Computer music and post-acousmatic practices

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ABSTRACT

This short paper considers the practices of computer music through a perspective of the post-acousmatic. As the majority of music is now made using computers, the question emerges: How relevant are the topics, methods, and conventions from the "historical" genre of computer music? Originally an academic genre confined to large mainframes, computer music's tools and conventions have proliferated and spread to all areas of music-making. As a genre steeped in technological traditions, computer music is often primarily concerned with the technologies of its own making, and in this sense isolated from the social conditions of musical practice. The post-acousmatic is offered as a methodological perspective to understand technology-based music, its histories, and entanglements.

1. INTRODUCTION

The beginnings of *computer music* dates back to 1956/7, with Newman Guttman's *The silver scale* (1956), which was the first piece to be completely synthesised by a computer, to Lejaren Hiller's and Leonard Isaachson's *Illiac Suite*, the first computer-assisted composition for acoustic instruments, and with Max Mathews' programming language *MUSIC 1*. Originally, the term referred broadly to the use of computers for organizing, crafting, and transforming sounds. Computer music described the uses of entirely new production methods for musical exploration and development:

> The term 'computer music' embraces a wide variety of compositional and performance activities, ranging from the generation of conventionally notated scores based on data calculated via the computer to the direct synthesis of sound in a digital form within the computer itself. [1]

Over time, however, facilitated by a number of landmark works, the term has become increasingly associated with a set of musical conventions, where abstracted and abstract sounds balances the music largely within the realm of an intrinsic, spectral development. In combination with acoustic instruments, as in *mixed music*, the processed sounds often point into an *abstracted* domain, and this fits well with one of the primary goals of computer music: the direct synthesis of digital signals into audible sound [2]. Computer music became fairly well defined as a genre up until the 1980s and 90s.

Since the mid 1990s, computers have become increasingly integrated in (almost) all aspects of music production, and a multitude of new musical practices have emerged. What do these practices afford to the continued understanding of computer music as a genre with its own histories and conventions? Indeed, the institution that organises this year's ICMC was once called CCMCM – The Center for Computational Musicology and Computer Music, before changing its name to the more fitting DMARC – Digital Media and Arts Research Center.

To what extent has many of the new practices derived from computer music moved away from the original focus on abstraction and towards representational attentions, as well as a focus on rhythm and pulse? Which, if any, characteristics link the electronic music of Stockhausen, for example, to more contemporary performers and producers such as Daft Punk or Autechre?

In criticizing electroacoustic (and acousmatic) music, Simon Waters states that:

> Until recently, electroacoustic composers have been less interested in the social and cultural than the acoustic construction of their music. This concern with acousmatics and the phenomenology of sound has resulted in some wonderful, if obsessively self-referential pieces of music, but it has potentially impoverished the aesthetic development of the genre and stifled some aspects of a serious investigation of the application of electronic and digital means to music. [3]

These criticisms have been repeated regarding computer music by Bob Ostertag in his essay "Why computer music sucks" [4], claiming that computer music is only a digital extension of serial music reserved for academics. Eric Lyon, however, points out that: "Computer music has a strong record of producing experimental work of unknown commercial value that subsequently proliferates wildly into the practice of commercial music" [5]. Computer music clearly has historical relevance also outside of academia.

Several years have passed since these essays were written, and our article examines computer music, not as a singular and isolated genre but as part of the wider context of technology-based music. This helps preserve computer music as a historical category, and strengthens the understanding of its continued influence on the engagement with sound and music in today's increasingly open space of aesthetics and practices.

2. THE POST-ACOUSMATIC

At the outset, discussing acousmatic music and computer music under the same heading might seem problematic, given the historically different approaches and working methods. The acousmatic describes and explores an experience where we hear a sound but do not see its source or cause. This became a central concept in the development of *musique concrète*, electroacoustic and acousmatic music, where a focus on the *heard* sound and the evoked sensations remains a central feature in its musical experience. This practice and approach to music-making is not a mere listening exercise, but a method for treatment of musical materials and presentation in concert. In several ways, these approaches constitute the conventions (and clichés) of acousmatic music.

Computer music could be defined within the genre boundaries of acousmatic music, as we do not *see* the sound producing elements or sound sources, like that of a performance on an acoustic instrument. If we were to follow this line of thought, we should also consider glitch, noise, live coding, live electronics, and so on, as acousmatic music. However, as a consequence the category would lose much of its specificity and any type of explanatory power from a musical perspective.

The post-acousmatic does not offer a new genre definition, bounded as a continuation of the acousmatic tradition. Rather the post-acousmatic is a methodology for examining the groups of new technology-based practices that are related to, and indebted to, the acousmatic tradition. This perspective offers a methodology to examine work of artists and composers that are indebted to the seminal work of Pierre Schaeffer, but pursue other trajectories than those described within the acousmatic musical canon [6]. From this perspective, the post-acousmatic examines a musical pluralism that is not demarcated by terminology and genre boundaries.

