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On the Process of Sound Creation: Some Models for Teaching Artistic Creation in Music Using a Soundpainting Project in a French Primary School

By

Grazia Giacco
University of Strasbourg

Solène Coquillon
Strasbourg, France

Abstract

Based on the most recent scientific activities in the field of research-creation and creative practice, the purpose of this project is to conceive an innovative transposition of new methodological issues (research-creation; practice as research, or practice-led research) in artistic creation teaching. Following an initial theoretical approach on the process of artistic creation, this paper will focus on the study of Soundpainting activities in a French classroom in order to highlight the importance of an interdisciplinary approach to teaching artistic creation. Here, sound creation is not an academic composition, but rather work on the organization of sounds using a variety of extended technical sounds or structures from contemporary musical aesthetics.

Keywords: creation, creative process, music education, research-creation

From the spring of 2014 through 2016, the lead author for the present study coordinated and worked with other arts professors; students; artists; and primary, high school, and university teachers on the *didactique de la création artistique* (DiCrA; teaching artistic creation) project. DiCrA received a grant from the University of Strasbourg (IDEX, or excellent initiative) within the framework of the University of Teacher Education at the Academy of Strasbourg (*École Supérieure du Professorat et de L'Éducation* [ESPE]). Sonia Lorant, lecturer in cognitive psychology at ESPE, leads ongoing research.

The objectives of this research project focused on analyzing the creative process and determining methodology in the field of *research-creation*, transposing and designing models for teaching artistic creation, exploring the motivational and cognitive aspects of artistic creation, and investigating the impact of artistic creation on academic learning. One goal of this research is to encourage the renewal of arts education in France, especially in primary schools, by focusing on artistic creation, an experimental or experiential learning method. The institutional framework (i.e., the existing programs and curricula), cultural policies in France, and cognitive issues in the creative process together represent a vast topic. It is relevant to note that, despite the attention given to students' artistic practice in the curricula, students' musical education is not the same as their visual arts education, where teachers encourage students to be creative; in school music classes, interpretation is the focus.

The Ministère de L'Éducation Nationale, de L'Enseignement Supérieur et de la Recherche (MENESR, 2015a, 2015b) supported a creative approach, particularly in the 2015 curricula, but artistic creation in music classrooms remains an uncommon practice. While this topic would benefit from a large statistical study, that is not the focus of the present research; rather, we seek to study and explain the current music education situation in France, particularly as it relates to artistic creation. Though the French national Education Programs (primary school and high school) provided some freedom for creative activities in students'

musical education, a lack of training and trust in creative practices by primary school teachers and even high school specialist music teachers causes educators to neglect creative activities. Further, the lack of time devoted to music in classes, the pressure for students to demonstrate performative actions, and busy curricula slow the development of creative projects. This is compounded by the lack of training among teachers to design an evaluation adapted to creative activities.

Focusing our research on France allowed us to take an in-depth look at the epistemology of artistic creation in the field of didactics, to develop accessible tools for nonspecialist teachers, and to encourage teachers to design more creative projects in their curricula. To develop approaches, we took into account the efforts of training centers such as the Centre de Formation de Musiciens Intervenant (a training center for musicians in school), teachers, and artists (Boulez, 1973; Delalande, 1984; Reibel, 2005; Renard, 1982, 1991) who encourage the creative process in students.

In 2014, Delalande and Saint-Martin created CREAMUS (n.d.), the education branch of Groupe de Recherches Musicales (GRM). As stated on the CREAMUS home page, GRM, created in 1958 by Pierre Schaeffer, played a major role in the development and theorization of music education, based both on the practical exploration of sound sources and on inventing. CREAMUS continues this idea by analyzing several educational projects on artistic creation in music at primary and high schools. CREAMUS is part of that 40 year history that combines music, research, and education. The site hosts resources from the GRM fund as well as educational records classified by age, sound sources, context, pretext, and system; and teachers who wish to share their projects are able to detail their practices in a public space.

Another organization exploring creativity and artistic creation in music is the Cité de la Musique (Philharmonie de Paris, 2015, p. 38), which offers creative workshops for school

groups and adults to experiment with sound design using electroacoustic and digital tools.

The participants familiarize themselves with the various technological tools needed to create a musical project (e.g., microphones, mixing consoles, amplifiers, computers, and software).

Composers, sound technicians, and educators work with participants throughout the process.

CREAMUS and Cité de la Musique are two examples of cultural institutions in France

sensitive to the development and dissemination of artistic creation practices in music.

Pedagogical research on this topic is lacking, however. The ultimate purpose of the present research was to further explore the process of and pedagogical approaches to artistic creation.

Background

Works by Schafer (1977, 1992), Corner (Corner, 2006; Frog Peak Music, n.d.), Filliou (1970) and other researchers (De Martino, 2003; Paynter, 1992, 2008, 2011; Porena, 1979) inspired the present research, as did the methodology specific to *research-creation* or *creative research* (the concept goes by various spellings). In Canada, the Social Sciences and Humanities Research Council (2015) defines research-creation as

an approach to research that combines creative and academic research practices, and supports the development of knowledge and innovation through artistic expression, scholarly investigation, and experimentation. The creation process is situated within the research activity and produces critically informed work in a variety of media (art forms). Research-creation cannot be limited to the interpretation or analysis of a creator's work, conventional works of technological development, or work that focuses on the creation of curricula....

Fields that may involve research-creation may include, but are not limited to: architecture, design, creative writing, visual arts (e.g., painting, drawing, sculpture, ceramics, textiles), performing arts (e.g., dance, music, theatre), film, video, performance art, interdisciplinary arts, media and electronic arts, and new artistic practices. ("Research-creation")

Indeed, the reasoning behind this field of research over the past 3 decades leads us to believe that these issues are deeply connected with the teaching methodologies themselves, affecting all levels of education, from elementary to university. Such research includes *practice-led research*, *research-led practice*, and *practice-based research / creative research* (Bruneau & Villeneuve, 2007); *research-creation* (Gosselin & Le Coguièc, 2006; Stévanche-Lacasse,

2013); *practice-led research* (E. Barrett & Bolt, 2010); *research-led practice* (Smith & Dean, 2009/2014); and *practice-based research / art-based research* (McNiff, 2013). Reflecting on the pedagogy of artistic creation thus implies building on all the epistemological and methodological issues surrounding art, creation, transmission, and dissemination as a sociocultural product. The creative process (conception, process, analysis, assessment) in research-creation and teaching artistic creation are methodologically analogous. Our approach is in a *transdisciplinarity* approach (Nicolescu, 2010; 2012):

Transdisciplinarity concerns that which is at once between the disciplines, across the different disciplines, and beyond all disciplines. Its goal is the understanding of the present world, of which one of the imperatives is the unity of knowledge (Nicolescu, 2010, p. 22).

About Some Models of the Creative Process. Wallas's (1926) model of the creative process is one of the most cited. It involves four stages—preparation, incubation, illumination, verification—and shows the linear and chronological progress of the creative process. A relative linearity exists in Bennet's (1976) model. Bennet investigated the process of musical creation "through a series of semistructured interviews with eight professional composers of classical music" (Bennet, 1976, p. 3). The model Bennet developed from this research involves six stages: germinal idea, sketch, first draft, elaboration and refinement, final draft copying, and revision. The model allows for movement to the first draft while in the germinal idea stage or between the germinal idea and sketch stages. The following is Bennet's (1976) description of the composing process:

The composing process frequently involved first discovering a 'germinal idea'. A brief sketch of the germinal idea was often recorded, followed by a first draft of the work, elaboration and refinement of the first draft, and then completion of the final draft and copying of the score. (p. 3)

In Webster's (2002) model, the creative thinking process is analyzed in its entirety, including the intentions behind the initial choice, *product intention*; the process itself, *thinking process* (from divergent thinking to convergent thinking); and the final step, *creative*

products, broken down by product type (composition, recorded performances/recorded improvisations, written analysis, mental representations).

