Making Music, Finishing Music – An Inquiry Into the Music-Making Practice of Popular Electronic Music Students in the "Laptop-Era"

Andreas Waaler Røshol
University of Agder

Eirik Sørbø
University of Agder

Abstract: In this study we seek to present a description of how bachelor and masters students in popular electronic music experience making original music in their chosen Digital Audio Workstation (DAW). The chapter focuses on how the participants understand their role while making music afforded by the DAW environment, their strategies for getting started when making music, and the challenges they experience when finishing music. In the study we interviewed six students at bachelor and masters level. We see a tendency in how participants attribute the technical component of music making as the defining aspect of the producer role. The respondents seem to understand themselves as primarily producers when making music in the DAW environment. When starting out with a new song, most of the respondents describe an experience of flow that gradually dissolves as the structure of the song emerges and their inner critique gains foothold. The respondents concur on the challenges of finishing music in the rich decision-making environment that the DAW affords. We conclude by emphasizing the importance of students developing their own creative strategies suited to their unique music-making practice. We argue that the students need to become self-aware of their strengths and weaknesses in order to develop such creative strategies. Arguably, teaching practice that facilitates such meta-learning is therefore highly relevant in higher electronic music

education. This is especially relevant in the DAW environment where discipline is required in order to stop fiddling with details and release their music to the world.

Keywords: creative process, music-making, composition, higher popular electronic music education, contemporary popular music record production, digital audio workstation

The scholarly interest in popular music education has seen a rapid increase over the last two decades (Mantie, 2013), after the release of Lucy Green's (2002) seminal book on informal learning for popular musicians. Since popular music education does not have an established canon similar to classical music (and partially jazz), the question of its aims and how these are being realized by students are important (Smith, 2014, p. 33). Similarly, it is important to remember that these aims were being pursued informally before popular music education was established. Therefore, as Lucy Green (2002) emphasizes, this informal learning practice, real-life experience, should inform formal learning practice. Meaning, the aims of the student should inform the aims of the teaching practice (Brown, 2015, p. 5). As the democratization of music technology has made music-making hardware and software more easily available (Pras et al., 2013), the informal practice of music making has drifted towards an environment shaped by the affordances of the DAW (Bell, 2018). Several studies have investigated informal music-making practice in the DAW environment (Bell, 2014, 2018; Söderman & Folkestad, 2004; Thompson, 2012) while others have investigated such practices in more formal teaching settings (Tobias, 2013; Bell, 2018, 2019). Although this dichotomy of formal and informal settings is useful for dividing research in the field, it can also deprive the perspective of its nuances. The case study for this chapter, for example, focuses primarily on the students' own artistic music making. Although the students' music making is undoubtedly affected by their ongoing formal education and its included one-to-one tuition, the practice resides primarily in the informal sphere as the students see it. This makes it difficult to put it in either box.

Beside the relationship between formal and informal learning is the relationship between music technology, creativity and pedagogy (Burnard, 2012; McIntyre et al., 2018; Sørbø, 2020). This relation is not

only important for scholars but also for students, learning not only the process, but also about the process (meta-learning), which is given increased attention in general education as well (Fadel et al., 2015; Fullan & Langworthy, 2014). Bell (2015, 2018) addresses how the DAW mediates our creative practices, drawing on Gibson's (1979/2014) concept of affordances. Arguably, in order to take the challenge of mastering this new music-making environment seriously, it is important for both scholars and students to become aware of how the affordances of the DAW environment affect the students' behavior and creative processes. We sought to investigate this topic through focusing on how the students experience making music in the DAW environment, narrowed down to these three research questions:

1) How do the participants understand their role while making music?
2) How do the participants normally tend to work when starting on a new composition?
3) How do the participants handle the challenge of finishing music?

The structure of the chapter will be as follows: first, we present a theory section that contextualizes the DAW-environment; second, we will discuss the method and research design; third, we will utilize material from the interviews to discuss each research question; and finally, we will conclude and give a few pointers for further research.

The DAW Environment

At this point it is necessary to discuss what we mean by the DAW environment, and pertinent to this is the concept of affordances. "The *affordances* of the environment are what it *offers* the animal, what it *provides* or *furnishes,* either for good or ill" (Gibson, 2014, p. 119). A natural expansion of Gibson's usage of the term affordances is not only to discuss what the environment offers the animal, but also how the affordances relate to behavior. Don Norman uses the term *signifier* to discuss indicators that communicate appropriate behavior (2013, p. 14). Combining both Gibson's definition of affordances and Norman's use of signifier one can

argue that affordances invite behavior (Withagen et al., 2012). In a later article, Withagen and Kamp (2018) expand on this ecological definition of affordances by introducing Ingold's theory of making. In this chapter we draw upon both of these articles where Withagen has contributed, especially when discussing environment and the process of making.