Acousmatic music and computer music are both established, musical expressions, with particular traditions, conventions, histories, and clichés. These musical traditions are indebted to the explorations and experiments starting with Schaeffer and Mathews, among many others. In computer music, with its focus on timbre, texture, and signal processing, we can also see a connection to earlier, established modes of composition. Early hybrid computer music from the 1960s and 70s, for example, contained developments of technologies for real-time performance and composition as a key ambition, found in much of Mathews' work, as well as in the work of Peter Zinovieff (EMS, London) and Knut Wiggen (EMS, Stockholm) [7].

These developments were complementary to the existing physical, interactive, and performative practices of acousmatic and electronic music widespread in Europe. Acousmatic music and computer music shared the same intentions and motivations, namely making music without the use of acoustic, musical instruments [2]. How does this, then, impact our understanding of computer music? Does this contribute to expanding or encapsulating the practices? Indeed, the recent book *Inside Computer Music* [8] analyzes several canonical works of computer music by Barry Truax, John Chowning, and Philippe Manoury, but also includes works of soundscape composition by Hildegard Westerkamp, and acousmatic music by Natasha Barrett and Trevor Wishart. These selections highlight the encapsulation of all these genres by the computer but that does not necessarily render it "computer music".

From its inception and up until today, computer music composers have sought and gained new tools, and have shifted their methods towards uses of high-level software on computers and portable tablets. Most newer tools abstract the signal processing routines and variables, making them easier to use while removing the need for understanding the underlying processes in order to create meaningful results. Composers no longer necessarily need mathematical and programming skills to use the technologies. These abstractions are important, as they hide many of the technical details and make the software and processes available to more people, and form the basis for what can arguably be seen as a new folk music.

3. TECHNOLOGICAL AFFORDANCES AND ARTISTIC PRACTICE

Technologies never emerge in isolation, but exist within a contextual continuum where technologies, tools, uses and users form a wide and complex mesh of ideas, interactions, and practices. When discussing software for computer music, Charles Dodge and Thomas A. Jerse have posited that

> most computer music software falls into four broad categories: algorithms for sound synthesis, algorithms for modification of synthesized or sampled sound, programs to assist the musician in composing with sound from the computer and/or from acoustic instruments, and programs that enable a computer performance of a composition. [9]

This broad definition is in keeping with the original idea of "computer music", and indicates that all software for musical production is computer music software. Dodge and Jerse wrote this in 1985, and since then, a plethora of software has emerged - software that forms an aesthetic point of view that lends itself to musical work that stands quite a distance apart from the more sombre timbres described in their book. This points to a continuing shift in technology-based creative practices. The shift is further underpinned by the enormous production of electronic instruments, components, miniature computers, and new consumer technologies that also include increasing opportunities for creative work.

In contrast to the historical practices of electroacoustic music and computer music, the recent technology-based music and its artistic value is not necessarily determined by experts, this contributes to blurring the lines "between composer, audience, composition, performance, and mediation" [10]. This radical development has technologically been made possible by the binary exactness that allows users to process spectral details previously not attainable, to control complex co-variation of variables, and to assign, map, and control computational routines arbitrarily. With increased computation power and availability, the focus on the computer itself has arguably been pushed somewhat into the background, and the focus on the computer itself is less common than what it once was.

In the program notes of computer music during the 1990s, descriptions of algorithms and processing methods were normal occurrences, and the technological fascination was evident. When describing spectromorphology, Denis Smalley referred to this as "technological listening" [11], as an addition to Schaeffer's system of listening. Leigh Landy as referred to this "recipe listening" [12]. Common for these two listening types is a focus on the technological processes behind the music rather than just the heard sound. As computers are increasingly becoming integrated in everyday life, the interest in the details of the technology itself is becoming smaller, and what once seemed "automagic" is now merely "automatic".

New artistic practices with technology are increasingly supported by informal networks for learning, distribution, and performances. Most, if not all, of these developments happen outside of academia, and have not been developed institutionally as the early concrète-, electronic- or computer music. They are products of new, informal "communities of thought and culture", to use George Lewis' description of art technologies and their social constructions [13]. As a result, a disconnect between "old-school" computer music and the new practices can often be traced - a separation that leaves the new genres without history and the "old-school" with a bleak future.

Where once composers could generate sounds on a computer through laborious tasks of writing punch cards and compiling on large mainframe computers, a relatively new practice is live coding, which often leaves a distinct imprint on the music. In the "post"-digital tendencies, identified by Kim Cascone, the medium is no longer considered the message, "specific tools themselves have become the message" [14]. Cascone signals the fact that the unique fingerprint gained from any system is the artifacts of that system's construction and this will ultimately be part of the process, emphasised as "The technique of exposing the minutiae of DSP errors and artifacts for their own sonic value has helped further blur the boundaries of what is to be considered music" [14]. Without doubt, there are many examples of practices where the work cannot be separated from the technologies that create them, for example Karlheinz Essl's *Lexicon-Sonate* (1995) and Oval's generative software structures. However, by solely focusing on the tools themselves, composers run the risk of ultimately ending up with the same self-referential practices that can be seen in many musical styles, and was identified by Simon Waters earlier regarding the technology-based domain.

