Bellacode: localized textual interfaces for live coding music

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ABSTRACT

In May 2018, the collective RGGTRN presented a series of live coding workshops focused on the development of localized live coding esolangs, targeting the underlying affordances of TidalCycles via the Estuary web-based environment. This paper focuses on the interpretation of the live coding esolangs *La Calle* and *Sucixxx* created during the workshops. We expose these languages here as they engage critically with both live coding practice and the specificity of the artist-programmer. This paper ends with a brief analysis of an anonymous survey deployed during the workshops and a brief discussion of future work. On the basis of this account, we suggest localization as an aspect to be further explored in live coding practice.

1 INTRODUCTION

In May 2018, the collective RGGTRN presented a series of live coding workshops focused on the development of localized live coding esolangs, targeting the underlying affordances of TidalCycles (McLean 2014) via the Estuary web-based environment (Ogborn, et al. 2017). These workshops happened in Bogotá (Colombia) at the Real-Time festival, Manizales (Colombia) at the 17th Image festival, Medellín (Colombia) at festival ART, Lima (Perú) at Telefonica Foundation, and Quito (Ecuador) at the MediaLab UIO. During these workshops, we (i.e. the members of RGGTRN[1]) encouraged participants to develop live coding languages using their own linguistic logic. From this, we encountered that for some participants 1) having a lingua franca of software and live coding was problematic; and 2) there was a desire for mainstream live coding languages to be reflective of the participants' locale. This paper exposes the live coding esolangs La Calle and Sucixxx created during the workshops as intelligible ideology critiques of both live coding practice and the specificity of the artist-programmer.

The second section of this paper provides a context and a motivation for both the workshops and this paper. The third section is a description of how using slang and transfeminist reggaeton became the main design characteristic of the esolangs *La Calle* and *Sucixxx*, respectively. This paper ends with a brief analysis of an anonymous survey deployed during the workshops and a brief discussion of future work. On the basis of this account, we suggest localization as an aspect to be further explored in live coding practice.

1 RGGTRN is Emilio Ocelotl, Jessica Rodriguez, Marianne Teixido, and Luis Navarro. Web: https://rggtrn.github.io/

2 CONTEXT AND MOTIVATION

The workshops series described in this paper happened in the context of RGGTRN's 2018 "Bellacode Tour" throughout Colombia, Perú, and Ecuador. This tour was sponsored by the Ibermúsicas Fund[2] and involved participants from inside and outside the collective. These workshops were motivated by 1) Luis N. Del Angel's ongoing PhD research at McMaster University regarding the development of culturally situated platforms for live coding music; and 2) Emilio Ocelotl and Marianne Teixido's interest in finding and recognizing communities of live coders in Latin America.

The workshops series was named "Parserx_ lenguajes vivos para el performance sonoro-visual" [Parserx_ live languages for audio-visual performance]. The word parserx is a pun made of the computational word parser and the Colombian slang parcera(o). A parser is a program that analyzes strings in order to translate them into something else, such as another language. This made sense as parsing was the method used for creating the participants' esolangs (fig. 1). Parcera(o) is used to approach someone in a friendly way as it often means "friend" or "buddy". During our stay in Colombia, nevertheless, it was pointed out to us that the origin of this word was a pejorative one, and thus we acknowledge here our misappropriation. The workshops were open to the general public, eighteen-years-old and above. Each workshop lasted six hours, divided over two days wherein participants were encouraged to develop their own audio and video live coding esolangs, as well as to reflect on natural languages through a follow-up survey.

This paper focuses on the audio live coding "half" of the workshops, where Estuary and TidalCycles were principal tools. Estuary (Ogborn et al. 2017) is a collaborative web-based live coding environment that provides access to the affordances of TidalCycles (McLean 2014) as well as other live coding languages. The features Estuary provides enabled participants to 1) work immediately in the browser rather than installing software; 2) test and play with their developed esolangs, either solo or in a collaborative setting; and 3) wrap their custom esolangs around TidalCycles functions and the WebDirt sampling engine (Ogborn and Beverley 2016) optimized for live coding music in a web browser.

