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Poscolonial Peruvian Sheep and Their Digital Dreams: Pure Data as a Tool for Conceptual Reconfiguration in Peruvian Musical Education

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Resumen: en este trabajo, discuto el uso de Pure Data como herramienta central para el desarrollo de cambios paradigmáticos en la educación musical del Perú, a través de la implementación del Laboratorio de Música Electroacústica y Arte Sonoro de la Universidad Nacional de Música en Lima - Perú. Este análisis es realizado tomando en consideración las particularidades presentes en el desarrollo del estudio de la música de base tecnológica en el país y las carencias históricas que han marcado ese desarrollo. Este trabajo complementa mi investigación previa con respecto a la relevancia de narrativas sociales específicas presentes a lo largo de la historia de la nación en relación a la tecnología y la innovación musical. En ese sentido, presenta un nuevo proceso histórico que busca revertir el curso de una historia de aprendizaje musical que excluye las practicas de música de base tecnológica asociadas al uso de Pure Data, de participar de los procesos oficiales de creación musical en el país.

Palabras-chave: Música Electroacústica, Arte Sonoro, Música Académica Latinoamericana, Música Experimental Peruana, ELUNM, Pure Data, Lenguajes de Programación Visual.

Abstract: in this work, I discuss the use of Pure Data as the main tool for the development of paradigmatic changes in Peruvian musical education, through the implementation of the Laboratorio de Música Electroacústica y Arte Sonoro of the Universidad Nacional de Música in Lima - Perú. This analysis is made taking under consideration the particularities present in the development of the study of technology-based music in the country and the historical shortcoming that have marked that development. This work complements my previous research regarding the relevance of specific social narratives present through the history of the nation in regards to technology and musical innovation. In that sense, it presents a historical that seeks to revert the course of a musical learning history that excludes technology based musical practices associated with Pure Data, from becoming part of the official processes for musical creation in the country.

Keywords: Electroacoustic Music, Sound Arts, Latin American academic music, Experimental Peruvian Music, ELUNM, Pure Data, Visual Programing Languages.

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> *Sometimes, writing Open Source software is truly a labor of love, and in a way it is the geek's way to express political engagement rather than walking a protest march through Washington – Berlin – Paris – Tokyo.*
>
> *Susanne Schmidt, 2014*

* * *

Access to Pure Data (Pd), as a tool for audio processing and musical experimentation, is commonly taken for granted. After all, it is free and its implementation as a practical tool for multiple musical applications and practices appears to only require personal effort and patience with the initial learning curve. The different possible levels of difficulty could make it also attractive for both academic and popular electronic musicians and sound artists, regardless of their musical or technical expertise and predicted involvement. In a contemporary situation in which it is becoming difficult to hear musical sound not shaped by technology, Pd could be considered as nothing but a natural historical development for computer music and related arts: the social structure has sprouted the signs and artifacts of the times. If you consider that this sounds like a legitimate assessment of a world setting ready to receive its due, you are missing several pieces of the puzzle. Some of these missing fragments of Pd's significance, while less discussed, might seem self-evident and are also inherent to the history of western thought as shaped by technological advancement: open-source culture and DIY, communal networking development, technological democratization and technology-based distribution of knowledge, machine-oriented contemporary cultural practice, musical automation as applied science, innovation, and avant-garde experimentation in music, among many others.

By the time *Bang* was published in 2006, as a sort of proceeding of the *First International Pd-Convention 2004* taken place in Graz, Austria, and using a Creative Commons Noncommercial-No Derivative license, the social and political connotations of Pd were clearly understood. *Bang* inclusion of the text "Media Environments as Cultural Practices: Open Source Communities, Art and Computer Games" by Reinhard Braun, is representative of this *social approach*, as it displays relevant issues regarding the significance of particular discourses and complex systems for cultural

coding in the construction of production environments supported by new technology. Citing Spreen, it calls us to pay attention to "... the extent to which media and technology are culturally coded, the degree to which every technical or technology-based development is tied to processes of its discursivization and culturalization" (SPREEN, 2001, p. 37).

