The Modular Journey: Uncovering analogue aesthetics in digital landscapes

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This article draws on a practice theory perspective to investigate instances of sound practice in a particular community of technology use by focusing on the community and product offerings in and around contemporary modular synthesisers and their growing popularity in the 'Eurorack' format in order to investigate the attraction and allure of analogue things in a digital age. This article identifies issues of authenticity, legitimacy and creativity as key drivers of the way we project our identities onto objects and the intimate technologies we own, and the search for meaningful technological encounters. In the realm of sound practice, the follow-up questions are similar: why when there is software and affordable digital alternatives, do some musicians swear by modular synthesis given the commitment this practice requires in terms of money, time, self-education and exploration (and for a lack of a better term) tinkering? With Eurorack as a case study, this article investigates the attraction and allure of analogue things in a digital age by investigating meaningful sound practice as emerging out of the discourses of online communities around the modular synth phenomenon.

1. INTRODUCTION AND BACKGROUND

In March 2014, music magazine *Sound on Sound* featured an article entitled 'The Analogue Revival' stating that 'the last few years have seen synth giants and boutique companies alike release perhaps the widest range of new analogue synths since their heyday in the "70s"' (*Sound on Sound* 2014). This apparent and somewhat anachronistic revival of pre-digital electronic instruments draws attention to the attributes, discourses and cultural practices of an emerging analogue turn in the digital age, and in so doing questions and problematises the taken-for-granted superiority of 'Digital'. The term 'digital disengagement' and its disconnective practices are put forth by Kuntsman and Miyake (2019) in an attempt to de-naturalise the dominant paradigm of Digital and propose a critical perspective on 'digitality' and the ongoing and contemporary tendency to invent new problems that require technological (internet-centric) solutions. Perhaps the most visible (counter-)reaction to the digital paradigm is a return, or rediscovery of analogue, and the aesthetic of physical things in an increasingly de-materialised world. The analogue turn has not gone unnoticed in the mainstream, with David Sax's *The Revenge of Analog: Real Things and Why They Matter* (Sax 2016) being among the more well-known explorations of this ongoing cultural trend. More recently, *The Guardian*, in an article entitled 'Get Real: Why Analogue Refuses to Die' argues that digital technology offers too much choice and not enough satisfaction, and that 'analogue, in short, demands that you make a decision – to read this one book, write this sentence, take this photo – while digital keeps luring us on with the promise of perfection and infinite choice' (Burkeman 2017). Unlike more general innovation and development trends focusing on efficiency, this analogue trend appears to originate from a design ethos that seeks to create more reflective and meaningful encounters with technology; an alternative to the 'always on, all the time' ethos of digitisation.

Against this background, this article draws on a practice theory perspective (e.g., Reckwitz 2002) to investigate instances of sound practice[1] in a particular community of technology use by focusing on the community and product offerings in and around contemporary modular synthesisers and their growing popularity in the 'Eurorack' format, in order to investigate the attraction and allure of analogue things in a digital age. This article identifies issues of authenticity, legitimacy and creativity as key drivers of the way we project our identities onto objects and the intimate technologies we own, and the search for meaningful technological encounters.

Briefly, modular synthesisers are electronic musical instruments that were first invented in the 1960s by sound pioneers Robert Moog and Donald Buchla. In the 1960s and 1970s a modular 'synth' was very expensive and large, making them mainly the property of university research departments and professional recording studios. These monolithic systems of sound generation comprised separate components such as oscillators, filters and voltage controlled amplifiers housed in a cabinet about the size of a refrigerator, each component connected to the other with external 'patch cables', making the instrument flexible to the user and more similar in appearance to the telephone

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[1]A succinct term suggested by one of our anonymous reviewers.

switchboards of the early 1900s than how we are used to seeing synthesisers today. These electronic instruments gradually faded away by the mid-1970s with the advent of portable, cheap and integrated analogue synthesisers such as the Minimoog (manufactured between 1970 and 1981), and particularly with the advent of digital synthesisers in the 1980s. Modular synths seemed forever destined for the scrap heap. However, the technology resurfaced in the 1990s, gaining in popularity with 'Eurorack' into the 2010s, as a clear, contending alternative in the age of mobile digital devices, laptops and sophisticated music software.[2] This alternative did not originate from any of the large Japanese or American manufacturers, but from one-person artisan ventures making and selling their modules and components online to an ever-growing community.