3 DEVELOPING LOCALIZED TEXTUAL INTERFACES FOR LIVE CODING MUSIC

A common activity in the live coding community is developing original languages/interfaces. Some of them are domain-specific, built on top of general-purpose computer languages. Examples include TidalCycles (McLean 2014), built on top of Haskell, Sonic Pi (Aaron & Blackwell 2013), built on top of Ruby, and Fluxus (McLean, Griffiths, Collins and Wiggins 2010), built on top of Scheme. Other languages/interfaces are built on top of languages that are already specialized for sound/music, like the Threnoscope (Magnusson 2015) and Ixi Lang (Magnusson 2010) both built on top of SuperCollider. In some other cases a new language/interface may be deemed *personalized* as it is developed for the use of a sole user/artist. Examples include *Cacharpo* (Del Angel and Ogborn 2017), *Daem0n* (Ogborn 2013), and the *Autocousmatic* (Collins 2009), among many others. Esoteric languages, or "esolangs", such as the well known Brainfuck (Brainfuck 2018) often deploy opaque notations in order to uncover "the constraints of mainstream programming languages" (McLean and Wiggins 2012). They additionally propose alternative programming notations in order to highlight the expressive possibilities of computer programming. Examples close to esolangs in live coding practice include Dave Griffiths' Scheme Bricks, Betablocker, and Al-Jazari all built on top of Fluxus (McLean, Griffiths, Collins and Wiggins 2010).

During the workshops, we looked to further proliferate distinctions (Coleman 2013) by encouraging

participants to design **localized live coding esolangs.** Here, participants had the option to "adapt, translate, and customize" TidalCycles' lexicon, syntax, sample files, and functions to their "specific locale" or culture not only to make them more "meaningful and comprehensible" to them (Souphavanh and Karoonboonyanan 2005, 1) but to potentially convey "a specific cultural and political message about code itself" (Temkin 2015, secc. 8, para. 2). The latter is exemplified in قلب (Nasser 2015) an esolang whose intention—not far from live coding practice—is for people to reflect upon knowledge connected to Arabic as well as to enjoy the calligraphic quality of that natural language.
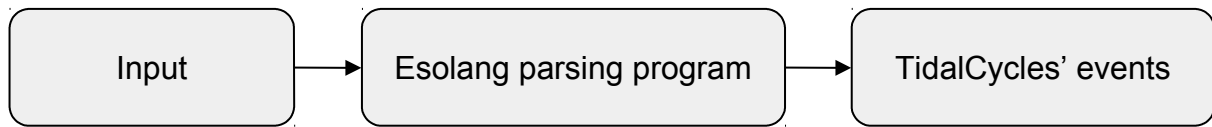

Figure 1. A workflow for implementing the live coding esolangs during the workshops

Based on the distinctions made above, we position the resulting languages within the category of live coding esolangs as their purpose is to live code music and to appreciate a code, and thus a logic particular to a determinate group of people. From the fifteen custom esolangs produced, this paper will focus on two examples, chosen because they both invite the audience to reflect upon ideologies (i.e. ideas, interests, and values) different than the ones of mainstream live coding languages and critically explore natural language, slang, and experience within the participants' individual communities. Documentation of these languages can be found at https://github.com/rggtrn/laCalle and https://github.com/rggtrn/sucixxx. They can be played at https://github.com/d0kt0r0/estuary.

3.1 Slang and musical patterns with *La Calle*

La Calle [The Street] is a mini live coding esolang developed in Lima (Peru) by workshop participant Ivanka Cotrina, using slang characteristic of that city's working-class neighborhoods (Table 1). According to Ivanka, "the street is the place where new codes of language are created … and where meaning is domesticated" (Del Angel, personal communication, September 2018). Ivanka sees slang as "an alternative way of communication that delineates territories, meaning, that one can connect [with others] through a rhetoric that is accepted [in that territory] despite not being grounded on cultured language". Ivanka was interested in demonstrating, in a playful way, that this marginal code is not inherently countercultural but rather is just another form of communication helping people to manifest themselves and be heard. Ivanka was also aware that this slang could be oppressive towards women so she chose a vocabulary distant to that sexism.