In the field of music education, Paynter's (1992) work, which was similar to Delalande's (1984) work in France and Porena's (1979) work in Italy, provided much of the inspiration and guidance in our research. His thoughts on creating through sound, on music pedagogy, on the concept of experience (Dewey, 1934), and on the role of creativity in school programs were fundamental to our research on teaching artistic creation. For Paynter (1992),

sound, time, ideas and technique are the four corners of the musical experience. Music is the result of the dynamic relationship between them. To understand music, we need to understand these relationships: to know how sounds work; how they can become musical ideas and how those ideas, transformed by artistic techniques, can structure time. (p. 33; see Figure 1)

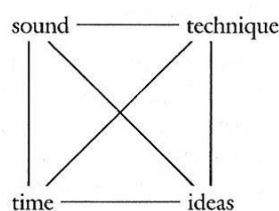


Figure 1. “Sounds out of Silence” graphically represents the core of the relationships between the four corners of the musical experience. From *Sounds and Structure* (p. 33), by J. Paynter, 1992, Cambridge, England: Cambridge University Press. Copyright 1992 by Cambridge University Press. Reprinted with permission. [These figures cannot be reproduced, shared, altered, or exploited commercially in any way without the permission of Cambridge University Press, as it is copyrighted material and therefore not subject to the allowances permitted under an open access free online journal.]

Another of Paynter's diagrams placed *responding and realizing* in the central position (see Figure 2).

Everything we do in education aspires to an expansion of the intellectual life. Music is not inferior in this respect; thinking and making with musical sounds gives rise to ‘ways of coming to know’ and ‘ways of telling’ different from those in other disciplines but no less important to intellectual development. Thought meets thought in the sharing of our own creativity and in performing, listening to and understanding the output of other people's inventiveness. A flow chart of this activity would reveal a network of interaction within which one might take any direction so long as it passed through the central point. Every point in this vibrant world resonates with others. At

the center is the aural response which links creating, performing and listening, and which exists only through the seemingly unlimited relationships ('Infinite & Eternal', as William Blake thought them to be) that can be set up between sound, time, ideas, and artistry to produce stimulating and satisfying musical structures. (Paynter, 1992, p. 23)

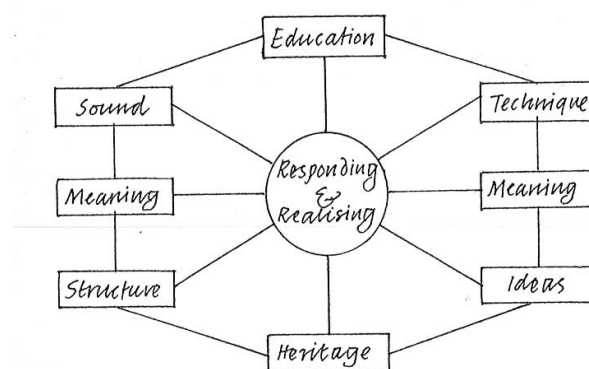


Figure 2. Paynter's flow chart of activity, wherein all motion is possible as long as it passes through the center. From *Sound and Structure* (p. 23), by J. Paynter, 1992, Cambridge, England: Cambridge University Press. Copyright 1992 by Cambridge University Press. Reprinted with permission. [These figures cannot be reproduced, shared, altered, or exploited commercially in any way without the permission of Cambridge University Press, as it is copyrighted material and therefore not subject to the allowances permitted under an open access free online journal.]

In France, there are two proposed models for the creative approach: one by Authelain (1995) and one by Duvillard (2011; see Figure 3). Duvillard positioned a *cultural nourishment* phase in the middle. When using this model, teachers must decide the place and time to provide this nourishment and, how and when the students will be allowed to meet the artist and the work; each project and class are different, so timing is at the teacher's discretion. This is important since each project can take different paths depending on the choice; the student's posture will change and adapt itself accordingly.

EXPLORATING SOUND MATERIALS	IMPROVISING	STRUCTURING	CHOOSING AND SELECTING	ACHIEVING
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EXPLORATION	MAKING ACT	CULTURAL NOURISHMENT	ORGANIZATION	COMMUNICABILITY
Creative shock Stereotype Multi-directions Choice	<i>Poïesis</i> Rehearsal	Artistic thing Cultural identity	Rupture Succession and juxtaposition Encounter	

Figure 3. The top image represents Authelain's (1995) approach to creativity. The bottom image represents Duvillard's (2011) approach to creativity. Both sequences are linear, beginning with an exploration phase followed by a central organization (or structuration) phase and ending with a final implementation phase.

The central axis of our work, however, is Gosselin, Potvin, Gingras, and Murphy's (1998) model: dynamic artistic creation (see Figure 4). For them, the representation of the creative process was seen both as a *process* and as a *dynamic*. Gosselin et al. have continued to work on this model since 1998, applying it to the *Programme de Formation de L'École Québécoise* [Québec Education Program] (Education et Enseignement supérieur, 2012). What we find interesting about this model is its dynamic presentation, which takes into account different recurring moments within each phase. This model begins to leave the chronological and linear stages represented in other creativity models.

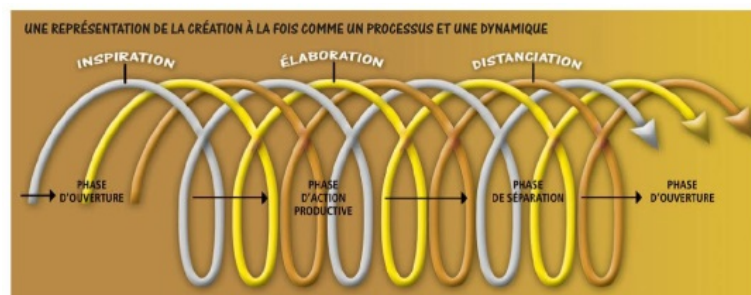


Figure 4. Gosselin et al.'s model highlights three phases: the *opening phase*, the *productive activity phase*, and the *separation phase*. Each phase is in turn divided into a dynamic that includes three "moments": *inspiration*, *elaboration*, and *detachment*. From: *Chapitre 8: Domaine des Arts* (p. 6), by Éducation et Enseignement Supérieur, Québec, 2012. Reprinted with permission of Author. [This model was published first in Gosselin, P., Potvin, G., Gingras, J.-M. & Murphy, S. (1998)].

A new model for teaching artistic creation. From the study of all these models, and particularly from Gosselin et al.'s (1998) model, Giacco proposes here a new model on the process of artistic creation (see Figure 5).

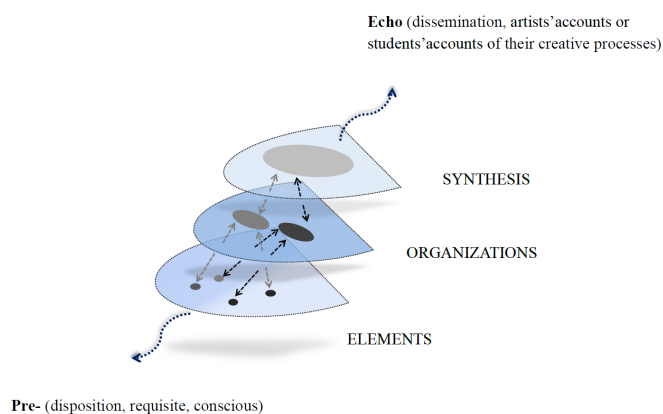


Figure 5. Giacco's model for the creative process allows for free movement between each phase.

With this model, Giacco wanted to break the linear and chronological sequences of most representations of the creative process. This remains, however, a representation, and although we tried to account for the discontinuity and dynamism, the creative process keeps an element of mystery, one which cannot be properly quantified or qualified. We designed our model after the other creative process models discussed in "About some models of the creative process," synthesizing the different phases of the creative process. It is not a psychological model (Biasutti, 2012, 2015; Botella & Lubart, 2015); it is a didactic tool, grown out from models of artistic creation, from a creative approach (Passeron, 1989), and particularly from a psychoanalytical approach (Anzieu, 1981). The differences between these models highlight the complementarities between the approaches. For example, Biasutti's works focus on psychological models of musical improvisation, taking special interest to the mental processes that govern musical improvisation.