2. 'EURORACKING' AS POST-DIGITAL SOUND PRACTICE

While a traditional view of the digital society is marked primarily by processes of digital de-materialisation into software (for instance CDs to Spotify, face-to-face meetings to Skype or printed maps to Google Maps), we are now seeing a re-materialisation from software back into hardware, partially or entirely, resulting in hybrid technologies, analogue revivals, tributes, simulations and digital replicas that blur the boundaries between nostalgia and innovation, and more simply between the traditional dichotomies of analogue/digital and new/old (Cramer 2015). Re-materialisation is an umbrella term that stands in for a number of questions, such as 'Why do people buy vinyl records when there is Spotify?', 'Why is Polaroid introducing a new line of analogue instant cameras when we have smartphones with Instagram?' or 'Why do digitally affluent and integrated people voluntarily engage in practices of "digital detox" or "digital disengagement"?' What are the key drivers for these analogue practices that run counter to what we have come to understand as the norm of today's modern (neoliberal), multitasking, digital lifestyle? In the realm of sound practice, the follow-up questions are similar: why when there is software and affordable digital alternatives, do some musicians swear by modular synthesis given the commitment this practice requires in terms of money, time, self-education, exploration (and for a lack of a better term) tinkering?

Understanding modular synths and sound practice as an alternative technology to dominant networked, screen-based technologies, the case at hand provides valuable insights not only into the potential

shortcomings of digital technologies but also into the way we project our identities onto objects and the intimate technologies we own, and the search for meaningful technological encounters. The social circumstances underlying 'people's disengagement from new technologies' (Selwyn 2006) and the question of whether 'digital resistors' are voluntarily exercising an empowered 'digital choice' seems as relevant today as it did over a decade ago. Wyatt (2003 2014) argues that we need to pay attention not only to use and non-use but also to practices of use and non-use, and these categories need to be refined to include not only rejection and resistance but also forced use, reluctant use, partial use and selective use. The retreat or retro-revival of analogue technologies in creative work seems to align with the idea of a post-digital condition.[3] Cramer (2015: 13) makes an ambitious attempt at defining the post-digital as a growing disenchantment with digital, and a revival of analogue, and the return of individual agency, as exemplified in the anti-corporate DIY-aspect of 'repurposed' digital artefacts.

One aspect of the post-digital is that the concepts digital and non-digital no longer exist as clear distinctions. Today, with our always-on, always-connected culture and the extent to which material goods and services are themselves the product of digital production techniques and distribution networks, it no longer makes sense to distinguish between the two. The binary discussions of the past have matured into focusing on identification, embodiment and design aesthetics rather than the underlying technology (Thorén, Edenius, Lundström and Kitzmann. 2017); or as argued by Cramer (2015: 162): 'in a post-digital age, the question of whether or not something is digital is no longer really important – just as the ubiquity of print, soon after Gutenberg, rendered obsolete all debates (besides historical ones) about the "print revolution"'. Indeed, the very concept of the post-digital 'epitomises the sense in which the disjunction between what is digital and what is not has blurred, as has any conceptual distinction between the two' (Fazi 2016: n.p.).

3. SOUND PRACTICE AND ITS MATERIALITY

It is easy to group the return of the modular synthesiser with the re-emergence of other so-called 'older' media such as vinyl (in so much that is indicative of the post-digital condition); however, in order to understand why, and what the implications are for processes of digitisation, further articulations are necessary.

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[2]For an interactive map of the world's Eurorack manufacturers, see www.google.com/maps/d/viewer?mid=1TMKeJR_trTwMxupCe9IMDP34-ao&ll=-3.81666561775622e-14%2C-41.3346686921966&z=2.

[3]You Want a Garden Home Reator.com TV commercial, 2018. www.ispot.tv/ad/dx45/realtor-com-you-want-a-garden-home?fbclid=IwAR1S4NmMLWlR2aVWB6FnxxkLEMJ9VNvWakB6EOiun0JFLen7W1dLAePXXeo.

Practice theory provides one such articulation because it places particular emphasis on the practices and processes associated with a particular act of 'doing' in relation to a media artefact as opposed to just the media object itself. The idea that any social structure (e.g., society, community, city) is constituted (enacted) by combinations of physical artefacts and social expression is not unique to practice theory, as these types of agential, material and social flows have been analysed as 'assemblages' (DeLanda 2016) or 'dispositifs' (Foucault 1998). What practice theory adds to the theory-equation is a focus on the embodied practices that are performed in relation to artefacts and social meanings that are irreducibly required in order to perform an acceptable, legitimate outcome (Reckwitz 2002). In this respect, the materiality of a media artefact, in this case the modular synth, is understood via the interconnections between embodied material practices and the meanings that are ascribed to them by communities of practice (Magaudda and Minniti 2019: 674). Connections are constituted by material and social flows, and the ripple effects caused by human/machine interaction and the ways in which agency is dispersed through agential networks of significance, affect and emotion. Accordingly, the 'return' of an older technology would not be merely a matter of nostalgia (Niemeyer 2014) or the fleeting allure of something that seems different (and thus exotic) from the norm. It is rather, 'the result of a performative process, resulting from the orchestrated interaction between (material) objects, meanings and embodied ways of doing' (ibid.: 675).