In this language, parts of speech can be concatenated in various ways to form meaningful patterns of phrases and sounds. The syntax of *La Calle* is similar to that of TidalCycles. It is read from left to right where transformations (i.e. verbs) and their respective arguments (i.e. adjectives) can be placed before or after the sounds (i.e. nouns) (fig. 2). *La Calle* allows sentence-like syntactic patterns which can also be stacked (fig. 3).

Figure 2. The same sound pattern represented in *La Calle* and TidalCycles.

Part of Speech	La Calle dictionary	Meaning in Spanish	Meaning in English	Description in TidalCycles
symbol	¿, ?, .	¿, ?, .	NA, ?, .	returns newline
interjection	¡hey!	¡hey!	hey!	returns an empty string
pronoun	la, el, las los, un, una, uno, unas, unos, que, qué.	la, el, las los, un, una, uno, unas, unos, que, qué.	she, he, the, a, what.	returns an empty string
noun	causa, señito, cevillano, batería, chancha, chelas, tarzán, cholo, viejita, toque, jato, tombo, tía(o), sajiro, roche, brother.	amiga(o), señora, ceviche, grupo de amigos, pozo de dinero, cervezas, tarde, limeño, vieja, policía, tía(o), indirecta, problema, amigo.	friend, miss, ceviche, group of friends, a collection of money, beers, late, Limean (from Perú), old lady, police, aunt/uncle, indirect, problem, friend.	returns a literal string and triggers a sample event.
verb	saber, servir, ganar, sacar, estar, ir, mandar, cansar, quitar, alucinar, arrugar, taypá.	saber, servir, ganar, sacar, estar, ir, mandar, cansar, quitar, alucinar, desanimar, servir.	know, serve, win, take out, be, go, send, tire, remove, hallucinate, discourage, serve.	returns a transformation event.
adjectives and adverbs	misio, helenas, chill, aguja, frikeada(o), full, zampado, cerrada(o), bien, más.	pobre, frías, relajado(a), pobre, asustada(o), muy, borracho, cerrada(o), bien, más.	poor, cold, relaxed, poor, scared, very, drunk, closed, well/very, more.	returns numbers from 0 to 0.9