Giacco's model considers sound creation (as it relates to the act of creating, not only as a practice of creativity) with students as a phased process. This is not a process presented

in a linear directionality but a process that shows the phases as a whole (elements, organizations, synthesis) while considering the flow between each phase. The process can be read in any direction, namely going from the synthesis phase to the experimental phase of the material (elements), then returning to the organizational phase and the final product. Giacco's model does not describe what is happening with the creative process in the mental mechanisms of children's or creators' minds, but rather represents the evolutionary spaces of the material. It is a model of the creation process, born of the practical requirement to visually provide a support that could sum up the intersection of the phases in a creative process and show their *porosity*, or ability to transition from one to the other based on the artistic process. This line of thinking would allow teachers engaged in creative activities with their classes to view the phases and position themselves according to the various steps or actions.

Giacco's model identifies three strata: *elements*, *organizations*, and *synthesis*. Between these three areas, paths flow from one level to another, like a distillation or aggregation process. The flight paths (*Pre-* and *Echo*) anticipate and exceed the creation itself. The strata (*Elements*, *Organizations*, *Synthesis*) are not unidirectional and airtight; they are capillaries allowing for back-and-forth, dynamic round trips. For example, once an organization is defined, reflexive analysis of the creative process (self-reflection) can cause creators to question their choices and return to the elements interspace. Likewise, once creators reach synthesis, they can question their organizational choices, even challenging the elements themselves in a discontinuous creative process. These strata are superimposed, intermittent, and interdependent layers. This is an evolutionary process of creation, a dynamic, where error is necessarily taken into account. These interspaces also encompass the unfinished by suspending, at any time and in any place, the creative process. Throughout the musical creative process, listening is an important part of selecting and organizing sound

material. Creators place themselves in processes that constantly lead them to make their ways between partial focus of an event (elements or organizations) and the overall projects they want to achieve (synthesis). Because this representation of the creative process is not linear, creation can also travel in reverse, going from the synthesis interspace to progressively finding the elements that will bring creators to the achievement of the overall project they had first envisioned. Several contemporary composers use this system, sometimes starting from a visual image, an imaginary gesture or a mental space (Giacco, 2007a, 2007b), sometimes relying on graphical sketches, as is the case with the Italian composer Salvatore Sciarrino (Sciarrino, 1998; Giacco, 2001, 2013). There are different approaches for each space in the model (see Figure 6).

	ELEMENTS experimentation 1		ORGANIZATIONS experimentation 2		SYNTHESIS achievement	
Pre-		SELECTION 1		SELECTION 2		ECHO
	Contact		Formal articulations		Formal sequence	
	Sensorimotor	Discrimination	Assemblages	Discrimination	Finished/unfinished	Diffusion
	Proliferation	Association	Montages	Association	Global project	Feedback
	Points/Lines/Matters	<i>Bisociation</i>	Tension/relaxation	<i>Bisociation</i>	Finalization	Evaluation
	Comparison	Sharing	Continuity/discontinuity	Sharing		
	Elementary Research		Surfaces/masses/textures			
	Iterative movements		Structural research			
			Formal iterative movements			

Figure 6. Possible approaches for each area of Giacco’s model (see Figure 5). *Bisociation* “[makes] a distinction between the routine skills of thinking on a single ‘plane’... and the creative act, which... always operates on more than one plane” (Koestler, 1964, p. 36).

From model design to practical application. As teacher-researchers at a university, in charge of training students enrolled in a master’s in education program (graduates will go on to teach primary and high school), we are working to teach future teachers about creativity and sound creation. The interdisciplinary approach implemented during training courses develops experimentation and creativity by using analyses of artists’ practices and the

creative process: The artistic disciplines themselves form the basis for this approach. In France's school and college curricula, the importance given to creativity suggests that in the coming years teachers will be able to be even more committed to this path. The curricula underline the importance of the practice of artistic creation. The objective in kindergarten in France is to broaden the range of creativity and musical imagination in children, personally and collectively, by exposing them to diverse musical worlds (MENESR, 2015a, "3.1.2. Univers sonores"). Of note is that as of September 2016, the cycles in France will be organized according to the following levels: Cycle 1, early learning cycle (all sections of kindergarten); Cycle 2, basic learning cycle (grades CP, CE1, and CE2—6 to 9 years old); Cycle 3, consolidation cycle (grades CM1, CM2, and six—9 to 12 years old); and Cycle 4, development cycle (grades five, four, and three—12 to 15 years old).

Although an experimentation activity is scheduled in cycles 1 and 2, it is only in cycle 3 (9 to 12 years old) that curricula offer a more obvious opening to creativity: Children must be able to "make personal proposals during creative, inventive and interpretative moments" (MENESR, 2015b, p. 144) a skill that will be more involved in cycle 4 (12 to 15 years old), than in high school and specialized music classes. While artistic creation is still not developed enough in the French education system, the curricula indicated that the students' artistic sensibility and expressiveness are developed by artistic practices, but also by encountering and studying diverse artworks from various aesthetic, temporal and geographical components in the history of art (MENESR, 2008, p. 25). The new programs specified that students must learn to identify and to assume their share of responsibility in a cooperative process of creation (MENESR, 2015b). We conducted our sound creation research in a cycle 3 class using *Soundpainting*. The teacher in this class had been using this collective composition technique for several years.

Soundpainting: An example application for teaching artistic creation

Conceived in the 1970s by Thompson (2006), “Soundpainting is the universal multidisciplinary live composing sign language for musicians, actors, dancers and visual Artists” (Thompson, n.d., “Soundpainting: Introduction”). Composers—Soundpainters—(not conductors) can use over 1,200 Soundpainting gestures to inform performers what type of improvisation they expect. In this sense, Soundpainting is an artistic conversation between the Soundpainter and the performers. We used Soundpainting in our research because it involves a collective action: inventing new sound productions. The objective was to place students in a creative position, with all that implies in terms of skills and knowledge. In Soundpainting, there is a real interaction between the Soundpainter and the gestures. This interaction is the basis of creativity, and so the social dimension is just as important as the artistic dimension (Masset, 2014). The group dynamic was equally important, as was the acceptance of error. Soundpainting is an exercise that can have many beneficial effects on children. It allows participants to be free and to use their imaginations. In addition, Soundpainting can have beneficial impacts to all classroom activities. One of the principles of this practice is that there are no mistakes; if doubt or an error occurs, it is important to keep going until the next gesture from the Soundpainter. Acceptance of error is something very important in teaching and learning, and working hard on this concept through an artistic practice can allow children to break free of a weight that hinders their progress. The purpose of a Soundpainting performance is to experiment with new sounds functionally. The discovery of these new sounds may be due to chance, but then it is necessary to form this discovery into a coherent sequence.

Furthermore, the distinction between a conductor and a Soundpainter according to Thompson (2006) is that the former is an interpreter and the latter is a composer. This is a crucial point because students must understand this distinction to be actively involved in the

creative process. The Soundpainter is like a painter who creates the sound material with the performers. Generally, Soundpainting follows a special syntax articulated around four points: *Who, What, How, and When*. The Soundpainter must use the signs in this order; however, *How* is not always used by the Soundpainter, leaving more improvisational freedom to the performers, who can then choose the nuance and the quality of their production themselves. Thompson (2006) provides three principles:

1. *When in doubt, don't lay out!* No matter what, don't stop playing unless you are clearly cut off by the Soundpainter. It often happens that while you are performing one gesture and watching the Soundpainter sign a set of new gestures, you will lose the integrity of the current gesture or sometimes even stop. (p. 8)
2. *There are no mistakes!* If you accidentally come in with Pointillism when the Soundpainter signed Long Tone, stick with Pointillism instead of switching to Long Tone. It will be stronger musically than sneaking out and sneaking back in with Long Tone. Don't purposely try to achieve this, but if it happens, stay with your choice and wait for the next gesture to get back on track. (p. 8)
3. *Don't sneak in, don't sneak out!* Come in right at the end of the Play gesture and keep playing until the Off gesture or until the next Play gesture. When given a Go gesture such as Play, it is important to make your entrance hard-edged—like changing the channels on a television set. The same can be said for Point to Point and Scanning—you respond immediately and stop once the gesture has been removed. (p. 8)

The peculiarity of Soundpainting lies in the fact that everyone can use it. Every ensemble, regardless of the specific art form, can utilize and benefit from this practice. There are vocal and instrumental ensembles, ancient or contemporary music groups, actors, circus artists. Each artist brings his or her understanding to the whole group. Soundpainting is for everyone and allows everyone to express themselves. Several principles of Soundpainting demonstrate an acceptance of error that becomes an integral part of the composition, and more generally, the learning process.

