

# **METANOIA: The Evolution of Analog and Digital in Electronic Music**

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## **Acknowledgements:**

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## **Abstract:**

My project and research focus on the question of Analogue vs Digital: which is better for producing Electronic music? This inquiry is deeply rooted in my personal experiences with music creation. Initially, I relied heavily on digital software while living at home and studying in High School. The convenience of having everything needed to create music on my laptop was transformative. After moving to the UK and gaining my independence, I was introduced to analogue hardware, which sparked my interest. With a diploma in IT, understanding these machines was fascinating and opened up new possibilities for me.

However, I quickly faced a challenge: much of my hardware was not portable, limiting my ability to produce music outside my room. This brings me to an essential

question: in today's fast-paced music industry, how important is it for producers to have mobile equipment? This question is particularly relevant for me as I work in the music sector across both England and Italy. To find a widely accepted answer, I engaged in comparative efforts with fellow musicians with whom I collaborate closely. My research aims to uncover the balance between the unique attributes of analogue equipment and the convenience of digital tools in modern music production.

## **Introduction:**

My project and research have been centred around the question of Analogue hardware vs Digital software and what is the best for producing Electronic music? The inspiration that has driven me to find an answer to this question lies in my personal experience with making Electronic music. When I started making music, I relied heavily on digital software. I was still living at home and studying in High School, so for me, the ability to have everything I needed to make a song on my laptop was eye-opening. When I moved to the UK and started working and having my own space, I was introduced to the world of analogue hardware, which I found intriguing. As someone with a diploma in IT, the ability to understand a piece of machinery opened up a new world. However, the issue was presented: I can't transport most of my hardware for use outside my room. This is where the question arises: in the modern era of music making, how integral is it for producers to have mobile equipment that can keep up with the pace we need to maintain in the industry? This question required an answer for me, primarily since I work in the music sector in both England and Italy. The way that I worked to find a widely agreed-upon answer came down to comparative efforts made by me and fellow musicians with whom I work closely. The most effective way to research my answer came down to creating my own EP using my collection of digital software and analogue hardware. I was challenged by using what was in my collection because my availability didn't allow me the time to use the university's equipment. This meant I spent most of my time in my studio and my bedroom for out-of-hours work.

## Literature Review

The research that went into this final project focuses on three main points: creation of sound design and the differences between sound materials available from analogue and digital, the historical evolution that produced digital software when the industry already had analogue hardware and what effect the digital era of music has on the job prospects and expectations of artists.

Through reading 'Composing Electronic Music: A New Aesthetic', I concluded that the conception of sound design was due to advancements in analogue technology. Further advancements in hardware led to the expansion of what was available, opening up an endless world of possibilities. It also notes the invention of tape splicing. This technique involves cutting different tape recordings and manually putting the best parts of recordings back together to provide the best possible outcome, in the 1950's presented the producers with the concept of 'micro temporal limits of organisation'; this meant that producers could now manually manipulate the length of recordings and play them in reverse.

However, as stated in "Spectral Analysis and Comparison of Analogue and Digital Recordings," digital software transformed the industry into a standard that many came to take for granted (Frosch, 2017). I would argue that digital presents its validity because analogue evolved into it, creating the perspective that analogue was not inherent. Comparative research completed by Ron Tipton suggests that, based on his numbers, looking solely at the EQ process of producing music is perceived as being more adequate on digital software and providing "better instrument definition with clearer sound at all frequencies" (Tipton, 2012).

The book 'The Cambridge Companion to Electronic Music' details the historical evolution of electronic music, from which I was able to learn what could be considered a perspective on the origins of electronic music. The author balances research-based facts and opinionated statements, providing an in-depth review of the evolution from analogue equipment-based production to digital software production. What can be gathered from this is an understanding of how electronics can be utilised to their fullest extent within a modern day studio setting by providing whole detailed

