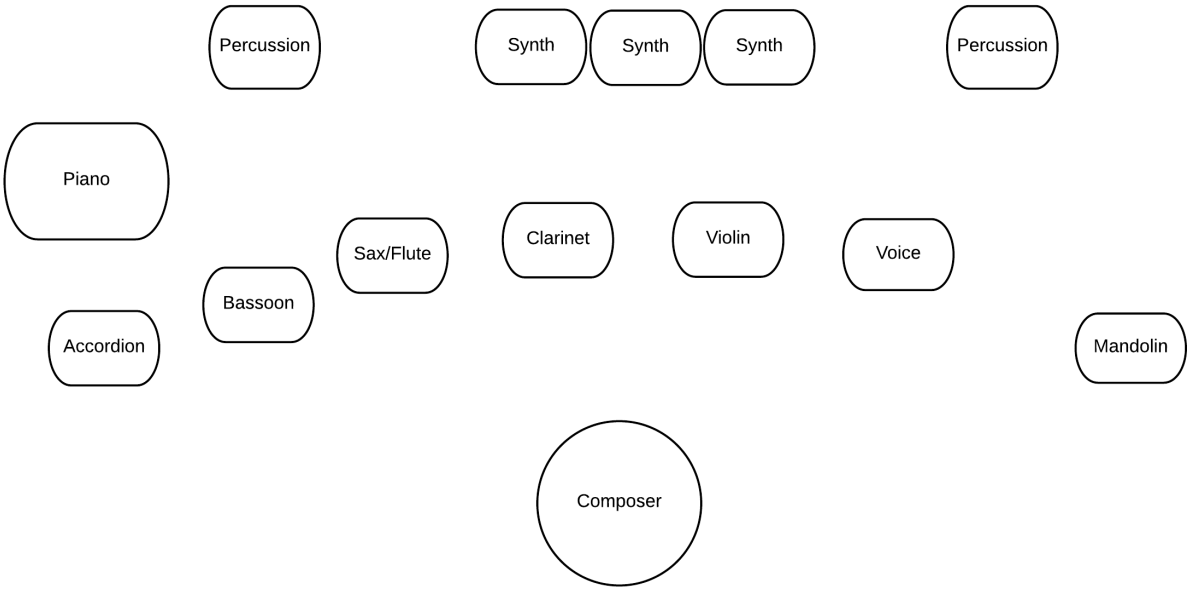

Figure D.1: Stage plot for the third concert

Escola Superior de Música e das Artes do Espectáculo

Café Concerto

Concerto de Abertura - Intervenção Instant Ensemble

19 de Junho de 2016, 21h30

duração: cerca de 20'

Instant Ensemble - Ensemble de Composição em Tempo Real do Porto

O Instant Ensemble é um grupo constituído por músicos de diferentes áreas (música clássica, jazz, rock, música electrónica) e com diferentes experiências e abordagens, especializado na composição em tempo real/improvisação guiada. Toda a música que será apresentada neste concerto será criada em tempo real, isto é, durante o momento da performance, sendo por isso única e irrepetível. Esta música nasce do diálogo e das características de todos os intervenientes - intérpretes, compositor(es), técnicos, público. Na segunda parte serão musicados em tempo real três filmes, dos realizadores alemães Hans Richter e Walter Ruttmann.

Músicos

Helena Restivo - Teclado
João Grilo - Synths
José Tiago Baptista - Violino
Leonor Abrunheiro - Voz
Lucas Rei Ramos - Teclado
Luís Filipe Neto - Clarinete
Luís Rodrigues - Bandolim
João Rodrigues - Percussão
Manuel Brásio - Percussão
Miguel Bastos - Flauta, Saxofone
Nuno Areia - Piano
Nuno Lobo - Fagote
Tiago Candal - Concertina

Direcção artística: Óscar Rodrigues

Nascido no Porto em 1986, estudou Guitarra Clássica e Composição no Conservatório de Música do Porto. Licenciado em Economia (FEP - 2009) e Composição (ESMAE - 2013), encontra-se actualmente a terminar o Mestrado em Composição e Teoria Musical na ESMAE. Para além da actividade enquanto compositor, é professor do ensino artístico desde 2009 e membro do Serviço Educativo da Casa da Música (e do Digitópia Collective) desde 2010, onde tem desenvolvido projectos de workshop-leading, criação colaborativa e trabalho com comunidades.

Apoio: Interferência - Associação de Intervenção na Prática Artística

Figure D.2: Program notes for the third concert

Figure D.3: Poster for *Concerto de Abertura*