Table 1. A transcription of La Calle's slang, their meaning in Spanish, English, and their translation to TidalCycles' functions.

```
                pronoun + noun
            pronoun + noun + verb
     pronoun + noun + adjective + verb
     pronoun + noun + verb + adjective
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Figure 3. *La Calle*'s stackable sentence-like syntactic and sound patterns.

3.2 *Sucixxx,* transfeminism, and reggaeton music

Sucixxx is another mini live coding esolang, developed in Quito (Ecuador) by workshop participants Chakala, Maria Juana, Carolina Velasco, and Daniela Moreno, borrowing ideas from transfeminism (Koyama 2003) and reggaeton music. The creators of Sucixxx have known each other for a long time. They are DJs and performers who share an interest in "hacking, partying, and twerking" (Del Angel and Teixido, personal communication, September 2018). The words and phrases utilized in their language make reference to different aspects of reggaeton music. That is song names, band names, pleasure, sexual desire, and body movement (Table 2).

Sucixxx's syntax is also read from left to right where where the expressions before the dash are initializers, the expressions immediately after the dash represent sample names, and the remaining expressions represent a pattern transformation (fig. 4). This language also allows stackable sentence-like syntactic patterns (fig. 5).

Figure 4. The same sound pattern represented in *Sucixxx* and TidalCycles.

Reggaeton, as a genre, is often associated with the misogyny and gender violence referenced in both the lyrics and the visual representations of the music videos. In reggaeton, it is assumed that women are the object of desire and that by leaning back to the man during the dance (i.e., "perrear" or twerking) they are being marginalized and objectified. However, the latter proposition obviates how women might also desire and enjoy dancing this way. While twerking is strongly erotic, its purpose is not always sexual. That is, when a woman chooses to twerk someone, it does not mean, necessarily, she wants to have sex with that person. It is the appropriation of one's body and the pleasure it can generate when dancing what matters in this case (Pagola 2017).

Sucixxx dictionary	Meaning in English	Description in TidalCycles
putita, perrita, tu sicaria, mala mujer, amorfada, gata fiera, torta golosa, feminasty.	little whore, bitch, your sicaria (the name of a reggaeton song), bad woman (the name of a reggaeton song), amorphous, the name of a lesbian reggaeton band, feminasty.	returns an empty string.
comeme, dame, azotame, rompeme, barre el piso, interpelame, encadename, aborta.	eat me, give to me, whip me, break me, sweep the floor, interpellate me, chaining me, have a miscarriage.	returns a sample name and triggers a sample event.
suave, suave suavecito, duro, más más, con lengua, con el pelo, con flow.	soft, very soft, hard, more more, with tongue, with the hair, con flow.	returns a transformation event.

Table 2. A transcription of Sucixx's phrases, their meaning in English, and their translation to TidalCycles functions.
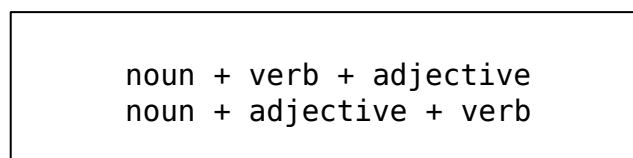
```
noun + verb + adjective
noun + adjective + verb
```

Figure 5. *Sucixxx's* stackable sentence-like syntactic and sound patterns.

Chakala and Carolina explain that the three "x" in "Sucixxx" have different meanings. They reference the post-porn movement, representing a recognition of "new ways of expressing pleasure and visualizing desire". "xxx" also represents "death, censorship, and pornography". Thirdly, the "Suci" in "Sucixxx" makes reference to the Spanish adjective "sucio/sucia", which translates to "dirty, muddy, filthy, with stains,

impure, unclear, out of the law". In this sense, the "x" highlights the binary element of Spanish where often the last letter of a word makes reference to either a woman (e.g. Sucia) or a man (e.g. Sucio). By substituting this letter with an "x" the binary disappears (e.g. Sucix).

Reggaeton music has recently experienced an increase of number in women singers (e.g. Ivy Queen, Tomasa del Real, and Ms Nina, BadGyal). The lyrics from these singers often seem as misogynistic as the ones sung by their male counterparts. However, the fact that those who sing are women, expressing sexual desire from their own perspective, potentially unsettles a reading of straightforward misogyny. According to Chakala, the phrases used in Sucixxx are "a reappropriation of [mysoginist] insults". Carolina asserts that their response to this language, which "historically has been used for controlling and judging women",

> "is not a "search for 'respect', or about being seen different, nor about being valued for 'how we really are', on the contrary, it is about assuming control over our own desires, our ways of living our body, and so, we take over this language".

Carolina remarks that, in addition to referencing reggaeton songs, their language Sucixxx also references their own "interventions and readings" on "how they approach music".

4 SURVEYING THE USER EXPERIENCE AND FUTURE WORK

During our trip to South America, an optional online survey was made available to participants to complete. This survey assessed user experience when utilizing computer languages as a means of music creation. Its aim was to identify opinion about potential language constraints benefiting or harming the learning and use of these languages. The response rate to the survey was low (n=6). All participants answering the survey were Spanish speakers of more than eighteen years of age. Table 3 shows their responses.