4. RESEARCH DESIGN

This article investigates online, digital interactions as they occur in online discussion forums – a form of online ethnography, or netnography. Kozinets describes netnography as investigating 'the textual discourse' (Kozinets 2002: 64) of 'online communities' as ways to tap into the 'tastes, desires, relevant symbol systems and decision making influences of particular consumer groups' (ibid.: 61). In practical terms, this article takes an inductive, exploratory approach to data collection performing a content analysis within a subset of a particularly prominent and publicly open, online discussion forum aimed at aspiring and experienced musicians called 'Modwiggler'.[4]

Modwiggler currently has 47,099 registered users that are active in 43 officially hosted company forums, and seven subforums aimed at exploring the various aspects and uses of the Eurorack format. The largest subforum is called 'Eurorack Modules', with 42,277 threads and 929,292 posts. For the purposes of this

article we chose to focus on the subforum 'Modular Synth General Discussion' with 8,429 threads and 155,287 posts in order to capture discussions that shed light on the use of analogue things in a digital age. The forum does not require membership or login to read, and all the threads and posts are public and only actively contributing and searching requires a login.

The Eurorack scene was chosen as the main object of study because of how it potentially is indicative of not only the collapse of the boundaries between digital and analogue but also an instance of how the specific aesthetic and material qualities of both digital and analogue inform the ongoing technical development and creative uses of technology itself. Through this process we were able to identify common themes and recurring discussions that we linked to our initial interest in gaining a deeper understanding of why people are drawn to this technology and how digital and analogue (or for that matter, hybridised) practices are articulated in the community. Initially, we scanned several subforums manually using various search terms relevant to our research question (Holz, Kronberger and Wagner 2012) in order to get a sense of the general thematic direction of relevant discussions, generating a set of seed categories that represent a first corpus of data. Thus we arrived at the umbrella themes that were the result of the following search terms: 'analogue vs digital' (found in 18 threads), 'analog digital creativity' (35 threads) and 'elitism' (27 threads). These initial categories furthermore relate to the more general observations regarding specialist hobby subcultures that are based on an identifiable distinction (such as analogue vs digital): an engagement with productive consumption (creativity) and the implied status of partaking in an activity that is outside or at least different from normative consumer culture (elitism) (Haring 2007). Each thread was searched again for exact matches of the search terms, yielding what we show in Table 1.

There was some thread/post overlap between the search terms 'analogue vs digital' and 'analogue and digital creativity'. The still rather large data corpus of 7,371 posts was subsequently thematically coded within each category in order to further reduce the amount of data using Patton's 'intensity sampling', which involves selected examples of data that serve as 'excellent or rich examples of the phenomenon of interest, but not highly unusual cases; cases that manifest sufficient intensity to illuminate the nature of success or failure, but not at the extreme' (Patton 2002: 234, as cited in Suri 2011). Our initial three somewhat large umbrella categories were thus further articulated and divided into six slightly more detailed categories:

- Analogue or digital
- Frustration

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[4] www.modwiggler.com.

Table 1. Seed categories and initial Modwiggler data sampling

Search term entered in subforum 'Modular Synth General Discussion'	Total no. threads	Deemed relevant	Total no. posts
Analogue vs digital	18	5	622
Analogue/digital creativity	35	13	1,477
Elitism	27	9	5,272
Total sum	80	27	7,371

- Creativity
- Elitism
- Aesthetics
- Gear lust.

Arriving at the six categories entailed empirical sampling based on perceived relevance in order to perform a qualitative deep analysis, particularly by scanning the title of the threads for particular relevance (focusing on threads or posts whose title explicitly mention or otherwise explicitly relate to one of the six terms) and discarding those that did not display sufficient levels of congruence.