However, if Pd conveys the values of the new digital world and embodies the inheritance of the Great Divergence,[1] its contribution could only be measured within those cultural environments that have participated in the cumulative historical effort and be positioned in the *positive side* of the technological gap, what happens at the *other* side? If the traditional dichotomies of north/south, developed/underdeveloped, or center/periphery function as a useful representation of the processes of acquisition of the conceptual frameworks that accompany technological development, these methodological divisions need to be able to (1) illuminate a series of explorative questions that can make the usefulness of Pd, and other musical and technological tools, in *alien* environments, clear, and to (2) explore the particular strategies that need to be taken for the adaptation of *foreign* tools, like Pd by *local* musical communities, like, let's say, Perú.

If Perú can be placed as part of the underdeveloped and peripheral world, I believe that further enquiry makes it clear that the particularities of Peruvian history present their own problems in the process of acquiring the values and behavior embedded in Pure Data's conceptual framework. In this work, I present parts of the strategic plan that I have developed during the last years to implement bridges for the learning and communication of conceptual discourses associate to the use of the programming visual language of Pd, a plan that is meant to shorten the conceptual gap that had kept Pd *foreign* and *afar* in Peruvian musical practice.

1. Initial reflections on my own private Idaho

I encountered Pd short before meeting Miller Puckette and entering the Ph.D. program in computer music at UCSD in 2006. I was directing, at the time, a sound arts collective based in Tijuana, Mexico, called Discos Invisibles, and was mainly dedicated to promoting alternative

[1] The Great Divergence or European miracle is a concept used to describe a socioeconomic shift in which the Global North surpassed other areas of the globe, emerging during the 19th century as a dominant force.

expressions and musical experimentation within a popular electronic music setting. From an *across the border* perspective Pd seemed to me to be the perfect political tool to confront the inequalities made explicit at the transregional border Tijuana/San Diego. My sense of belonging to various imagined communities, including Latin-America and Peru, together with a political perception of the north as an imperial and colonial force, an expected legacy from my educational background in Peru, were to inform my master thesis: "Constructing Musical Spaces Beyond Technological Eden: A Participative Initiative for Musical Interface Development Based in the Peruvian Context". This work, as I stated in the abstract:

> ... explores the situation of the technology-based musical worlds of Latin America. Focusing on the electronic experimental popular music scene of Peru, it adds to post-Colonial contemporary research by presenting the voice of an unrepresented community to the academic world of "music and technology". I discuss the need for implementing a democratizing of the access to information by allowing the inclusion of, in this case, Peruvian intelligence in the selection and design of interfaces to be used by the members of the Peruvian scene (López, 2008, p. vii-viii).

The language was vindicative and politically charged, and during this period I was under the impression that technological tools were there to be simply seized. I also considered that my academic training could be *smuggled* into Tijuana (and later into Perú), as it is exemplified in my papers "Tijuana Sound Arts Project: A Nomadic Studio Report" (LÓPEZ, 2009), and "Technological Advantage for the Sound Arts: Border Politics for a Sound Installation at the Tijuana/San Diego Transregional Border" (LÓPEZ, 2010). As Dick Moore made me notice at the time: I was always political or always talking about Peru. I was yet to be fully aware of my membership to a dual set of values and behavioral practices and how my sense of belonging to the border region was a crucial element for the political agendas I identified with. Becoming culturally and technologically trained in the United States implied a reconfiguration of cultural values and the understanding of the nature of a content that could not be easily isolated from the regional and local sensitivities that accompany my new vision of the appropriate tools of the trade for musical experimentation. Pure Data felt simply right, not necessarily because of its own capabilities but because of a process of acculturation and cultural reconfiguration that, after more than fifteen years living in the United States, had made it simpler for me to absorb the products of *the other*. The

conceptual gap between the west and *the rest* was not evident anymore, outside of the rhetorical discourse, and I felt comfortable with the abstract ideals Pd could add to my ideological set of rules regarding the use of technology-based music as an instrument for bringing communities closer and *returning knowledge* to spaces I considered my own. The set of intersecting and overlapping social identities produced by my social confrontational experiences have formulated a standpoint in which I took the role of an outsider within. This has become especially true since my return to Peru in 2010 and my attempting to develop an academic career in the country. Through this work, I will present a history of my experience in the implementation of Pd as a main tool for teaching music technology at the Universidad Nacional de Música in Lima between 2017 and the present, as a continuation of a plan that in its multiple variations still has as its main objective the shifting from a traditional musical paradigm to an all-inclusive and integrative model.