science-based research into how electronic music has built a new era (e.g. average modern day laptops) having the software SuperCollider meaning that the academic processing needed to make music was now accessible to the masses and portable. Importantly for someone like me, the book notes how the popularisation of digital music can build bridges for intercontinental collaboration, as well as how it incites a different culture of music. Producers like me, who have moved from their home country, are provided with the opportunity for collaboration that defies physical presence, as well as citing the isolation that can come with analogue production due to its somewhat elitist culture and limited mobility. The cultural perspective on digital influence is one of drastic change. The difference is that now professional gear and music content are available with the touch of a button, meaning people can explore more freely, but at the cost of paying more money. The capitalistic insight of the industry suggests that analogue is better than digital due to the aforementioned lacking character or physical attachment, similarly to spotify being “a hyper-commercial company that sells music to everyone, while marketing itself as hip, global and personalised employer”<sup>1</sup>(Leijonhufvud, 2021) meaning that these software-centered companies can be recognised more freely than hardware-based companies as they do not have a physical product to be held accountable for; leading to the misleading of users. From a cultural perspective, digital content is less valuable than analogue content, but why should the average consumer pay equally or more for something that is so easily accessible? Especially when a vinyl record, on average, costs more than two months of a Spotify subscription. The culture shift has led to artists making less money because, similarly to the argument between digital software and analogue hardware, the average consumer is more likely to choose the cheaper, more portable version of a product over the more expensive, immobile one.

To conclude my literature review, my research answers the above question by suggesting that the better option may depend on the artists' priorities. From talking to my colleagues, I've gathered that some people prefer the nostalgic element of analogue hardware. They find it better to control the hardware themselves, or they believe that it makes their work seem more valuable because of the privilege that

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<sup>1</sup> ett hyperkommersiellt bolag som saluför musik till alla, samtidigt som man marknadsför sig som hipp, global och individanpassad arbetsgivare

analogue represents. However, other artists prefer digital due to the portable and cheaper nature that comes with software, as well as they find that fully functioning digital studios provide them with more working opportunities as they can bring their work to artists as opposed to having to gather artists to them, which in today's industry could be argued as being better as the industry had to evolve post pandemic. The cons of analogue can often outweigh those of digital. It was found in my reading that it was usually hard to be precise with analogue when mixing work, as the numbers needed could not be directly programmed and had to be manually adjusted.

## **Methodology:**

The approach taken for researching analogue vs. digital was obtained by conducting a survey which focuses on the use of hardware and software in the composition and production of a musical body of work, highlighting the advantages of each domain in the context of the subject's productions and workflow.

The spectrum of the domain's importance was investigated based on the personal opinions of a group of music producers. Based on the results of my investigation, it is determined that a vast number of the selected group of electronic music producers prefer digital audio tools to analogue components, mainly due to their ease of accessibility and affordability. Proposed as a counterargument, the example of using mainstream analogue synthesisers both as an instrument and as a production tool was viewed from a different perspective than before, showing that most of the subjects who took part in this survey would eventually purchase one only if they could afford the unit.

A conclusion can be derived from the realm of possibilities available from the research, given that previous data suggests that each artist could provide an alternative conclusion. As this investigation takes place within the music technology sector, a musical body of work being produced will provide the baseline for any possible conclusion. The musical body of work also provides the investigations with the ability to justify a conclusion.

## **Impact:**

My intention regarding the project's impact is to highlight uncommon music practices, as it allows listeners and artists to experience diversity within their listening experience, as well as open up the minds of artists to what mediums there are in the industry to explore. I intend to inspire other electronic music producers and musicians to become multi-faceted in their repertoire, offering a range of legitimate services. An ethical issue that presents itself is that if the conclusion had come out in favour of me using analogue, as I don't wish to put out a bad influence on other up-and-coming artists, by suggesting that the expensive pieces of gear are inherently in any way better. As this is a current issue, given that the research suggests analogue adds value to producers' work, I will also provide a written account stating my trust in both mediums. I believe that good music can be made using both types of equipment and that it should not pressure you into thinking you cannot afford to make good music. In a sense, this EP will be aimed mainly at music producers and musicians, especially those who participate in the electronic music scene. While I hope the EP will reach a wider audience, I assume that the essence of the project will not be as easily perceived by those who haven't worked with music equipment, which is not an inherent deterrent, and I hope it will still be understood on an emotional level. The nature of the project is aimed to be perceived by those who have experienced working with DAWS and synthesisers, as it will be a project they can understand in every element. As well as it will be a project that can display my abilities when I apply for future roles and opportunities moving forward in my career.

## **Findings:**

Based on the findings from my literature review, the evidence suggests that:

- Analogue synths continue to be significant in electronic music, but especially in live performances. While they are not entirely missing from recording studios, their popularity has declined with the advent of virtual instruments and the widespread availability of MIDI controllers, as the modern music landscape increasingly favours flexibility.
- Analogue mixing tools are gradually being phased out, as DAW mixers can achieve similar, if not superior, results compared to analogue consoles, often with greater

technical precision.