Sound design project in a primary school class. The secondary author for this article was the teacher for the study, which is detailed in **the following subsections**.

Setting. In September 2014, we decided to carry out a Soundpainting project in the public primary school Josué Hoffet in Oberhausbergen, France. We conducted the

project in a 4th grade classroom with 24 students aged between 9 and 10. One student was deaf, and one student used a wheelchair. The total population of the school was 223 students, from 6 to 11 years old, and was divided into 10 classes, from 1st grade to 5th grade. On Monday afternoons from January to June 2015, the teacher took the students to a dance studio next to the school for a 50-minute session. The researcher accompanied the teacher in order to have an external view of what was going on during the sessions and to build the project together.

Participants. The study participants comprised 24 students (10 boys and 14 girls). Only one child was a musician (studying piano at the Conservatory of Strasbourg), and all the others had never had training or lessons in music schools. The students' musical experiences in school were limited to singing songs in a group, often for school festivals (for Christmas or for open school festivities). They had never experienced working with their voices in an experimental way like in this Soundpainting creation project.

Pedagogic method. We adopted Giacco's model (see Figure 5) for the conception and realization of this project. The audiovisual recording of the sessions and post recording analysis allowed us to understand the progress of the experience and of the student's skills in creating the sound elements, first in a small group and later in a larger one (collective practice). The student groups formed spontaneously according to the affinities of the students themselves and to their choice elements (air, water, fire, or earth). We scheduled the sessions in cooperation (researcher and teacher), and they included trace analysis and interviews with the teacher. During the dance studio sessions, the researcher played an observational role, observing the sessions while taking notes and creating graphics. With the approval of the teacher, the researcher interacted with the students (often to answer questions the students had during the experimental phases of the sound material) but was never in a directive role. This role is similar to what M. Barrett (1997) described as a characteristic of

naturalistic inquiry: “The researcher interacted with the children as they worked at the composition/notation tasks, made observations of the nature of children’s participation in the task, and annotated the notations completed by the children” (p. 6).

The teacher assumed a multifaceted role (Boucheton & Soulé, 2009; Kratus, 1991): She guided the students through the research phase of the four elements, allowing them time to experiment, listen, and choose; she helped the students organize items into larger musical structures (organizational phases) by offering several structures and giving them opportunities to express their views and to choose; and she accompanied them into the final performance by bringing in the Palettes, the final version of their creative work. She was careful never to impose a directive posture, but rather to let the students make this research by themselves by adapting her professional gestures and posture to the learning progress of the students.

At the beginning of this project, after the teacher explained Soundpainting to the students, she started teaching a few basic gestures to them. They were immediately receptive. In order for them to better integrate the learned gestures, they used them to sing their morning song. The teacher modeled this at first, but gradually the students took her place. A particular situation caught her attention: She had a deaf student in the class. He had had a device for several years and a cued speech translator helped him. One morning, he did the lead vocals: He made perfect gestures; he was focused, and he reinvested all the comments that had been made during the various sessions; he was the only student able to improvise and react to the proposals made by the performers before him. We could see and sense that he took the time to listen. Here, *listen* takes on a fuller meaning: The French word *écouter*, from the latin *auscultare*, means “to listen carefully, to explore.” For this child, in this context, it means to listen, to (re)create something. The teacher discussed this experience afterward with one of the student’s translators, who was present at this session, and she told the teacher that

deaf children were very attentive and that they observe much of what happens around them. This explained why he had taken into account what the other students were doing.

Before returning to Soundpainting, the teacher asked the students what Soundpainting was to them in order to explain it to a new student who had just arrived. For their Soundpainting practice, the teacher was the Soundpainter, but the students could reproduce the gestures at the same time to better integrate them. In addition, they had the opportunity after a few sessions to take her place as the Soundpainter and to sign for the class. The experiment was successful, and some students demonstrated interesting creations using precise gestures the teacher corrected as they were doing them.

Based on Guerra-Lisi and Stefani's (2010) four elements (air, water, fire, and earth) theory in musical semiotics, we proposed an experiment to the students. Five to six person groups would each have to search for sounds (and possibly their graphical representations) that could evoke sensations and feelings or sound gestures from each element. We invited the students to search for other graphics, sounds, and signs stemming from this sensorimotor sound awareness and associated with its sound production (phase exploration/elements). Using the four elements theory, we made a graphic detailing the results of this exploration in addition to those proposed by Guerra-Lisi and Stefani (see Appendix 1: Graphic Notations of the Four Elements). This experiment demonstrates the ability of students to associate sounds and notations (see Figure 7), using enactive, iconic, or symbolic signs (M. Barrett, 1997; Davidson & Scripp, 1988).



Figure 7. Examples of graphic sound notation by children. From left to right and top to bottom, the images represent earthquake, quicksand, volcano, hammering of the earth, falling rocks, and earth.

After a few sessions spent trying to find sounds for the four elements in workshops, we realized that it was time to involve the students in the overall creation. Giacco's model (see Figure 5) on the creative process indicates that the students should not remain on the elements space but continue on to the organizations space. We introduced Palettes, which "are primarily Content gestures identifying composed and/or rehearsed material" (Thompson, n.d., "Soundpainting: The Structure of Soundpainting"). In Soundpainting, a Palette is a relatively short fragment of material on which the group has worked before. In his method, Thompson (2006) said that Palettes need to be organized. Thus, we asked the students to pay attention to sounds that seemed interesting and workable and then to use them in the final performance in a predefined order. In between these Palettes, some students could take the Soundpainter's role to compose in real time in an open form.

We held a sound research workshop during two sessions: The students had searched for sounds and now had to draw their graphical representations. Gradually, throughout the sessions, the students had gained the autonomy to sign, namely to become Soundpainters themselves in front of the class. For example, one student Soundpainter signed and composed simultaneously. While she was looking for interesting sounds the other students helped her with the movements. In another example, a student was trying but did not know how to get what he wanted. The teacher found a solution, but the student was not able to do it; the

students and the teacher understood that they would have to wait for the moment again. This is what learning through creation is: doubt, trial and error, desire, and searching for ways to get to the creation.

We used a systemic approach applied to research-creation (Gosselin, 2006) to design our project. Under this approach, we took into account the creative process as well as artistic creation. Like any creative process, this Soundpainting project was supposed to take into account the socialization of the group, since it was a collective creation. The various experiments produced by the students were interdependent during the organizational phase (second phase): listening to themselves and to others and answering in relation to the elements and organizations proposed by the other students. The project was not about following an analytical method but rather highlighting the constructivist nature of the work of the practitioner in artistic creation (Gosselin, 2006, p. 28), the child itself.

Instructions. In order to have a precise idea of the activities, refer to the project's lessons plan in Appendix 2.

Evaluation of the activities. We did not measure the sound creation activities in quantitative terms, as Webster (1987, 1994) did, but rather in qualitative terms valued according to a set of dispositional outcomes (Eisner, 1998, pp. 14–15): to be able to imagine new possibilities, to explore the ambiguity, and to be opened to divergent thinking. Creative practices require an assessment model tailored for the type of project and to the students' skills: "Most types of educational assessment evaluate the correctness of students' responses. But with creative activities, no model for correctness exists" (Kratus, 1990, p. 37). Although the reference to Kratus is dated, we believe that the difficulties in the assessment are still relevant today, and represent one of the reasons that cause a lack of engagement in creative practices in French schools.