2. Historical background of musical experimentation and the Conservatorio Nacional de Música - CNM

Even though I have no knowledge of any previous attempts to use Pd or similar languages for any musical practices at the Conservatorio Nacional de Música - CNM (today Universidad Nacional de Música - UNM), it is still important to note that it is the only academic space for musical training in the country that has historically consider electroacoustic music as part of its tradition and has been preoccupied with the creative use of musical software. Peruvian musicians trained at the CNM and residing in the country like José Sosaya, Guilles Mercier and Juan Ahon, among others, have made the effort, at different moments in time, to include electronic and electroacoustic creative practices and maintain the conversation alive through courses and workshops. A chronological critical history of these previous attempts can be found in my Ph.D dissertation “Este Futuro es Otro Futuro: The role of social discourse on the [under]development of contemporary academic electronic music in Perú” (LÓPEZ, 2020). This being said, these processes have been intermittent and have, therefore, not maintained the continuity necessary for the creation of a culture or the development of a generation of composers and performers that we could currently look back to.

3. Musical territories: Contemporary development of the Laboratorio de Música Electroacústica y Arte Sonoro

In 2017 I was invited to lecture on electroacoustic music and computer music technology at the recently renovated Laboratorio de Electroacústica of the Universidad Nacional de Música (known since 2019 as the Laboratorio de Música Electroacústica y Arte Sonoro). By my arrival, courses of music technology were only given as part of the composition curricula, and this situation remains today. The inauguration of the new lab was an important symbolic event as it ratified the existence of a space dedicated to electroacoustic music and gave me the opportunity to implement the use of Pd. As the world might be moving away from the electronic music studio era, the particularities of Peruvian musical history require the construction of symbolic spaces for the representation of musical cultural developments from which the Peruvian population has been excluded. The physical space represented by the lab, serves as a mediator between the different conceptual framework that inhabit musical education in the country, allowing for a territorial materialization that challenges the perception of *distance* assigned to technology-based musical practices. Before the lack of existence of a national conversation regarding music technology (outside of the production and recording engineering traditional paradigms), the construction and legitimation of collective identities around creative practical uses of musical technology, requires a space for the composition of social content and the accumulation of representations that integrates the personal experiences of the students of music with a new set of capabilities and tools that can be shared in a communal physical area of representation.

In September of 2017, I presented the paper "Hybrid Modulations: Report on the Culture of Electroacoustic Music in Contemporary Peru" at the EMS17 Communication in/through Electroacoustic Music Conference in Nagoya, Japan. The main concern of the text was to present an:

> evaluation of the current situation of electroacoustic music in Peru. It maps the current interest (or lack of it) on part of the Peruvian musical institutions in relationship to electronic and electroacoustic music for both composition and performance. It deals primarily with the, in general, unsatisfactory, state of affairs that has kept Peruvians from producing a culture of electroacoustic music within the geographical territory of the country, and with the steps taken recently (and those not taken) to fill that historical gap. (LÓPEZ, 2017, p. 1).

The paper had a mixed reception by the attempting scholars. Some European musicians and researchers failed to comprehend the relevance of what, for them, was elementary or certain and were, also, unable to grasp the social connotations for the Peruvian environment. As it was put by one of them, there was no reason to complain, after all I had my studio. On the other hand, Latin American researchers felt immediately identified with the political language and the notion of *subalternity* that was being implied in the subtexts of the presentation. The culturally specific aspects of the conversation were unable to cross the imaginary line that divided us into the traditional north/south model of perception. The trivialization of the microsocial processes necessary to integrating specific social subjects into the mechanisms for the construction of new identities that include technology as a practice and as the part of the performance of identities, was a demonstration of a conceptual gap still relevant for both sides of the equation. It would be fair to say that Peruvian discourses have yet to find a space for the empowering of their discourses at the acceptance of their peculiarities. I believe the use of Pd in Peru finds a similar response in a global discourse dominated by a global north, real or imagined. The uneven manifestation of the dynamics of knowledge production, including not only technological and academic products, but the narratives that celebrate the existence of global achievements from an idealized north, become effective for keeping a worldwide participation from efficiently implementing the existence of those perceived as the other. The main contention to be discussed surrounds the problematic representation of the postcolonial Peruvian citizen as an actor in a new global scenario where the novel implementation of musical programming has to be considered as more than a simple keeping up with a global present. This being said, it is impossible not to admit the economic constrains that, many times, make it almost impossible for the Peruvian discourses to participate of the international conversation.