The post-acousmatic is used as a methodological perspective to understand music that is indebted to the historical developments of acousmatic music, yet follows different paths. Computer music is part of this historical lineage. Patrick Valiquet invites us to understand Schaeffer's *Treatise on musical objects*, not as a how-to guide for composers but rather as a research project which tries to bring together issues in musicology, acoustics, and psychology [15]. This urges us to shift our focus from the technology to the social, and to embrace how important the practices of acousmatic and computer music is and has been in order to embrace "the lived and situated entanglements of technologies and people" [16].

Technology is not merely a series of (physical) objects but also includes social contexts and competences among its users. These contexts, and their meshes of histories, interactions, and ideas, facilitate an understanding of technology, and technology-based music, that is no longer confined to the concert hall, but finds fruitful engagement in, among others, galleries, museums, public spaces, clubs, and online. These wider engagements with technology-based music can bring it into closer discourse with decolonial, feminist, ecological, and socially aware practices where the canon is increasingly questioned and critiqued.

4. REDEFINING COMPUTER MUSIC

Is it possible to redefine computer music, or, as Eric Lyon asked, "do we still need computer music?" and *how* should we redefine it? The term computer music is arguably still largely defined by the early efforts in making large, mainframe computers useful in composing music. The small availability to composers of that time bears little resemblance to the proliferation of available technologies we have today.

Today, access to computers in some form of another and the software used to make music has expanded in ways which could not have been imagined in the 1950s. However, as so much music is now made using computers and digital technologies we have to ask how relevant the term computer music is today. Does it simply point to a historical tradition and a set of conventions? On one side we have the Computer Music Journal, which for years has been an important publication for academics working within these conventions, but we also have the Computer Music Magazine, which features tips and tricks for making music with computers, and covers a range of both free and commercially available software and hardware. Can the different musical aims of those publications be included within a new understanding of the term computer music?

Solely focusing on technology does little for considering and, ultimately, reconsidering computer music. Perhaps the problem itself refers back to this focus. Concentrating on an old genre, which dates back to when making music on a computer *was* a feat, hinders musical explorations that goes beyond a mere focus on technology. A greater focus on the social and cultural aspects of music is needed in order to truly make technology-dependent music less concerned with the tools of its own making. This shift will open further discussions which are sorely needed in the domain of technology-based music. For example, there are issues of accessibility to software and hardware tools produced within computer music research, experienced as barriers for blind and visually impaired creators [17], not to mention the lack of diversity of "race, gender, linguistic background, or geographic location" in computer music [18].

What was once called "computer music" could perhaps be more accurately described as "media arts", as the boundaries between genres, the uses of technology, and the disparate and scattered practices which spring out of this historical genre are impossible to gather within one category. If we choose to not have our main focus on the computer (the specific tools), but rather on the medium - we can bring ourselves out of this rut and into a musical culture that encompasses more than the artifacts of its own system.

By taking a cue from the post-acousmatic perspective,

we should not view the technologies as isolated and separate entities but rather as part of a larger entanglement of technologies and people. The post-acousmatic defines a set of practices that are shared by many musical practices, and we should strive for "a more inclusive or polycanonical view of electronic and electroacoustic musical history [that] enables us to look back on acousmatic music as a remarkable and unique development, but as a development that is and was always part of a weave of interrelated traditions, some of whose adherents were aware of the other strands, and some of whom were not" [6]. The historical strands of computer music, which has influenced acousmatic and electronic music beyond quantification is also part of this strand and shares the same aesthetic and practical paradigm.

5. CONCLUSIONS

As a historical genre, computer music is full of fruitful, important, and influential experimentation and musical works. The works from the historical canon have influenced countless composers, sound artists, and researchers, however, the demarcations that once separated computer music from other types of technology-based music no longer seem useful nor relevant. Technology-based music is defined more by fragmentation than as an integrated field akin to the historical computer and acousmatic traditions.

The field of technology-based music has expanded, and technologies have facilitated a space for creation where a multitude of various engagements with sound and music are possible, drawing on several music- and art traditions. This indicates a shift away from the western, modernist, and typical conventions of acousmatic and computer music, and urges us to approach technology as a contextually situated resource [19] as it opens new avenues of critique and creation. Furthermore, an approach of this type will contribute to additional inclusion of other "communities of thoughts and culture," than the ones that currently form the basis for ICMC, wittily (and ironically) described as International Caucasian Male Conference. These issues have also been raised by several authors in a recent issue of array. (1/2021) entitled "Diversity, pluralism - equity?". [1]

The predominant understanding of "computer music" describes a historical aesthetic category, however the techniques have been assimilated into all forms of technology-based, -mediated or -driven music. With this in mind, we propose that the musical developments encapsulated in the post-acousmatic perspective are the best evidence of the historically relevant and important continuations of the computer music tradition.

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