The teacher in our research assessed her students in a formative manner throughout the sequence in order to prepare successive sessions. Methodological breaks taken when sharing with the students allowed them to show the teacher what they had learned and what they were able to do. By analyzing the video we were able to assess the students on their abilities to propose sounds and to develop on them, to discriminate between sounds and their organizations (thus showing an ability to make choices), to listen (to themselves and to others), to perform a Soundpainting sequence, and to become a Soundpainter.

Results. The conclusion of the research involved a public performance in the ESPE University gardens in Strasbourg for the interdisciplinary project—installations artworks, objects, videos, sounds, performances in collaboration with the visual arts department, University of Strasbourg— *#Jardin (perdu-retrouvé)* (2015) [*#Garden (lost and found)*] (see Figure 8).

All students were able to participate and all were able to acquire the basic tools for creating the Soundpainting. In addition to the artistic success of this public presentation of the work carried out throughout the year, the students were very proud. During a review of the lessons learned in class, the teacher gathered these remarks, which showed the place of the students' emotional experience through their investment in the project: "I felt joyful because they were admiring us" (Nesil, personal correspondence, 8th June 2015); "I felt joy" (Gil, personal correspondence, 8th June 2015). Soundpainting seemed to be a beautiful, artistic experience for them: "What I liked in Soundpainting is that we were free to make the movement we wanted when we wanted" (Amandine, personal correspondence, 8th June 2015).

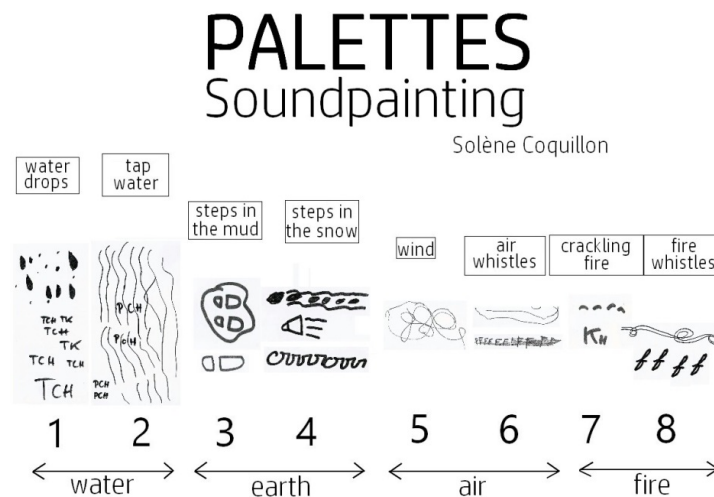


Figure 8. Palettes sound notation for *#Jardin (perdu-retrouvé)* [*#Garden (lost and found)*, 2015].

Through the various comments and questions from the students in each session, we realized that they had not only learned and implemented the instructions, not only grasped the skills and knowledge, but that they had mastered the concept of Soundpainting because they had previously experienced the Soundpainting gestures (see Appendix 3).

Conclusion

This project began as a research question: How do we develop creative practices in French schools, especially in music education? In France, creative practices in visual arts are much more present in school activities. In music, however, particularly in the first degree (6 to 10 years old), the most common activities are singing and music listening. Instrumental practice, particularly in the first degree, remains confined to the accompaniment of songs. A real work of creation must be developed with voices, instruments, or sound objects. In return, this creative practice will improve listening skills. Using digital tools and new technology for music education, teachers have the support to realize creative activities. However, the tools themselves are not enough: Teachers must use them in conjunction with a creative project.

Our questions, which this research has better identified, are

- How can creative activities be integrated in the curriculum?

- How can education research on artistic creation become a reflection on creative practices?
- What methods can be developed that could promote creativity in music education teaching?
- How can research creation provide answers to the methodological profile of arts education research?

This is the aim of our ongoing research. By using Thomson's (2006) Soundpainting method, this network of questions may be able to guide teachers in designing, implementing, and monitoring their creation projects. They would then be free to build their own networks of answers starting from the core question, *why?* (see Figure 9).

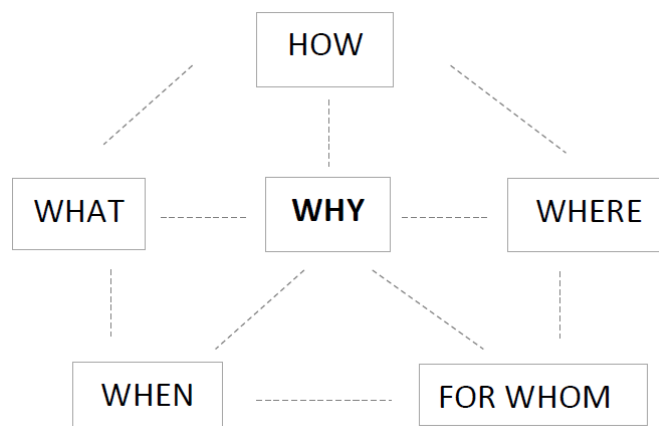


Figure 9. Network of questions for creation projects. The central question, *Why?* connects freely to all other questions.

- **Why:** themes, objectives, motivation; “conditions” (Bennet, 1976); “frame of mind” (Authelain, 1995)
- **How:** project selection—individual, group; artists’ approaches; experimentation; interdisciplinarity
- **What:** material, exploration; research; gleaning; choice, verification
- **When:** period, temporal perspective; time: project length, session length; stages

- **Where:** place of creation, space, achievement; where + how = choice of media, production tools, what creative forms (multiplicity), technical product, artwork
- **For whom:** student's involvement, type of audience, interdisciplinarity.

According to Biasutti (2006), research on the cognitive processes used while composing music highlights the functional abilities that are the basis of the creative process (i.e. the generation of ideas, the ability to organize and transcribe sound events). By encouraging collective creation and stimulating the metacognitive mechanisms, creative teaching may lead to the recognition of the quality of processes in artistic creation rather than the analysis of the final product.

The implementation of this project is the practice of artistic creation, which opens the relationship between creation and collaborative art with young students (Burnard & Murphy, 2013). The limitation of this project is its singularity—not all teachers have the time and training to build such projects. We cannot expand time, but we can change minds, we can change ways of thinking. This is why we are strongly involved in teaching artistic creation research and in a creative and musical training of future teachers during their master's studies.

We believe it is necessary that the education of students preparing for teaching careers in French Universities should be based on solid and innovative research on creation as an activity that develops divergent skills and critical thinking in a collaborative space. Our research in the pedagogy of artistic creation—DiCrA—has mainly centered on the creative process as a source of knowledge and on the transdisciplinary learning potential of creative practices. As stated by Eisner (1998), the practice of artistic creation develops specific skills:

Finally, I wish to identify a particularly important set of outcomes for arts education. This one pertains to dispositions that are difficult to assess, let alone measure, but they are dispositions that appear to be cultivated through programs that engage students in the process of artistic creation. I speak of dispositional artistic creation. I speak of dispositional outcomes such as the following: a willingness to imagine possibilities that are not now, but which might become; a desire to explore ambiguity,

to be willing to forestall premature closure in pursuing resolutions; the ability to recognize and accept the multiple perspectives and resolutions that work in the arts celebrate. (pp. 14–15)

Soundpainting practice may develop students' skills, which they can then employ in the classroom and at school. This is a transfer of artistic creation skills toward broader skills such as concentration, togetherness, respect, and self-confidence. Through all these skills, students are part of a collective artistic creation but feel recognized in their own creative work. They are able to sign their work, giving it a certain authenticity. In addition, through improvisation and composition, students have a degree of freedom. In order to move toward a pedagogy like the one proposed by Guerra-Lisi and Stefani (2010) further study with music or visual arts teachers may be beneficial. Psychological studies and analysis may provide greater insight on the impact this type of education may have on children at a cognitive level.