After returning from Japan, we organize the Concierto de Música Electroacústica. Ejercicios, Improvisaciones y Música Aleatoria Electroacústica para Computadora, Arpa y Marimba (See FIGURE 1). This concert was the result of the courses taken by the students during the year, and also a first-time experience for composers using a programming language as a framework for musical composition and as a tool for live performance. During the year they work along the side of a harpist (Eve Matin) with whom they created a sound library to be read and processed in Pd, and

an alternative notation system. This was a first experience, both for the students and the university, in bringing together the practices of composition and performance by the use of technology. Following the traditional labor division model for music, performers and composers, in Lima, maintain a *territorial* distance.

FIGURE 1 – First electroacoustic concert using Pd, 2017.

Source: Universidad Nacional de Música, 2017

The advertisement for the event included images related to Pd as a background in order to familiarize the community with other models of musical representation. The use of traditional

instruments was also a strategic decision, as a concert purely based on electronics was, at the time, not representative of musical culture neither for this nor for other academic environments of the country. The concert included a presentation and explanation of the patches constructed by the students and myself, using a beat slicing technique that allowed us to access different portions of a harp sample for playback and processing (See FIGURES 2a and 2b). Within the multiple intentions of the concert, (1) the idea of stretching the sonic possibilities presented to the composers at their current environment, and (2) the illustration of the practice-bending potential of the *programming* of musical pieces with Pd for a performer/composer, where at the heart of a public display that intended to cover academic and artistic goals by opening a vast new space of options for on and off-stage musical practices for a community unaware, for the most part, of the world of digital signal processing.

FIGURE 2a – Exemplary patch by Jose Ignacio López for his 2017 composition.