When we use *music making in the DAW environment* in this chapter we refer to:

- When the music maker is making music in one or multiple DAWs
- When the music maker is able to listen back to what is currently being worked on
- When the music maker can make (almost) any changes at (almost) any time

Both the latest record by Daft Punk, *Random Access Memories* (Franco & Guzauski, Sound on Sound, 2013), and the work by producer Stevy Lacy (Pierce, 2017), constitute different forms of the DAW environment. Although there is quite a difference from making music in professional studios with top-shelf gear, as in the case of Daft Punk, and making music using iRig and GarageBand on iPhone, as Stevy Lacy does, both settings constitute different forms of the DAW environment, using the DAW as a compositional tool (Eno, 2004) or an instrument to make music (Bell, 2018, p. 37).

The DAW in the 21st Century

The process of popular music record production is arguably associated with a series of roles working together in a professional studio, a few examples being recording engineer, mixing engineer, songwriter, artist, mastering engineer and record producer. Today a lot of released music is still being made in this traditional structure. However, the democratization of technology in the 1980s and 1990s gradually made it possible to make music in smaller project studios with fewer people (Pras et al., 2013; Théberge, 1997). Watson notes: "Whereas in a professional studio, music production has always been a collective project between recording

artists, musicians, producers and recording engineers, in small digital home studios, multiple roles are performed by a single person (…) That a single person could perform all of these roles would have been unthinkable without the enabling power of technology" (2014, p. 36). Bell calls the period from 1990 to the present the era of space-less studios (2018, p. 27). Arguably, music production in the 2010s became even more space-less due to the emerging laptop's portability. Further, the development of music-making software for tablets and phones has made it possible to make music almost anywhere. Or, as Scheps puts it, "Every laptop is a studio and every room is a live room" (Scheps, 2018).

Contemporary popular music making in the DAW environment can crudely be separated into two roles: beat making (everything except what is vocal related) and toplining (the lyrics, melody and vocal production). The person making the instrumental is often referred to as a beat maker, producer or tracker (Auvin, 2017), where we find the first two to be the most frequently used. Bennett has also discussed different modes of collaboration in popular music songwriting extensively (2011, 2012, 2013).

The music technology has continued to evolve in the 21st century, and we will present two examples of such development that indicates some of the directions in which the DAW environment is heading. Just recently, Townsend's virtual microphone system, L-22, received the prestigious award of technical achievement (TEC) in the recording microphone category at one of the largest music industry conferences in the world (NAMM TEC, 2020). A virtual microphone system gives the user the possibility to change between different virtual microphones during (or even after) the recording process while still using the same physical mic. Our second example is the website "Splice", which most music producers will associate with its vast loop and sample libraries that are all royalty free. Obviously, sampling or sample-packs are nothing new. However, the size and structure of the searchable content makes it easier to find the sound one is looking for. Music makers can search for hi-hat loops in the correct tempo, a kick sample, or a piano loop in a certain style, key and tempo. The possibilities are seemingly endless. Keeping these two examples in mind, an intriguing question becomes evident: how does the

flexibility afforded by the DAW environment mediate the creative processes of music making?

Four Challenges That Contribute to Complexity in the 21st Century DAW Environment

Our interpretation of the term complexity is important in this chapter. On the one hand, the word points towards flexibility and possibilities, as the radius of creativity (Toynbee, 2000, p. 35) increases proportionally with the number of possibilities. On the other hand, these possibilities can make the music-making process more challenging to master, and in the following section we will address four of these challenges.

The first challenge relates to the sheer number of choices the DAW environment affords. Schwartz discusses this aspect in what he calls *the paradox of choice*. As the number of options increases so does the demand from its user. Schwartz argues for different strategies to cope with this form of complexity (Schwartz, 2004). Some of these strategies are making one's decisions nonreversible (Schwartz, 2004, p. 178), embracing voluntary constraints, having low expectations towards the results of decisions, and paying less attention to what others around us are doing (Schwartz, 2004, p. 9). Though it might be argued that the amount of available options when creating music has always been incredibly high, we argue that the DAW environment still represents something different. Eno reflects on what he calls *primitive instruments*, such as electric guitars, and he argues that the limitations of these primitive instruments make the user quickly *stop looking for options* and start grappling with the instrument. Digital software, on the other hand, has unlimited options and therefore it is easy to get lost in the available options (Eno, 2018).