5. FINDINGS AND DISCUSSION

5.1. Overview

Applying the concept of practice theory to the Eurorack experience reveals the putting together of a modular synth as a fundamentally material practice, where physical components (modules, the rack, patch cords) are selected on the basis of what the user perceives as necessary or complementary to their overall aim and creative practice. Modules need to earn their place in the rack. In Bjorn, Meyer and Nagel (2018: 96), modular composer and artist Bana Haffar advises to 'be objective in your choice of modules, don't just go out and buy what's trending', and continues, 'Dig into what you have, and get only what you need.' Accordingly, each manufacturer comes to express different sensibilities, where for instance Doepfer (2019) modules express the original, the cost-effective, the conservative, the Make Noise modules express experimentation known as the 'west-coast philosophy of synthesis' (Pinch and Trocco 1998). The choice of manufacturers one makes out of the more than 400 available and the combinations one cobbles together become unique extensions of one's identity, a creative personality that comes to light in the unique sounds that emerge; a result of commitments made in contrast to the endless choice of digital environments.

The materiality of the rack that houses the modules reveals that while each module type and manufacturer communicate a specific sensibility and musical practice, any empty spaces one might find in a rack not yet entirely filled express unfulfilled potential, unused

so-called 'Eurorack real-estate' much like the empty spaces in a book or CD shelf. Thus the rack becomes an object of desire, put on display, both as future purchases (empty spaces) and past purchases. Our results show that as the rack grows, so does its cultural capital, and the way the synthesiser grows and mutates, its identity gradually changes, much like a record collection or personal library. The performative configurations of a modular synth becomes a manifestation of a 'journey'. The following sections show these characteristics in more detail.

5.2. Eurorack as analogue practice

A modular Eurorack synth can potentially contain combinations of analogue, digital or hybrid modules. Debates over the relative superiority of the analogue over the digital has been an important point of argument (e.g., Thorén and Kitzmann 2015): where analogue is often described as more 'real' or 'organic' than its digital simulations (Johnisfaster 2012). In the Eurorack community, rather than distinguishing between analogue and digital, there is a separation between 1) aesthetics of meaning (whether something expresses digital-ness or analogue-ness) and 2) materialities of technologies (whether something is built with digital or analogue components). What emerges then is the sentiment that the analogue and digital are equal modalities that can actually play together well and that it is up to the individual user to find the balance to suit specific needs. This creates (non-digitally augmented) analogue practices, wherein *meaning* emanates from the relationship between the object (what the object affords) and its meaning (what the object projects unto the user), which in turn has changed the act of using a modular synth into an aesthetically analogue sound practice that has an underlying technology, which might be analogue or digital. However, despite this pragmatic stance, the notion that the analogue, or at least the analogue aesthetic (i.e., single-purpose hardware, knobs, switches and patch cords) continues to be preferred:

> The best thing about analogue hardware synths is getting away from the f*cking computer and [generic] screen based interactions. There's a material physicality that is rewarding and tactile. (Therefore 2012)

In other words, the particular, screen-based practice of using a computer is linked to abstract work-related sensibilities. A more 'rewarding' tactility than that of screen-based seem to be single-purpose, dedicated interfaces. A general, critical view on the digital is described by Mystic:

> Basically it's a choice between *The Empire Strikes Back* and *The Phantom Menace*. Analogue is all like a big Jabba the Hutt puppet sculpted lovingly by hand. Digital is Jar Jar Binks. He looks pretty good on screen but if you put him side by side the puppet you can always see the differences. (Mystic 2012)

Arguably what is being pointed out here by Mystic is the manual workmanship and imperfect nature of an analogue artefact, which is what Zedius affirms with the observation that imperfection carries a uniqueness: 'Organic isn't just a buzz term; in this context it's meant to describe something as infinitely vast' (Zedius 2012).

The experience of interacting with the object, in a tactile and playful manner, is seen as central to the modular experience: 'I generally feel that the physical aspect of music creation is an important part that seems to feel left out at times when using only digital gear' (Bitwizard 2017). The same poster also points to the overwhelming nature of software-based synth tools, where the sheer number of choices with regards to sonic possibilities becomes too much and thus paradoxically has the effect of stunting creative output: 'The main features I care about in modular synthesisers is the ability to patch freely without preconceptions, and to have knobs and switches' (Pugix 2017).