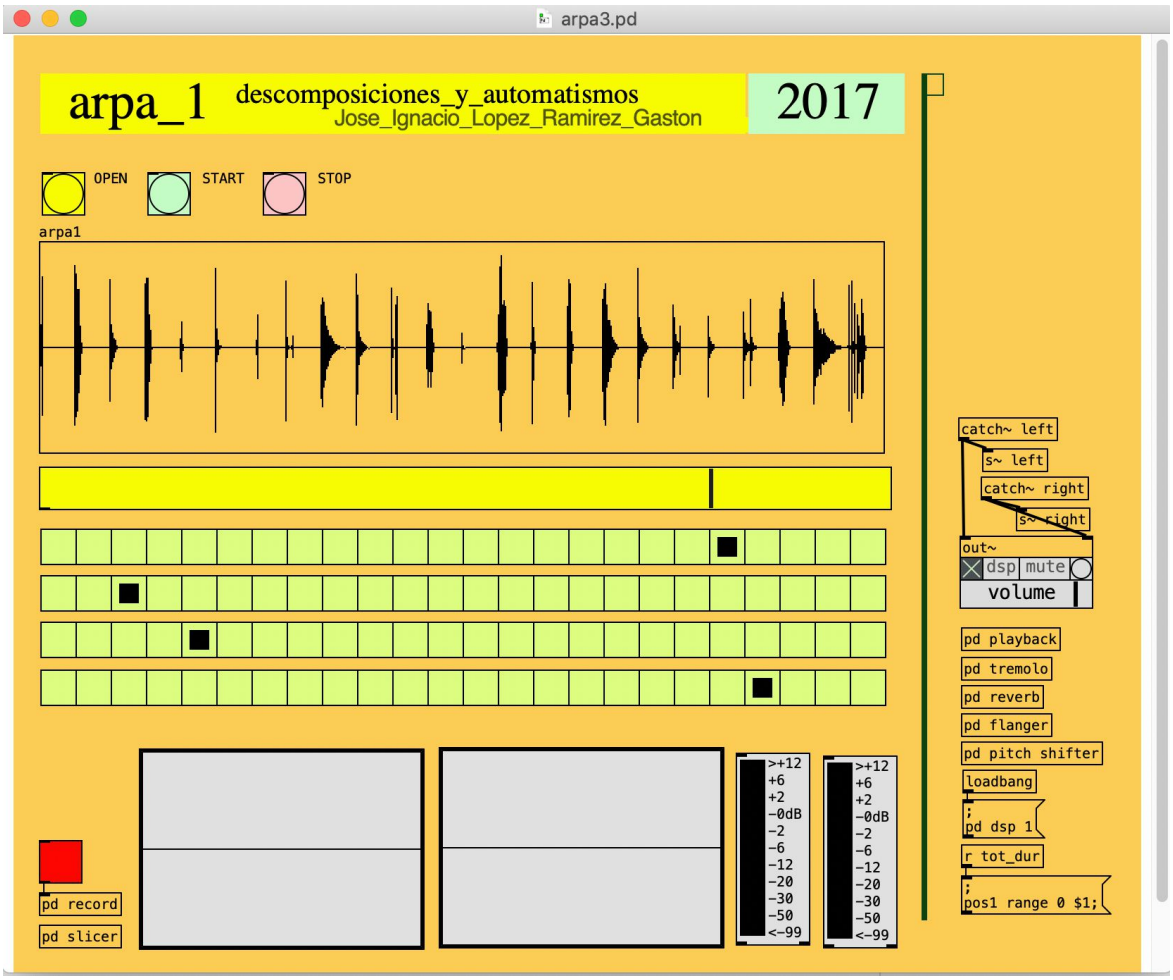
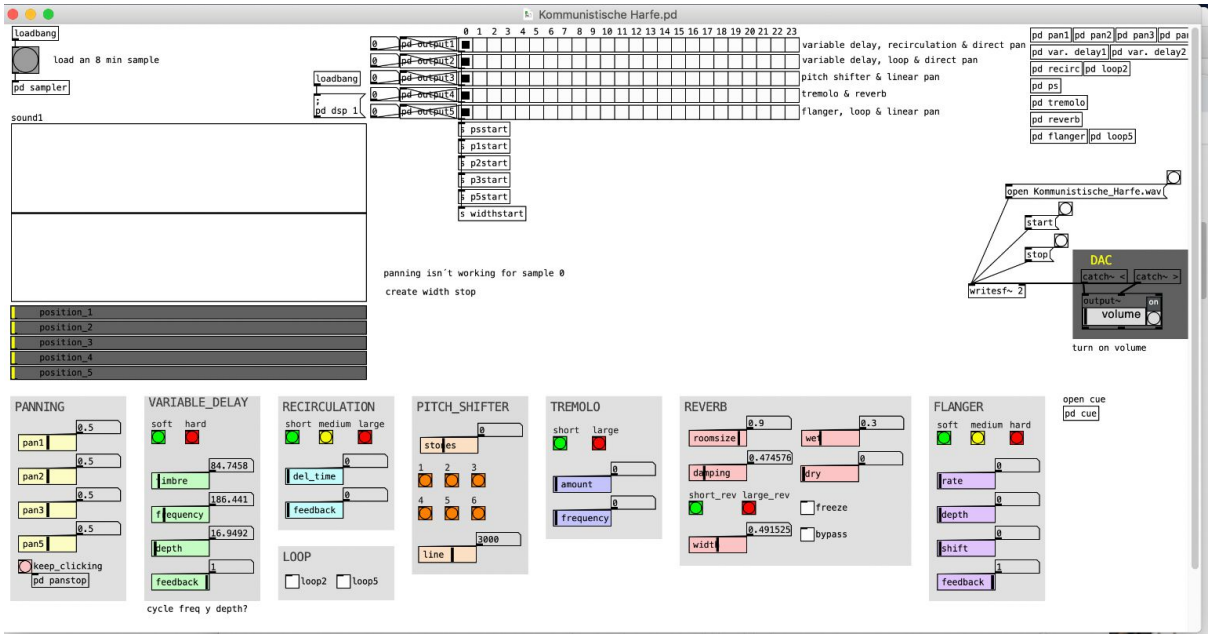