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Appendix 1: Graphic Notations of the Four Elements

AIR	WATER	FIRE	EARTH
Prototypes (Meaning: <i>prototypos</i> “Primitive form”)			
<p><i>Lightweight, inconsistent, ascending, continuous, enveloping, suspended, transparent, free, elusive... fleeting, invisible, cold, warm, sibilant, lashing, soft.</i></p> <p>*Note for the reader: Adjectives in italics are translated from Guerra Lisi & Stefani (2010, pp. 42-46). Adjectives that are not in italics are from our own proposal.</p>	<p><i>Fluid, continuous, inertia, gravity, heaviness, descending, slow, bulk, shapeless, enveloping, winding, which escapes, untied... cold, warm, clear, pure, smooth, surface, fine droplets, fast droplets, continuous, discontinuous.</i></p>	<p><i>Energy, heat, intense, vibrant, fiery, vivid, bright, unpredictable, uncontrollable, incoercible, extreme, intangible, quick, pulses, tones, bursts...</i></p>	<p><i>Touch, compact, dense, solid, hard, immobile, stable, static, rigid, strong, serious, low, opaque, support... telluric, hidden power, deep, heavy, eroded, hollowed, bulk, corporeality.</i></p>
Vocal-sound stereotypes			
<p><i>Exhalation with sound, head voice, delicate sounds vibrated on lips, even with objects; constrictive consonants [v] [f] [ʒ] [h] [k] [z] or vibrating [r] [br] [fr] vocals [i:] [ə].</i></p>	<p><i>Melodious voice, vocals [ə] [ɔ] [y] [u], prolonged exhalation, sucking lips, lallation, gurgle, consonant [l].</i></p>	<p><i>Breathing with sound, intense release, sound tonic precipice from the letter I to the letter U [u] [e] → [ɔ], exclamations, laughter, crying, convulsive words, whistling...</i></p>	<p><i>Guttural noise, serious tone, intermittent voice, intense gesticulation, vowels [y] [u] [ə] → [u] [ɔ] [e], consonants [m] [n] [ŋ] [p] [d] [g] [dʒ] [t] [k].</i></p>

Other sounds			
<p>Inhalation / exhalation, noisy or not</p> <p>Work proposal → try to find sounds that could <u>express the air</u> (our feelings about the air on us or our presence in the air) or <u>represent the air</u> (a sound that could describe an event or a material, without involving feelings). Sound elements: dots, lines, ascending / descending, continuous / discontinuous, accumulating / depleting, lightweight surface / bulky, crescendo / decrescendo (< >).</p>	<p>Sounds made with the lips, bubbles, tongue, [ʒ] [l] [pl]</p> <p>Cf. Work proposal (express/represent)</p> <p>Sound elements: dots, lines, ascending / descending, continuous / discontinuous, accumulating / depleting, lightweight surface / bulky, crescendo / decrescendo (< >).</p>	<p>Sounds erupting in rapid crescendo ([ʃ] [fz] [t])</p> <p>Cf. Work proposal (express/represent)</p> <p>Sound elements: dots, lines, ascending / descending, continuous / discontinuous, accumulating / depleting, lightweight surface / bulky, crescendo / decrescendo (< >).</p>	<p>Trembling, wrenching, tectonic, massive sounds [kr] [crz] [tk]</p> <p>Cf. Work proposal (express/represent)</p> <p>Sound elements: dots, lines, ascending / descending, continuous / discontinuous, accumulating / depleting, lightweight surface / bulky, crescendo / decrescendo (< >).</p>
Psycho-sensorimotor stereotypes			
<p><i>Suspended on tiptoe, raised collar bones, shaken hands, diaphragm suspended in inhalation, head and eyes turned upward or toward distant horizons, semi-closed or vibrating mouth, hands up, delicate touch between the fingertips.</i></p>	<p><i>Legs bent, shoulders hunched forward, relaxed and loose hands, feet resting on the outer edge, oscillating pace, head and eyes down, hypotonia, slowed down movements, slides...</i></p>	<p><i>Convulsions, on tiptoes and heels, jumps, slender body, rapid inhalation/exhalation, hyperkinesia (involuntary movements) of the eyes, rapid movements of the hands...</i></p>	<p><i>Contraction, crouching, grinding, clenched fists, energy intensely discharged from the sole to the heels, fixed stare...</i></p>

Other gestures			
<p>Suspended gestures with vertical evaporation.</p> <p>From these gestures, graphic coding transcription.</p>	<p>Continuous gestures dissolving while going down, accumulating pointillism.</p> <p>From these gestures, graphic coding transcription.</p>	<p>Sudden movements, unexpected, chaotic.</p> <p>From these gestures, graphic coding transcription.</p>	<p>Sudden movements, unexpected, chaotic.</p> <p>From these gestures, graphic coding transcription.</p>

Student creator: gestures, sound proposals, graphic notation



Howling wind



Waterfall



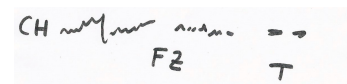
Crackling fire



Running water



Percussion with two fingers
on the palm of the hand



Crackling fire



Fire



Fire



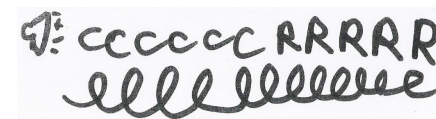
Earthquake



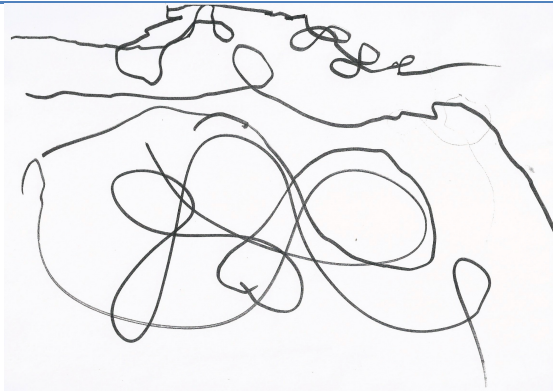
Volcano



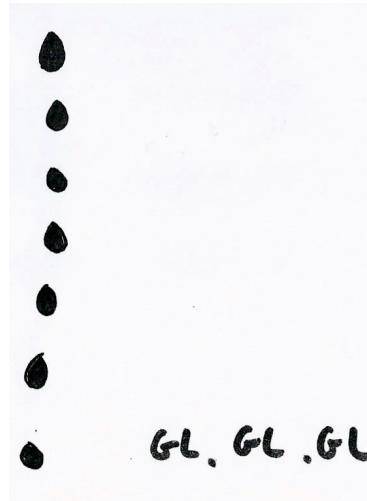
Falling rocks



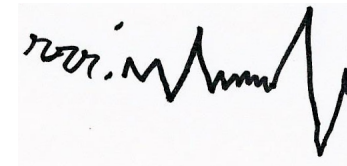
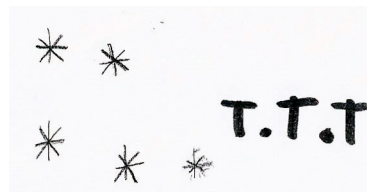
Quicksand