Pugix's ambivalence about 'what's inside' speaks to how the debate about whether analogue is 'better' than digital (or vice versa) may be fading into the background, at least for the modular synth community. Cycad73 gives a nod to McLuhan by noting the specifics of particular media and the importance of recognising what each has to offer:

> What has been forgotten is that the medium is always the message – digital is its own medium with its own characteristics and concerns, and the most successful technologies will be those that are authentic and native to the medium. (Cycad73 2017)

It is important to remember that an increasing number of today's modules are not purely analogue but rather hybrids that incorporate digital technology such as drum samples, as in the case of the Erica Synth Pico drums, or algorithms for the multipurpose module Disting by Expert Sleepers – essentially circuit boards running on computer code. What is maintained, almost to the letter, however, is the analogue interface – the knobs, patch cables and manual switches – that the Wigglers seem to adore. That said, the sonic possibilities of the digital are recognised and held, by some, in high regard and, as such, point to the potential for an exciting future of musical creation and production. The difference is more the single function per knob aesthetic of analogue (seen as an inherently analogue feature): paired with digital functionality, that is something inherently digital that expresses analog-ness:

> [P]hysical modelling has a lot / . . . / to offer, and looking at the world of CGI and seeing what is possible with computing power to create videos of imaginary objects that don't/couldn't exist in the real world, if we could have the equivalent for sound then that is where all the 'new' sounds of synthesis will come from I think. (Tropic Al 2017)

In summary, it is not a question of technology, but a question of analogue (sound) practice, which is arguably a misnomer for tactile and largely non-progammable/preset interfaces that encourage exploration, chance and the opportunity to work outside the 'boxes' provided by normative digital platforms and tools. Aesthetics play a role here as well: whether a thing or technology as a component is able to project analogue sensibilities – express analogue-ness, and among analogue sensibilities are found tactility, discovery and unique characteristics.

5.3. Limitation and choice linked to frustration and creativity

The virtues of digital software (limitless choice paired with algorithmically deliberate pre-processing) seems to cater to a different kind of creativity from Eurorack, which perhaps has less to do with artistic creation and more to do with efficiency and speed, both inherently digital virtues. Extensive all-in-one music software packages such as Spectrasonics Omnisphere, running on computers, while cheap and powerful risk overwhelming the user, creating a 'tyranny of choice' (Schwartz 2004), which may lead to frustration. Frustration rarely aids a creative endeavour, meanwhile the algorithmic 'intelligence' of the system also renders creativity superfluous, or as Osborne (2011: 176) argues, 'creativity is not absolute anarchy of choice but the on-going shaping of choice via the selection and manipulation of constraints'. Furthermore, as Elster (1999: 200) points out, the definition of artistic creation is 'the maximisation of aesthetic value specifically under constraints'. Taking Elster and later Osborne's arguments into our findings, our results indicate that although the *technology* might be partly or entirely digital, it combines an abundance of choice with a singular end result – a unique configuration of hardware. In other words, while there is plenty of choice, hardware requires commitment to an aesthetic, function or manufacturer, paired with spatial and budgetary constraints.

This commitment gives users the feeling of a creative level of control and an agency to interact on terms that are mutually derived from the tangible experience of working with a machine as opposed to a machine that works for the user, but on terms of its own. Exercising restraint and commitment is not easy though: 'Many of my fellow Eurorackers joke that our Eurorack interest is more like an addiction. I don't think it's a joke', writes Henryvidseye at the beginning of his post that goes on to become a bitter rant against the 'Euro scene in general' (Henrybirdseye 2014).

The Modwigglers were quick on the defence, with the general sentiment being that the technology is not for everyone and requires a degree of patience and willingness to thoroughly explore, something that often runs counter to our efficient task-driven world. 'Modular is a black hole of difficulty and possibility', writes Thoth. 'It really is for people who want to be Nobel laureate of abstract wave phenomena, and the further I dig, the further I find there is to go, which is really the way it should be' (Thoth 2014). The entry into modular is thus one that requires commitment and a degree of sacrifice, not only specifically financial (although this is a factor) but also in terms of time and the ability to open oneself up to engaging with an artefact whose experiential domain is one of uncertainty, surprise and structured limitation. 'Modular's tough, every time you use one you're not just learning to play an instrument you're learning how to invent one too' (MBII 2015). However, it is this very quality – its difficulty, its unpredictability, its lack of standardisation and general trial and error aesthetic – that is seen by its enthusiasts as such a force for creativity and personal fulfilment and pleasure:

> What I really like, and the modular has crystallised this for me, is sound. Just sound. I've played guitar for over 20 years now, and I'm always fighting for ways to keep me interested, but with the modular, I look at it and wonder: 'What noises are hiding in there that I can coax out?'. I genuinely believe that, even if I never bought another module, in 30 years this thing would still be able to surprise me, and nothing else in my rig can do that. (Donderdag 2015)

As a creative tool then, a modular system occupies a paradoxical zone in which creativity is both restricted and enhanced, which at times creates a kind of ebb and flow in terms of how users regard their system. 'The more I put into modular', writes Nolongerhuman, 'the more I find myself spending time tuning, calibrating, noodling, setting up /.../ but not making anything that I would consider music' (Nolongerhuman 2015). Daisuk describes his experience with a software-based synthesiser as tedious and uninspiring: 'I hated most of the process – and /.../ what's the point at the end of the day, if you don't enjoy the process?' (Daisuk 2015). His modular system, in contrast, provides the enjoyment of the process itself but at the price of limited productivity. For some, getting the most out of their system is not necessarily reflective of the task they set out to accomplish nor, for that matter, even music.