FIGURE 2b – Exemplary patch by Carlos Arce for his 2017 composition



3. Pure Data for musicians in a *unique* conservatory setting

The map is not the thing mapped

Eric Temple Bell

David Moore has mentioned, in regards of the motivations behind music students that confronting technology, that:

> students on music technology related courses often have different motivational goals than computer science students when it comes to programming i.e., some can often be more motivated to learn programming as they can see the creative potential it offers to their future artistic practice, however such students approach the subject from a more creative and less technological standpoint and though may be motivated can find it harder to pick up the programming concepts. There is a need to recognize this and take it into account into pedagogy. (MOORE, 2015, p. 76).

While this might be true for the educational environment of a Global North, or even for some Latin-American countries with a long history of technology based musical training, it does not necessarily apply to the particularities of Peruvian case. Without understanding the territory

being confronted and explored, it is impossible to assess the strategies needed not only to fulfill the motivational goals of our music students, but to expose them to information that could produce a variety of new goals and possibilities previously unnoticed. Without exposure, and the cognitive dissonance that accompanies it, it is impossible for the students to make informed decisions. The idea that the Peruvian environment has required us to follow Roosevelt's idea and *do what you can, with what you have, where you are*, has been normally misunderstood by foreign environment where most issues regarding technology based musical education have been resolved. Under the Peruvian circumstances, taking quick decisions and short-term or project-based models of organization, become effective tools to fight instability, secure specific basic learning processes in front of possible discontinuities, and motivate independent research and out-of-school continued studying.

Is in this regard, and under these circumstances, that Pure Data becomes an effective tool for a particular environment: a Peruvian conservatory in the process of becoming licensed by the state as a university. Two factors go without saying: (1) I am the only Ph.D. in Computer Music currently living in Perú and I was trained with Miller Puckette at UCSD, and (2) Pure Data is free and open source. This being said, other important elements of Pd have facilitated the learning process: (1) its modularity and object based structure that facilitated the learning of specific concepts as they are encapsulated in the different objects and within the libraries being used, (2) the direct graphical manipulation present in visual programming languages that makes Pd a more friendly environment for students unfamiliar with code and programming, (3) the different levels of complexity from very low-level mathematical operations to complicated audio functions that allow the students to obtain immediate practical results for their artistic practices. On the other hand, and in connection to the potential danger of a discontinuity or the lack of space in the curricula for a prolonged educational progression, collaborative learning is highly encouraged by declaring the Laboratorio de Música Electroacústica y Arte Sonoro as a free space for interaction and practice in which the students share responsibility in the learning processes and are allowed to develop projects that help them identify gaps in their learning process and secure the preservation and expansion of the processes confronted in the class environment. If for other environments the specifics of the program and the content of the courses are at heart for the comprehension of the educational processes and objectives, I rely on a community-based flexible learning tactic that

targets particular disadvantages (historical and personal) and allows with its pluralities and ambiguities (TRACY, 1985) for a continuous conversation that goes beyond the restrictions and limitations of a classroom. The idea, at the core of Pure Data, of a versatile and adaptable unstructured environment is mirrored by the education model being proposed.