- When working in the digital domain, the concept of headroom becomes less critical than in the analogue domain, despite it being more stringent.
- Digital tools facilitate the application of effects and instruments with greater precision and consistency. While features exist to incorporate a human touch (such as automation, LFOS, or internal settings), this often results in fewer requirements for audio editing or multiple takes.
- The use of MIDI instruments allows for the interchange of sounds and instruments without the need to manipulate the arrangement, making this production style more efficient than its analogue counterpart.
- The ability to recall specific settings, such as presets and effect chains, promotes a quicker workflow, helping users avoid losing instances or projects. This feature is not entirely achievable within the analogue domain.

## **Discussion:**

After submitting my project proposal, I embarked on an intensive and multifaceted brainstorming session to explore the central theme that would define my upcoming Extended Play (EP). This introspective journey allowed me to consider the intricate connections between various academic modules, personal projects, and my overarching artistic vision.

The process of creating a demo version of the EP proved to be a transformative experience that illuminated potential advancements in my production workflow. This early phase not only helped refine my music but also allowed me to stay true to my original creative vision. For instance, in my track titled 'A.D.H.D.,' the demo process underscored my desire to meld rich, organic sounds derived from acoustic instruments, such as the piano, with elegant string arrangements. However, I soon recognised the advantages of harnessing the capabilities of my Roland Fantom 6 keyboard, particularly its innovative "SuperNATURAL" engine, which holds the promise of infusing my compositions with greater depth and warmth.

As I delved deeper into the production process, I encountered a significant challenge:

the overall length of my EP fell short of the ideal 18 to 22 minutes, a crucial duration for maintaining listener engagement throughout the project. This realisation compelled me to reexamine the arrangement of my existing tracks carefully. I boldly introduced new sections where necessary, striving to enhance the auditory flow while ensuring the integrity of each musical piece. Additionally, I made the strategic decision to incorporate an extra track—an unreleased ambient piece—which not only helped me achieve the desired length but also seamlessly fit within the thematic and sonic framework of the EP. This addition served to enrich the overall listening experience, inviting the audience into a more immersive soundscape.

A noteworthy advancement in my creative process emerged with my investment in new tools tailored to optimise my workflow. Specifically, I subscribed to Slate Digital Complete Access, which gives me access to an extensive array of Solid State Logic (SSL) plugins and channel strip emulations lauded for their professional quality. This comprehensive SSL bundle empowered me to manipulate my MIDI controllers—including the UF1 and UC1—with remarkable precision and finesse. Through meticulous experimentation, I was able to construct a virtually emulated modular mixer that could be controlled remotely, thereby transcending the limitations of traditional studio setups. The seamless integration with Ableton's mixer enhanced my production process, transforming it into a dynamic and engaging experience that prioritised creative exploration. The project flourished due to the newfound freedom these tools afforded me, enabling me to experiment with a diverse range of production techniques and enrich the auditory palette of my work. Ultimately, my goal was to establish a synthesis of the warmth characteristic of analogue components with the flexibility offered by digital technology. This hybrid arrangement not only facilitated the completion of the project but also ensured I had a capable setup in situations where access to my physical studio was limited. By striking this balance, I cultivated an environment that nurtured my creativity, irrespective of location or resource availability.

As I engaged with the complexities of the songwriting process for my EP, I uncovered profound insights through diligent research and analysis. I discovered that many acclaimed artists and songwriters often craft lyrics that harmoniously

complement captivating melodies while establishing a robust thematic framework for each track. This meticulous approach helps avoid jarring contrasts that could undermine the overall experience of the song. Acknowledging that I was relatively new to understanding this creative flow, I quickly realised the necessity of external guidance to pinpoint a fitting theme and convey it effectively through my lyrics. Fortuitously, I had the invaluable support of my assistant and partner, Maggie Pikesley, whose expertise proved to be instrumental in navigating this artistic journey. Together, we explored diverse songwriting techniques, critically examining our collective experiences to identify a workflow that resonated with my style and creative identity. Under Maggie's mentorship, I successfully crafted the lyrics for several key tracks, including 'How to Fly', 'Alone' and 'Reality'. Maggie's encouragement and our collaborative brainstorming sessions sparked a wave of creativity within me, fostering a sense of confidence that I had not yet fully embraced. After dedicating an entire week to focused songwriting sessions, I found the resolve to tackle my work independently, resulting in the completion of the lyrics for "A.D.H.D." and "Hometown," both of which intricately reflect my personal experiences and emotional landscape. This journey of collaboration and self-discovery has not only significantly enriched my songwriting skills but also deepened my understanding of what it means to convey a message effectively through music. Through this process, I have come to appreciate the power of storytelling in songwriting, as well as the emotional resonance that can be achieved when lyrics are thoughtfully intertwined with melody and musical structure.