For the majority of modular synth enthusiasts, or at least those that are active in the community forums, the creative potential of the medium far outweigh its limitations and unpredictability. For some, the point is not even to make music but to just bask in the presence and experience of the thing itself. 'I use the modular like a drug. I create moods and alter my state with it … So I've abandoned music', writes SunSpots who then goes on to say that if he did indeed want to create music he would use something else entirely. For him/her/their, the modular is 'something other than music, that uses the musical idea and somehow creates something unique' (SunSpots 2015).

To create with a modular system, then, is not necessarily to create with intent but rather to view creativity as an ongoing experiential engagement with the machine itself. As such it is the machine that inspires and that fuels the creative impulse by virtue of the perceived peculiarities of its interface and general aesthetic: 'Do I use it every day? No. Does it inspire me on a daily basis? Absolutely yes! Even if I'm not patching; just the sight of the thing motivates and informs the music I make' (Doglien 2015).

In summary, modular synthesis highlights that creative practice comes from a lack of choice and limitation, as opposed to unlimited abundance. In this respect, the purposeful and engineered limitation of the majority of modular synth products is perceived by users as not only stimulating creativity and a sense of agency but also being an intimate and emotional relationship with the technology itself.

5.4. Aesthetics of elitism and gear lust

Much of the pleasure comes from the act of acquiring and anticipating the acquisition of new gear and from experiencing the simple presence of the equipment itself – looking at it, touching it and thinking about what it might do. As such, aesthetics matter, creating aesthetic practices of consumption: 'I won't buy certain modules because of how they look', argues Futuresound. 'In fact, there are entire brands whose modules I don't buy entirely due to aesthetics' (Futuresound 2017). Similarly Listentoaheartbeat emphasises that 'attraction is key' and that it is important for the 'modular synth to be attractive. I want to be drawn to it. When I enter the studio, I see it before I touch it, before I hear it. I want it to be an object that I can relate to, that I gravitate towards.' It is for this reason that a cohesive aesthetic is deemed important because it is 'an integral part of the modular synth

experience', which the user is 'happy to obsess over' (Listentoaheartbeat 2017).

Such sentiments speak to how the modular synth can be understood as an embodied practice in so much that users engage with the device in a performative manner, which is comparable to what Magaudda describes as 'the orchestrated interaction between (material) objects, meanings and embodied ways of doing' (Magaudda and Minniti 2019: 675). A key component of the modular aesthetic is personalisation and that the attraction that individuals feel towards their systems is largely due to the extent to which they were involved in the practice of building or the practices that constitute the assembly process:

> There's a nice harmony when you create your own synth that not only sounds the way you want it, but it looks the way you want it too. I think there's a sense of personal ownership to it that pushes the emotional investment in the instrument, which translates into more usage time, which translates into better skill with it. (Noisejockey 2017a)

Notable here is the stated importance of a 'personal ownership' that speaks to the level of agency that users experience with this technology. Instrumental here is not only the blurring of production and consumption, but also the experience that users have of engaging with an object that while under construction as an anchoring practice (Swidler 2001) not only comes into formation as an object, but also represents and projects an identity through the sound practices emanating from the always 'in becoming' end result.

Modular synthesisers, then, are as much visual spectacles as they are objects designed for the purpose of musical expression. Consequently, it should come as no surprise that some users have an almost fetishistic relationship with their 'racks', to the point of what one user described this as 'objectophelia'. Consider this confessional post by Alternating.bit: 'This may seem awkward or at least sound inappropriate but I'm curious if anyone else has ever just walked over to their modules to simply touch (fondle? lol) the faceplates or knobs after they haven't been in use for a while. I'm only talking a minute or so, but just to keep a warm connection, in a way' (Alternating.bit 2017). The question elicits a number of similar admissions. Ba1 admits to staring at him/her/their system for long periods of time, much to the amusement of him/her/their girlfriend (Ba1 2017). A similar scene is described by HowDoIKnow who writes 'my modular is behind me in my study, and I regularly stop work, spin around to gaze at it … rarely these days does it actually get turned on … Part of my modular lust for 5U is the appearance, in it's wooden case it's beautiful … my wife hates it! I regularly give a knob or two a quick wiggle, just to remind myself' (HowDoIknow 2017). An even more telling admission comes from

Noddyspuncture: 'More than once I have been observed (and commented on) actually saying 'bye' to my CS80 and leaning over and kissing it as I turn it off. I didn't forget myself … and I'm not embarrassed … it's just what I do! Seems normal to me' (Noddyspuncture 2017). This represents a kind of embodied practice that produces meaning through other aspects than the most obvious – sound.