Id	Q1. How would you describe your gender?	Q2. What is your age?	Q3. Besides Spanish, what other languages do you know?	Q4. Briefly describe any training in music and/or programming?	Q5. Describe ways in which language has affected your engagement with programming, including but not limited to the language used during the workshop.	Q6. What, if any, features would you like to see in the programming languages available for making music?
1	male	between 41-50	English	ActionScript 2.0, Processing, P5.js, Coffeescript.	I don't have any problems with English.	SuperCollider and music theory for programmers.
2	prefer not to answer	between 41-50	English	Workshops: 'live coding y los patrones de la música', Parserx, Creación de lenguajes de programación vivos para el performance sonoro', 'Poesía sonora y código', 'texto como interface para la creación sonora en SuperCollider', 'Síntesis y manipulación de audio en Pd (Pure Data)'.	For me it is an advantage that most of the information is in English because I learned that language when I was 5 years old and since then I use it and practice it. The biggest use I make of this language is to get information from the web and to watch video tutorials also on the web.	I would like to see the difference between two executions of code. That there was a view or a deployment similar to the one that exists in the merging or merging software of text files between, at least, the last two versions of the code that is being executed. This is meant to help those who do not understand the program or have not fully understood it by highlighting the differences.
3	female	between 26-30	I read English	Undergrad in Music.	Language is an element that sometimes discourages learning, since many of the programming documents are in languages other than one's native language, and that makes the process difficult or slow. However, at the same time, this is a stimulus to learn another language.	I am interested in sound creation, synthesis, and sound design.
4	male	between 18-25	English	Empirical learner of dance music (EDM).	Limitation, since I do not speak English fluently.	The possibility for the generation of more complex patterns within the already available ones.

| 5 | male | between 51-60 | A little bit of English | I am a programmer and systems analyst, web developer and audio technician. | I speak Spanish and I have not had any problems with that, although there is a lot of material in English that is not a problem for me either. The workshop that was taught in Spanish was not a problem for me. | It is always good [to have] a good manual, not so extensive. It should be practical. But it seems that now, manuals are a scarce commodity in any programming language whatsoever. |
| 6 | male | between 30-35 | English | Technician and self-taught person. | no response | Programming languages are suitable for any person, however the music is only based on samplers and experimentation (without rules). New rules should be encouraged (melodies, scales, arrangements, bars, sounds) so that the music created by algorithms is recognizable at first listen. |

Table 3. Responses to the survey deployed in addition to the workshops (translated from Spanish).

The survey results do suggest that participants related knowing English with learning a programming language. More than half of the participants were comfortable with learning a computer language through manuals, video tutorials and workshops in English. The rest, mention that finding this information almost always in English limits and discourages their learning as they are not fluent in that language. The survey's low sample size prevents much in the way of conclusions. However, the fact that survey respondents offered complex opinions on the relationship between (natural) language and (musical) programming languages suggests that there is much to be explored in the area of localized live coding esolangs. The latter is important as it puts into conversation knowledges (Haraway 1988) from both the artist-programmer's local community and the global live coding community; "shift[s] [the] attention from command and control toward cultural expression and refusal" (Cox and McLean 2013, 5); and, invites to avoid essentializing the artist-programmer by thinking they as developer within the broader culture of computation (Lialina and Espenschied 2015).

Further work within localized esolangs include reflecting more in functionalities that could extend the ones proposed in this paper. This could be enriched by exploring the body of knowledge from fields such as ethnomathematics, ethnocomputing, and ethnomusicology. Alongside this, future work may also include a more widespread survey deployment within the global live coding community and the analysis of existing localized live coding esolangs. We would like the latter to be informed by the Cognitive Dimensions framework (Green and Petre 1996) as referenced in computer language design (Blackwell, 2003), interface design (Blackwell and Green 2003) and live coding practice (Blackwell 2015; McLean and Wiggins 2011).

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David Ogborn (aka dktr0): Hacker, composer, artist programmer, live coding and guitar performer; lead developer of numerous software projects used in network music and live coding, including EspGrid, extramuros, and Estuary; director of the Cybernetic Orchestra, the Networked Imagination Laboratory, and the Centre for Networked Media and Performance (CNMAP) at McMaster University; Associate professor in McMaster's Department of Communication Studies and Multimedia, teaching in the undergraduate Multimedia program, the MA in Communication and New Media, and the PhD in Communication, New Media, and Cultural Studies.

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