The second challenge is related to how the music maker can make almost any changes at pretty much any time. Roads argues that electronic music composition is a *multiscale* conception, where it is possible to manipulate the entire composition just as easily as an individual sound, and that all such operations can affect any level of the composition (Roads, 2015, p. 9). Expanding on Roads' thoughts, we argue that

the linearity of traditional record production and its inherent separation between different phases, such as songwriting, recording and mixing, are reduced in the DAW environment. In this environment one can work on all these sub-processes at the same time, in what we in this article call music making. It might be argued that the challenge of finishing music is nothing new, that artists have always had this challenge. A good example to support this argument is how the production team behind the song "Billie Jean" did 81 mixes of the song before settling on mix number two (Swedien, 2011). However, we still argue that the DAW environment represents a more severe challenge in this regard. Imagine, in the case of mixing "Billie Jean", if not only the mixing was being considered, but also, at any point, which kick sample they were using, which amp and amp settings they were using, and so forth. Joel Thomas Zimmerman (known as the artist DeadMaou5) discusses this challenge of the music-making process: "Nothing is ever finished, I can go back to any of my releases, and make them better or change something, take something out or put something different in, they are never done, so you know, good enough" (Masterclass.com, 2016). This complexity can also be identified in the the Kanye West album *The Life of Pablo*. This album was altered even *after* the release: mixes, guest performances and lyrics were changed after release, resulting in multiple released versions[1] (Jenkins, 2016).

The third challenge is the possibility and underlying temptation of doing everything oneself in the DAW environment. Music making in the DAW environment manifests differently for the solitary bedroom producer versus the collaborative music making often associated with record production, where the producer is not the artist or songwriter (Burgess, 2013). Nonetheless, as Seabrook (2015) writes, today's hits are often written by large teams with specialized roles. Historically, this is not something new. Therefore, one notable change is the *possibility* to work solitarily in an environment where anything might be possible at any given time. Montagnese discusses his creative practice in a Sound on

---

[1]   This was done incrementally, meaning that the latest change overwrote the previous version on digital music services.

Sound interview (2015). In this interview he is referred to by the maga-
zine with a multitude of roles: musician, beat maker, mixer, recording
engineer and producer. "In writing and producing material for his latest
album, Abel Tesfaye (aka the Weeknd) and I were in so many different
studios and locations, and we were travelling so much, that I did not have
a solid reference point. (…) In every place we used different mics, diffe-
rent mic pres, different monitors, and while it may have appeared like a
nightmare to bring all that together, the technology makes it easy to do
that" (Montagnese, 2015). He also discusses how he works in his DAW: "I
do everything: all my writing, producing, recording, tuning, editing and
mixing in one session." Furthermore, he discusses how he works with no
separation: "Writing, producing, mixing is all one fluid process for me.
There's no separation between any of the things that I do" (Montagnese,
2015). In a rather humorous news article, Pat discusses why his album
"sucks": "DAWs are just the perfect excuse not to do stuff. Not to practice
an instrument, not to meet other musicians, not to put ourselves on the
line, not to ask for help or advice, not to listen to anybody but oursel-
ves (…) I'm talking about DAW syndrome — trying to do everything
on your own just because the technology allows it" (Pat, 2018). However,
it can be argued that this challenge is tied to social changes rather than
technical changes, and that the traditional process of record production
as a collaborative process between multiple and more distinct roles was
more complex. Nonetheless, we argue that mastering the sub-processes
does not mean that one masters the process of the "whole", music making
itself. Arguably, the whole is something other than the sum of the parts,[2]
and we believe this "new" and complex decision environment requires
rigorous training and discipline in order to master it.