Such sentiments again speak to the appeal of modular's tactile nature – something that digital technology does not provide to the same degree. KCD06 observes how much of the point of modular is the 'tactile aspect of the process'. Most laptops equipped with the right software could allow the average user to 'do everything from sound design to composition and arrangement to recording and distribution' without the hassle, expense and technical requirements that modular systems require. And yet, we want to use these systems that require us to poke, prod, twist and fiddle – or wiggle, to coin a new definition – to enact our cybernetic creations' (KCD06 2017). The materiality of the machine thus matters as does the embodied nature of the performative practice of building and playing a modular synthesiser. The ability to touch something, to physically manoeuver and arrange the individual components and to just share the same space physically is among the primary appeal of modular synthesis.

For those who have been 'seduced', the appeal of modular is clearly evident. For many it has changed their 'way of making music completely' with the 'physicality of connecting the modules together and tweaking in real time' as yielding more satisfaction and 'happy accidents' than what can be encountered in the digital counterparts (Polyroy 2011). Modulars do not promise endless possibilities or instant satisfaction. They require commitment, time, patience and good old-fashioned work and dedication, which is all part of the stated appeal. 'Using a modular is an experience – it surprises you, it challenges you, it confounds you, and the moments when you finally tame a small part of it yield a unique sense of satisfaction. It's really one of those things you just need to experience' (NV 2011). In this respect, the acts of collecting and putting on display become personal and material anchoring practices that in turn are reinforced by artefacts that serve as evidence of one's personal, sonic journey.

5.5. Practices of active consumption: producers, users and community

The term 'creative consumption' was initially deployed to counter the representation of consumers as passive victims of the culture industry, as famously described by Adorno and Horkheimer (Fiske 1989). More recently, 'produser' has been similarly used to

signal a greater degree of agency among consumers and the blurred distinctions that now exist between producers and consumers (Bruns 2008). While normally used to think through the dynamics of consumers and producers in the media and cultural industries (such as fandom, music, TV and popular literature) and digital technology's capacity to break down divisions between production, distribution and consumption, the concepts are also useful to consider how the modular synth communities negotiates between the twin poles of production and consumption. A related phenomenon is the DIY cultures of other musical practices, notably the early DJ and rap scenes that involved the repurposing of older technologies such as vinyl LPs turntables and cheap mass-produced synthesisers to engender new forms of musical expression and community (Attias, Gavanas and Rietveld 2013).

As a niche market driven by a mixture of hobbyists and professional musicians, it is perhaps not surprising that the relationship between module manufacturers and consumers is a close one. Other niche marks, which range from antique car collectors to knitting circles, reveal a comparable relationship between those who supply the materials required for the hobby and those who end up using it. Unlike mainstream consumer markets, where the relationship between supply and demand is often engineered by way of creating a need after the fact of a product's development, the 'need' for adding new objects (modules) is often driven by practices of mutual exploration by both producers and consumers of what might be possible from a particular approach, idea or technical innovation; a recursive relationship of manufacturing and resulting sound practice. There appear to be no focus groups, no business plans beyond those required for maintaining the company or projections regarding future growth and industry potential.

Accordingly, the exchanges on Modwiggler between producers and their customer base is a performative one where practices of consumption feed into production quite freely; expertise is freely shared and not limited to the authoritative voice of a module's creator. Representative here is the exchange between the engineer behind one of the major modular synth manufacturers, Mutable Instruments, and a non-expert user who had some basic questions about a module called 'Grids' (a topographic drum sequencer).