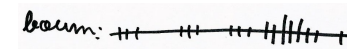
Wind



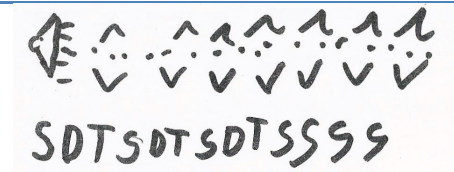
Water dripping



Fire



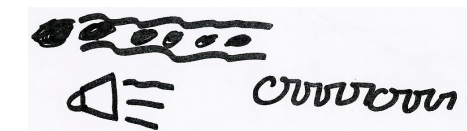
Crackling fire



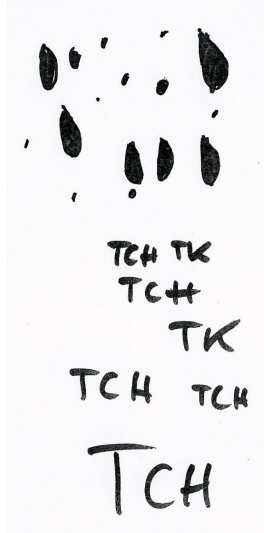
Clay modeling



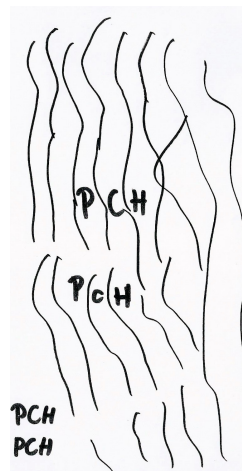
Steps in the mud



Steps in the snow

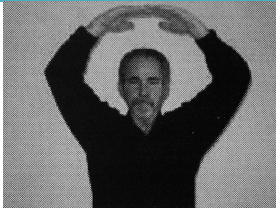

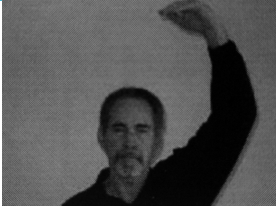
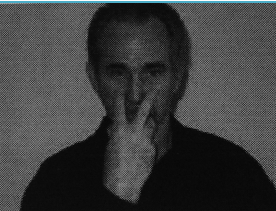


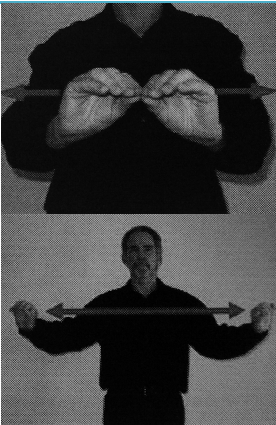
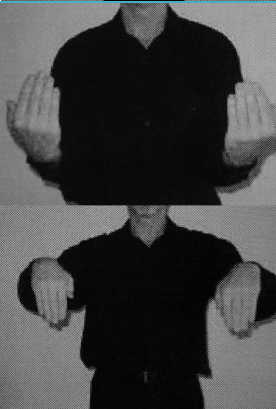
Water drops

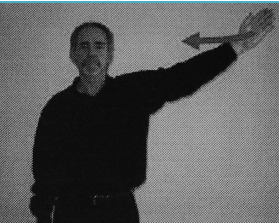
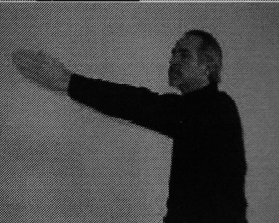
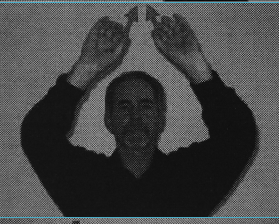
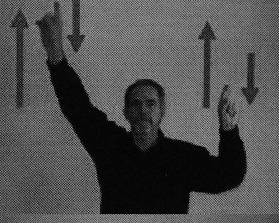



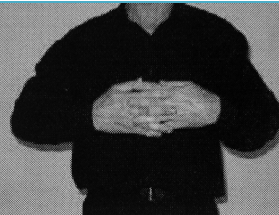
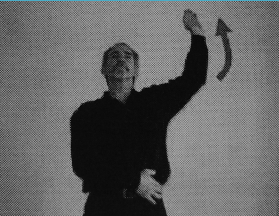



Tap Water

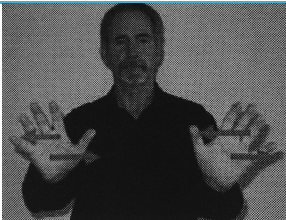
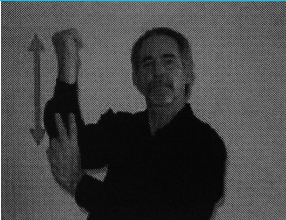
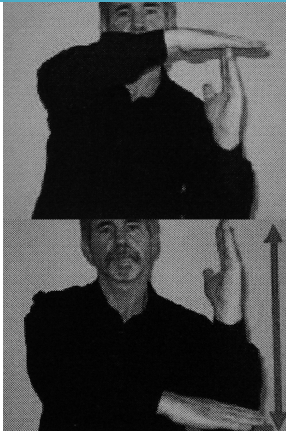
Appendix 2:
Index of Some Soundpainting Gestures (Thompson, 2006)

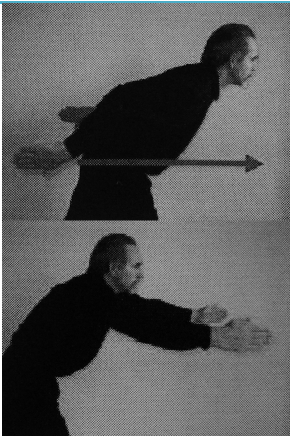
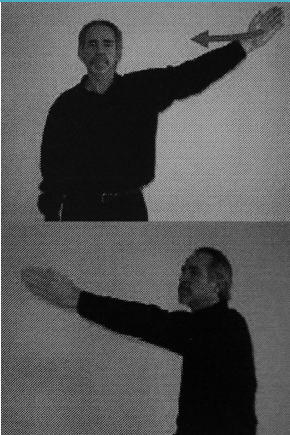
Gestures	Syntax	Categories	Gestures' description	Gestures' illustration
<i>Whole Group</i>	Who	Function	All the performers – whole group.	
<i>Groups</i>	Who	Function	Groups of specified performers, defined during the repetition or during the performance.	
<i>Rest of Group</i>	Who	Function	Identifies those who are not playing and who have not received any indication.	
<i>Watch Me</i>	Who	Function	Used to draw the attention of the group before new indications.	

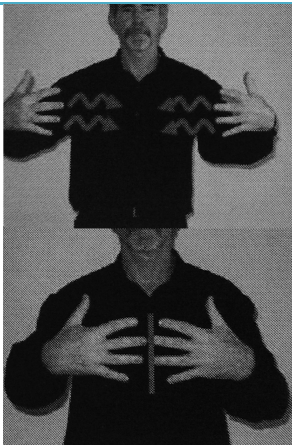
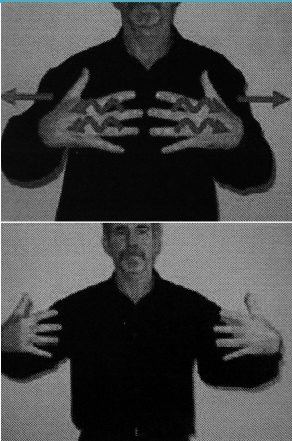

<i>Long Tone</i>	What	Sculpture	A long note (or sound), held.	
<i>Pitch Up/Pitch Down</i>	What	Syntax	Up or down 1 ton or half ton – according to the choice of performer.	

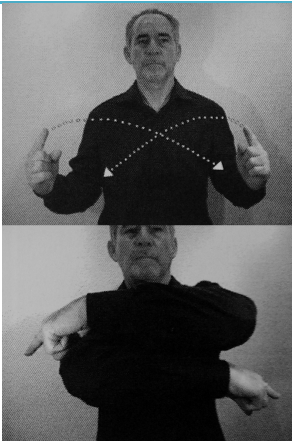

<i>Scanning</i>	What	Sculpture	The performers respond with a free improvisation when the gesture of Scanning past them, regardless of direction. The performers immediately stop playing as soon as the Scanning gesture is no longer in front of them.	 
<i>Pointillism</i>	What	Sculpture	Arrhythmic notes, staccato, and fragments of longer notes, played quickly.	
<i>Point to Point</i>	What	Sculpture	Just when he is pointed at, the performer must immediately start playing, slowly expanding his choice of a single idea. The type of improvisation is the complete freedom of the performer. He must stop playing as soon as the finger is not pointed at him.	 


<i>Synchronize</i>	What	Sculpture	Synchronize a specific material with specified performers.		
<i>Laugh</i>	What	Sculpture	A continuous laugh in a theater style (not realistic).		
<i>Continue</i>	What	Function	The performer must continue what he is doing.	 	
<i>With</i>	What	Function	Conjunction—a link between gestures.		