Proceeding into what I could define as the most productive section of the project, recording vocals has been extremely intriguing despite its difficulty. Despite having the option to ask my co-writer and assistant, Maggie Pikesley, for her help with this aspect, I ultimately decided to take on the challenge myself, as I lacked practice and experience rather than knowledge. As I define my singing skills as being on an average level, I started researching tools and techniques that modern-day producers use to optimise the recording time whilst obtaining an excellent result. As a solution to the aforementioned issue, I came across a series of artists who use a preset vocal chain that they can easily adapt to the project's context with just a few clicks, as demonstrated by the artist Bishu in his livestream content (Bishu, 2023). To further

enhance the implementation of analogue elements, thanks to digital emulations in this instance, I have researched highly reputable modules as well as the character they bring to the sound, such as the Teletronix LA-2A optical compressor, which derives its sound from the optical tube circuitry that gives vocals a more glued and warm touch. In addition to my vocal chain, I also implemented formant-shifting effects and chorus modulation on separate vocal tracks to add harmony and depth to the group. Lastly, to help myself prepare for the next step, I inserted one of the SSL Channel Strips plugin's available options to obtain more control over the project mixer, which was necessary for moving into the mixing stage.

As the final steps in the production process, I created a project for each track containing the audio stems of all elements, all of which had been rendered without any vital external effects (e.g., EQ, compressor, etc.). As mentioned in the previous paragraph, for each mixer track, I inserted a single instance of one of the SSL Channel Strip plugins, depending on the desired character and tone for each audio track. The motive behind this action was not only to prevent overpopulating a track with audio effects, but also to gain complete control of a single unit with the aid of SSL's proprietary controllers: UC1 and UF1. What these units grant me is direct access and control over two different interfaces: Ableton's mixer view and the SSL 360. To contextualise the use of the channel strips plugin, I must mention that, despite my initial intent to implement the University's SSL AWS900 mixing desk, the reason behind adopting this concept was due to the fluctuating number of required tracks needed for the implementation of a professional analogue mixing desk and the correlating issues of audio routing for the large number of stereo tracks present in the project. This allowed me to achieve a more flexible tool, implemented within the boundaries of each project, which let me preserve the same workflow of a professional desk in my home studio. A key aspect of this step that needs highlighting was the struggle of succeeding at gain-staging, as the same technique applies to both domains in different ways. As single online resources turned out to be unreliable due to diverging approaches, I turned to my producer friends for a more reliable approach. As a result of this brief research, I discovered the following key differences between the two domains:

- Due to the analogue domain of dealing with electrical current, every step of the

production within it takes into account the presence of a range in which noise disturbance and analogue distortion are obtained. In most instances, distortion is preferred, and it's considered the aspect that characterises this domain.

- The digital domain, because of its dependency on bit-to-electrical current conversion and therefore handling binary numbers, does not take into account the presence of ground noise similar to analogue but, on the other hand, it escalates the clipping issue to a greater scale, since the range of distortion is brought at the same level of the maximum level possible (usually equivalent to 0dBFS or dB Full Scale)

What I concluded from this discovery is that leaving headroom in the mix, regardless of the levels of single elements, is essential to obtain a clean result, crucial for the final step of the process.

As the final step, the same mastering process was applied to the EP as a whole, rather than to each track, to enhance the linear connection between tracks and achieve an approximate loudness of -7.5 LUFS (Loudness Unit relative to Full Scale).

## **Conclusion:**

To conclude this entire process, I learned from producing the EP that incorporating analogue hardware and digital software has significantly developed my understanding of myself as a musician. Creating the EP taught me that all mediums of music can enhance a project, as it included analogue, digital, and acoustic elements, each contributing its own benefits. What I believe and would argue could be learnt from this process is that the beauty of music exists on a spectrum, much like the human experience; no two people experience life the same way, just as two people will never make music exactly the same. I believe that any tool can be the ideal choice if it helps the artist express the light they have within themselves. As artists, we have no right to judge one another for how we choose to bring that creation to life. Through this process, I discovered what analogue and digital mean to me, while deepening my understanding of their significance to other artists. I went even further than I had imagined by comprehending how these two mediums can shape the workflow of those who sometimes have to pause creating music to focus on other aspects of their lives.

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