A response is posted in short order to which Jim replies 'Fabulous, thank you … checks username … ah, you're it's creator aren't you?' The discussion continues with Émilie Gillet, (indeed the founder of Mutable Instruments) who goes by the username 'Pichenettes', continuing to offer advice and engaging with further questions and exchanges. The mutual respect that the discussants have for one another is notable as is the general sense that the module in question is less of a consumer product and more of a shared experience between Gillet and her customers. A similar experience can be seen in the discussions around ALM's new and highly sought after version of 'Pamela's New Workout', which is a complex clock device that can be used to trigger other modules such as drums and samplers. After the announcement of the new module on Modwiggler by ALM, a flood of messages follows, which range from pragmatic support – 'Excellent! Has the digital noise problem with the original Pamela been resolved' – to unrestrained outbursts of desire 'WAAAAANT IT SOOOOOOOOOOOOO BAAAAAAAAADDDD DD!!!!!!!' (Davide3737; Battagiovi 2017). As in the Grids thread, the tone is supportive and positive but also focused in terms of identifying and solving issues and problems in a collaborative and generous manner. 'Nice find', writes ALM in response to a glitch discovered by one user, 'Will get a fix sorted' (ALM 2017). Noisejockey writes, 'wow. Really nice job, ALM. Your ideas for improvements and expansion make total sense … Hats off to you' (Noisejockey 2017b). Again, notable here is the balanced relationship between ALM and its client base who act more like collaborators than customers. In other words, there is a constitutive, performative connection between the production practices of the manufacturers and the emergent meaning it produces in the users, which feeds into practices of sound creation. Both producer and consumer reside in a shared, communal practice blurring the boundaries between the two roles, making *production* a constitutive, anchoring practice (Swidler 2001) of 'sound practice' alongside consumption, both facilitated by the online forum.

In summary, proximity in terms of communication and access fosters loyalty to the creator of a module, who is an identifiable person who comes to embody the product. As such, modules are made by artisans who are involved in every step of a product's development, rather than the faceless domain of corporate manufacturing. Instrumental here is the role of the discussion forum that shortens the distance between idea and finished product, as well as between customer and maker. Digital communication platforms and manufacturing technology has enabled a return to pre-industrial manufacturing, much like how Kickstarter is bypassing economies of scale. Indeed, the modular scene could not exist in the way it does without a deep integration with the digital paradigm in technical, economic and social terms. Once again, this negates the perception that modular synthesis is a solely analogue terrain and also points to how modular synthesis, as a community of practice, is aligned with internet-based communities of interest.

6. CONCLUSIONS

The results of our study show that meaningful engagement in sound practice is less dependent on (anchored in) the technology than on aesthetics. It is more important how something *appears* and *feels* (the embodied interaction, and its symbolic expression) than the underlying technology (the materiality). The tangle of wires and chaotic arrangement of knobs, switches and sliders that form the basis of the modular aesthetic are a telling contrast to the design principles that dominate the digital world with its emphasis on screens, slim profiles and generic usability. Modular synths have an affective and aesthetic dimension to them in so much that they invite touch and by design are created to be physically re-arranged and manipulated. There is playfulness to the modular experience, one that invites direct action and intuitive exploration that is perceived by many as lacking in screen-based synthesisers. Musical practice within a modular setting requires committing to the work and the moment, as when the cables are detached and knobs reset, the work, such as it is at that moment, is lost forever. In other words, forced commitment seems to foster a type of creativity that is at least partly fuelled by the ephemeral moment, much like a vocal performance, or live musical performance.

The modular synthesiser is perceived by some users as a kind of muse – a source of inspiration and escape into a realm perceived as separate from purely digital environments. That said, the distinctions between digital and analogue are no longer central to the modular phenomenon and, in fact, the success of the Eurorack format is largely due to digital technology and digital information networks, such as Modwiggler. Indeed, the majority of module manufacturers are single-person operations relying on the internet for customers, product testers, troubleshooting and inspiration for new modules in order to create a cohesive community. Modwiggler and similar sites are dependent on a close relationship between manufacturers and consumers, which speaks to the dual modalities of creative practice – one in terms of technical innovation/ production and another by the use of the technology for creative and expressive purposes. Finally, modular synthesis is also characterised as never being finished, nor is it ever really set in stone. No matter how carefully one documents the connections between modules and the positions of the knobs, there is no guarantee that the same sound can be produced again. For many enthusiasts, it is this very quality that makes the modular synth such a source for a creative and organic mode of expression, yielding a musical device that is in a constant state of becoming.

While it may be tempting to dismiss the modular scene as yet another fad or the providence of addicted collectors and techno-fetishists, the technology and the communities that have formed around it provide telling insights into our relationship with technology and the boundaries of the digital as the preferred paradigm for design and creative expression. As such, modular synthesis offers a unique opportunity to probe not only the dynamics of a specific form of musical practice but also the forms of engagement or modalities that are manifested by the technology itself and by the uses to which it is put by individuals and communities.

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