The fourth challenge relates to how the numerous possibilities and
readily-available premade musical structures (Bell, 2018) can invite
shortcuts and deprive its user of their agency for self-expression. On the
other hand, it can be argued that the determinism of the software (Bell,
2018, p. 36) decreases complexity rather than increasing it. Although it
might be easier to construct a musical structure that sounds similar to

---

2   Inspired by the writings of gestalt psychologist Kurt Koffka (1936, p. 183).

the current mainstream, as a lot of the available material on "Splice", for example, is tuned towards the current trends, that doesn't mean that it is easier to make music that resonates with the individual's artistic preference. In the end, it is the music maker that evaluates if the music is finished or not. Our respondents have a clear focus on making original music and, in this regard, utilizing premade material can reduce their agency. Giddens argues that structure should not be understood as something that places limitations on agency, but rather enables it (2007, p. 169). Giddens emphasizes that this understanding of structure also means that agents similarly can (or are forced to) shape or change the same structure (Sewell, 1992). This duality is challenged if the students do not have the technical knowledge to manipulate, reproduce or remake the musical structure, which might be the case with premade material. In this context we understand agency in relation to intentionality (Gallagher, 2007); if the students wish, they can change the structure as they please and thereby possess a level of control over the environment. This control would mean that the students do not have their radius of creativity decreased due to lack of technical knowledge. Therefore, the reduction of agency is most prominent in individuals that lack the ability to make such structures themselves where the availability of premade musical structures can invite shortcuts and easy solutions.

All of these four challenges are markers of the 21st century DAW environment, that builds on the digital revolution in music production that happened in the 90s (Bell, 2018, p. 26). It is the aspects of working with no separation between the different roles, with a small team of few decision makers, with the technological affordance of being able to work almost forever on the same song without being bound to expensive studio rates, with a vast number of options and premade musical structures available to its user, that we argue contributes to the complexity of the 21st century DAW environment compared to the pre-digital revolution. Bell comes to related conclusions in his study of a songwriter called Brendan and his creative process. Bell writes, "Distinguishing distinct stages of 'composing', 'recording' and 'mixing' was a challenging task because Brendan frequently varied the sequence of these actions" (2014, p. 307).

Method

As this study discusses one particular practice, we selected a qualitative approach for our investigation. The design was a common single-case study, where our aim was to "capture the circumstances and conditions of an everyday situation" (Yin, 2018, pp. 85–86). The everyday situation, the case, is the practice at one particular university (the University of Agder).

The target group were students from the bachelor's and master's program in popular electronic music performance at the University of Agder. The students on this program use their computers or laptops as a compositional tool, as their main instrument for music making, where they focus on making their own original music. All of the participants had a varying degree of experience releasing their own music, from posting their music on SoundCloud to releasing their music on an international label. Most of the students enrolled in the program already have high proficiency in their chosen DAWs, and the educational program seeks to expand their knowledge by giving them technical and aesthetical competencies in recording, songwriting, and production. Therefore, the core of the bachelor's and master's program is the activity of engaging with the aesthetic quality of the student's music making, which another chapter in the anthology has expanded upon (Sørbø & Røshol, 2020). In the line of questioning, we sought to direct the questions towards whatever artistic process the participant had the most agency over, meaning "their" music. Arguably, the challenge of making and finishing music is perhaps most evident in the music the student has a high degree of personal and creative investment towards. The interviews were conducted mostly in a studio environment. However, none of the parties engaged with any music technology during the interview. In the line of the scope of this chapter, we were interested in the experience of the participants and did not want to derail the discussion towards technical aspects.

Qualitative studies' rigor depends on the transparency with which they are conducted (Kuper et al., 2008) Naturally, the preparation, organization and reporting (Elo et al., 2014) were colored by the writers' acquired artistic knowledge, teaching practice and our time as students in the same institution. Though none of the participants were currently

attending any courses run by the authors, two of them (the third years) had Røshol as a teacher last semester, and two of them (the first years) will attend his course next year. Some of the masters students knew him personally, and these aspects had to be considered when analyzing the data. There is always the possibility that the answers are colored by the interviewee's relationship to the interviewer, as in this case with Røshol. In order to negate some of these issues we drew a random selection of two first-year bachelor students, two third-year bachelor students, and two fifth-year masters students. While there are a few female students in some of the classes, none of them were drawn in the random selection. In retrospect, it might have been better to curate the selection more carefully in order to avoid an all-male panel. There are numerous arguments for this, where perhaps one of the strongest is the overwhelmingly male demographic in studies related to music technology (Born & Devine, 2015) and how interviewing female students could have given a perspective on this aspect (Acker & Oatley, 1993).