<i>Erase</i>	What	Function	The soundpainter uses this gesture to indicate that all the previous gestures are canceled.	
<i>Volume Fader</i>	How	Sculpture	Increase or decrease the volume.	
<i>Tempo Fader</i>	How	Sculpture	Increase or decrease the tempo.	

<i>Play</i>	When	Function	Immediate start of playing depending on the gesture used by the Soundpainter. The performer must begin exactly at the end of the gesture and must do so with motivation, without any hesitation.	
<i>Off</i>	When	Function	Stop signal for the whole group or one Performer.	

<i>Enter Slowly</i>	When	Function	Start playing within approximately 5 seconds.	
<i>Exit Slowly</i>	When	Function	Stop playing within approximately 5 seconds.	
<i>You</i>	Who	Function	<i>You</i> gesture is a simple shortcut to quickly identify a performer without having to use the identification gestures.	

<i>Crossover</i>	What	Sculpture	Permutation of a Content between two groups.	
<i>Palette</i>	What	Sculpture	All kinds of music pieces composed and / or repeated. Palettes can last a few seconds as well as 15 minutes or more. They are executed after a start signal. When the Palette reaches its end, the Performers are silent unless the Soundpainter continues by signing a new gesture of Content.	

<i>Palette Punch</i>	What	Sculpture	<p>A very short fragment of music composed and / or repeated. A <i>Punch Palette</i> should only last a few seconds, and when it comes to an end, the performers must immediately return to the material they were playing when <i>Punch Palette</i> was signed.</p>	
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**Appendix 3:
Lesson Plan**

Sound Creation with Soundpainting

**Field: Artistic practices: musical
education**

**School Cycle: 3
Elementary level: CM1**

Period: from January to June (2015)

Length: 1 session/week

Skills developed:

- **Being able to take part in a collective musical creation**

Operational objectives:

- Memorizing some Soundpainting gestures
- Composing sketches of soundpainting phrases
- Becoming a Soundpainter and composing in real time
- Imagining, experimenting and choosing sounds evoking the four elements: air, water, fire, earth
 - Using graphics to represent the sounds evoking the four elements: air, water, fire, earth

Transversal skills:

- Focusing throughout the performance
- Meeting the requirements of a collective musical expression
 - Listening to oneself and listening to others
- Accepting group constraints and standing its ground in the group
 - Keeping silent when necessary
- Ignoring others while taking into account what they are producing
 - Building self-confidence in order to produce sounds
- Learning to prioritize the articulation of sound material beyond predetermined aesthetic categories

Venue:

- Dance studio (a cultural center named *PréO*, in Oberhausbergen)

Technical equipment:

- Zoom Q4 audio/video digital recorder
- Roland R-05 digital audio recorder

Progress:

Starting with drafts of simple phrases to more complex compositions that require multiple gestures. Going from the role of performer to being a Soundpainter. Applying the learned gestures and the skill to develop sound material in order to compose in real time.

Session proceedings

**First session
(55 min)
January 12th 2015**

**Discovering
Soundpainting**

- memorizing some Soundpainting gestures
- short presentation of Soundpainting as a multidisciplinary art practice → it's "painting with sounds"
- Soundpainting syntax explanation: **Who, What, How, When**
- Examples using a communication situation analogy → *What happens when we communicate with someone? We are talking with someone (**Who**), we are saying something (**What**), in a certain way (**How**), at a certain time (**When**).*

**First session
(55 min)
January 12th 2015**

**Learning basic
gestures**

- memorizing some Soundpainting gestures
 - composing drafts of Soundpainting phrases. Drafts of simple sentences to practice the basic gestures:
- Example of a draft of vocal phrases:
1. <whole group>, <long tone>, <play>, <volume fader>, <whole group> <off>
 2. <whole group>, <long tone>, <volume fader>, <play>, <rest of the group>, <long tone>, <whole group>, <off>
 3. <whole group>, <point to point>
 4. <whole group> <scanning>
 5. <whole group> <pointillism>
- Other gestures will be introduced throughout the sequence, following the needs and situations faced by the students.
 - Initially, the teacher is the Soundpainter, the students are only performers. They can make the gestures along with the teacher to successfully integrate them.
 - Gradually, the students can become Soundpainters and start composing in real time.

**Research session
(55 min)
January 19th 2015**

**Sound research
workshops**

- producing sounds evoking the four elements: air, water, fire, earth
- **Active research phase:**
4 groups of 5-6 students :
Each group works on an element. Students must find sounds evoking the element on which they are working.
- **Sharing:**
Each group presents the sounds that were found to the class.

	<ul style="list-style-type: none"> • Structuring phase: Collectively, there is a choice of 2 sounds for each item: a short sound and a long one. These 8 sounds will be the Palettes.
Research sessions (55 min) January 26th 2015 February 2nd and 16th 2015 Exploring sounds	<ul style="list-style-type: none"> • Composing drafts of Soundpainting phrases • Becoming the Soundpainter and composing in real time • Drafts of simple phrases to practice the basic gestures by integrating the sounds that were collectively chosen (Palettes): • Initially, the teacher is the Soundpainter, the students are only performers. They can make the gestures along with the teacher to successfully integrate them. • Gradually, the students can become Soundpainters and start composing in real time.
Research session (55 min) March 9th 2015 Graphical representations of the produced sounds	<ul style="list-style-type: none"> • Graphically representing the sounds evoking the four elements: air, water, fire, earth • Active research phase: Each group must find a graphic representation of the sounds they have found. • Sharing: Each group presents the sounds that were found to the class. • Structuring phase: Developing a graphic score that will be used during the following sessions as well as the final performance (see figure 8).
Production sessions (55 min) April 23rd 2015 May 11th and 18th 2015 June 1st 2015 Composing in real time	<ul style="list-style-type: none"> • composing drafts of Soundpainting phrases • becoming the Soundpainter and composing in real time • Drafts of simple phrases to practice basic gestures by integrating the Palettes (see Research sessions from January 26th 2015, February 2nd and 16th 2015). • The students can use the available graphic score to remember the Palettes.
Final session (20 min) June 4th 2015 Public performance	<ul style="list-style-type: none"> • composing drafts of Soundpainting phrases • becoming the Soundpainter and composing in real time • Public performance: “Water, earth, air and fire” performance at Strasbourg’s ESPE, part of the #Garden (lost and found) project, initiated by Grazia Giacco. • The teacher begins as the Soundpainter then invites a student to take her place as Soundpainter and to start composing in real time. • The students can use the available graphic score to remember the Palettes.

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Author Contributions

Project research DiCrA, creative process analysis and conception of creation model: Grazia Giacco. Soundpainting practice in classroom, Soundpainting paper excerpt, Lesson plan: Solène Coquillon.

Authors: Grazia Giacco & Solène Coquillon. **Translator:** Nicolas Daigneault. **Copy editor:** Joshua Wanger.

About the Authors

Grazia Giacco (giacco@unistra.fr), musicologist (contemporary music), has been teaching music and music education didactics as a lecturer in ESPE, University of Strasbourg, since 2013. Her research team is the EA 3402 ACCRA [Contemporary approaches on artistic reflection and creation]. In 2014, she received an IDEX scholarship from the University of Strasbourg for her research project "Teaching artistic creation". Actually, she leads a research project with John Didier on teaching artistic creation with a team of the University of Teacher Education of state of Vaud (Lausanne, Switzerland). Research fields: research-creation, artistic research education, interdisciplinary approaches of creative process, aesthetics of contemporary music.

Solène Coquillon (solene.coquillon@ac-strasbourg.fr), is teaching at a primary school in Strasbourg. She is also a musician and she practices Soundpainting in her classrooms. In 2014, she completed her master's thesis on *Soundpainting and its didactical applications in primary school* (under the direction of Grazia Giacco), published in 2015. She is pursuing her Soundpainting practice with Walter Thompson and she is collaborating with Grazia Giacco on research in teaching artistic creation.