4. Conforming a generation: Pure Data practices in composition and performance

By 2018, and as a result of the strategies and activities previously mentioned, we could count on a new, and first, generation of composers trained on the fundamentals aspects of visual programming with Pure Data. Under these conditions, a second strategical step is taken to expand the boundaries proposed for composition students: the formation of a laptop ensemble. The generation of a communal patch is suggested and, with the participation of the students themselves (specially Jorge Quispe), developed for the standardization of live performances based on pieces proposed by the students and myself. The ensemble had its first presentation as the Ensamble de Laptops de la Universidad Nacional de Música - ELUNM on June of 2019 sonorizing the 1928 silent movie *Dom na Trubnoy* for the Festival de Cine del Este. The organization of the ensemble served several goals: (1) the encouraging of communal work for path development and learning, (2) the breaking of traditional boundaries for composers, (3) a practice of communal learning and skill exchange, and (4) an initiative towards a sense of sharing in the construction of musical pieces, moving away for the traditional role of the isolated and individual composer. These strategic practices allowed for the problematization of their surrounding conceptual musical atmosphere and the building of new conceptual models that could expose the contemporary conditions of musical technology as a reflection of historical and social developments not yet digested by the academic status quo.

FIGURE 3 – The ELUNM performing: Issias Alonso, Saul Medina, Jorge Quispe, myself (center), Sandro Zelaya, and Michael Magán. June 2019.

Source: Isabel Rojas Colchado, 2019.

By the time the country closed its borders and restricted social activities in March of 2020, the ensemble had performed multiple times, and even travelled to Mexico to participate of the MUSLAB 2020 festival. The paper "Reconfiguring Instrumental Performance in Perú: Ensamble de Laptops de la Universidad Nacional de Música - ELUNM", discussing the ensemble, was accepted to the 2020 International Computer Music Conference, which has been postponed due to the pandemic emergency. Given the current situation, the ensemble has been working on implementing a system for network performance using the [netsend] and [netreceive] Pd objects for the transmission of TCP messages from several client computers into a central server computer that is to perform the sounds and processing loaded into the server patch. An initial patch developed, for this purpose, by the student Jorge Quispe has been later modified and extended by new GUI interfaces made by the students Bryan Yep, Saul Medina, and Michael Magán, each one according to the needs of the repertoire being constructed for the ensemble. This process was presented in the paper "Sonidos Telemáticos: Network Remote Performance for Compositional Paradigm Shifting in Peruvian Musical Learning Practice" at the 2021 International Conference on Computer Supported Education.

Several important actions have been taken between 2017 and 2021 to ensure the familiarization of the students with the tool, and a shifting on the general perception of musical

practices, including the publication of a first CD with the works of the first generation of students using Pd under the name of UNO. As the new schemes for human-computer interaction get internalized thru the use of Pd, specific projects are presented to enable them to implement patching as part of their *real live* practices as composers. These projects serve as an extra-curricular system of support that allows for the continuation of the learning processes started in the Taller de Electroacústica and Informatica Aplicada a la Música courses. These actions enhance the pedagogical potential of Pd by assuring the continuity of its learning outside of the classroom and in relationship to the multipurpose nature of the electroacustic lab as a referential space.

5. Final remarks

This article reports on, and explores, the historical particular circumstances in which Pure Data has been introduced to professional music learning in Perú. It hopes to introduce the subject, both inside and outside the country, and include Perú as a participating country in the conversation regarding programming-based musical artistic practice within a global academic environment. Whether other tools could have served similar teaching purposes or not, goes beyond the aims of this work, since no comparison can be stablished at this point as no other spaces for computer programming for music exist in the country. What I regard as evident is that implementing Pure Data as the main tool for technology-based musical practices at the Universidad Nacional de Música in Lima has proven to be a fruitful enterprise, and that we can see the results being harvested. As I have explained in this paper, several factors are to be blamed for the effectiveness and productivity of this process, including important socio-political landscapes present in this peculiar territory as well as features present in the specific data flow programming structure of a graphic language like Pure Data. However productive I consider this process is (at this point in time), only a sustained effort could assure its permanence, as the Laboratorio de Música Electroacústica y Arte Sonoro is self-referential in nature and has no academic counterparts outside the institution. In order to normalize the use of Pd, or simply keep it inside the radar of the new population of students, a community has to be formed out of the learning practices of the university. The lab is already producing students that after graduation are maintaining the practice of electroacoustic music and

Pd, and that is, in itself, an achievement that we hope can be assessed with more precision in the future, as the products of these newly stablished environments become a natural part of the professional and artistic practice of our alumni. In that sense, this text is part of the process of mapping the field and creating a cultural memory of a new community in the making.

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