After the selection of participants, we conducted semi-structured interviews (Kvale, 2007) of 45-minutes average duration. The interviews focused on seven topics related to the DAW environment: the participants' backgrounds, how they tended to learn new aspects of music making, how they perceived their role while making music, how they normally start making music, how they experienced finishing music and how they experienced feedback. Since we were interested in the participants' experiences, it could be described as an interpretive phenomenological inquiry (Norton, 2009, p. 116). We utilized probe questions (Kvale, 2007, pp. 60–61) when we felt that the candidates were touching upon something important about how they experience music making in the DAW environment. The interviews were recorded and transcribed. We used the stages for thematic analysis suggested by Norton (2009, pp. 115–123) to establish main categories from the collected data. The topics of feedback and learning were omitted because it proved to be challenging to place these topics in relation to the others, and the data was already too extensive for one chapter. The topic of background informed the remaining ones. One example from the thematic analysis was the participants' discussion of roles. This topic was merged as one category, based not only

on what role they identified with the most, but also how they described the different roles of music making, and how they described these roles in their creative music-making process. On one hand, the chosen method was exploratory since it was dependent on the participants' experiences, on the other hand, it was rigid since the interview questions posed limits on the inquiry itself. The three research questions are the result of the thematic analysis, all of which are linked under the theme of how the participants experience music making in the DAW environment.

The quotes used in this text have been translated and occasionally slightly altered, and we omitted foul language. Due to the scope of the chapter we did not focus on the challenge the students had of maintaining the process or relating the theoretical foundation of music making to the activity of composing.

Results and Discussion

As mentioned previously, the data will be presented and discussed according to the research questions:

1. How do the participants understand their role while making music?
2. How do the participants normally tend to work when starting on a new composition?
3. How do the participants handle the challenge of finishing music?

How do the Participants Understand Their Role While Making Music in the DAW Environment?

When asking questions related to our first research question, the respondents mostly described themselves as producers, although their understanding of the term varied greatly. It seemed like especially the younger respondents associated the activity of programing and controlling the laptop, having the latest version of the project, as the strongest indicator for the producer role. Further, they describe the songwriter as a top-liner, and one of the respondents drew a direct link from the activity of making the instrumental to the role of the producer.

Participant five: Within my field, I understand the one doing the programing, programing the beat and the synth as producer while the songwriter is the top-liner.

Two of the older respondents were more reluctant about this direct link. Participant three saw the producer role as having both a technical and social aspect, where both were necessary to master. It was only participant four that understood the role entirely outside the technical sphere. It is worth noting that participant four is the oldest of the respondents.

Participant four: Producer for me means that I am an active decision maker related to how it should sound or be (…) It's about changing either one's own or other people's artistic expressions for the better while following one's own voice during the process.

Although the producer role was the one that respondents related to the most, the participants also identified themselves with a multitude of other roles in a varying degree. In this context it is easier to discuss which roles they didn't associate with. The clearest role they did not associate with was lyricist, although many of the participants were active when working on vocal melody. Although the participants spent a large section of their time on mixing that didn't mean that they perceived themselves as mixers or mastering engineers, even though they mixed and, in some cases, mastered their own material. All of the participants associated highly with the producer, songwriter and artist role.

Overall, the participants showed an emphasis on the technical aspect as a marker for the producer role. This can relate to self-producing artists as discussed by Zagorski-Thomas (2014, p. 161), and the artist and auteur producer typologies as described by Burgess (2013, p. 9). Arguably, the participants think of their producer role not as a recording facilitator but as a recording creator (Bell, 2018, p. 33), making or creating their own music. The participants seem to think of the producer role as an overarching role with a series of sub-roles. However, the distribution and individual emphasis on these sub-roles were dependent on the type of music they made. For example, as few of the participants were vocalists, vocal-related activities, such as vocal performance, vocal production or lyrics, where not highlighted as part of how they understood their role

as producer. We speculate that their understanding of the producer role might have changed if that was the case. After all, the producer role is a role that carries a high degree of agency and power (Wiggins, 1991, p. 92) over the artistic output, and people have a general tendency to present themselves favorably (Paulhus & Trapnell, 2008, p. 499).

How do the Participants Normally Tend to Work When Starting on a new Composition?

We discussed with the respondents how they tended to start working on new compositions. We got lengthy answers that encapsulated not only how they started, but also how they usually tended to move forward once they had created something interesting.

Participant three spoke about the shaping of sound as the aspect that gave him ideas. His decision-making seemed to be informed by how the sound affords harmonic structures and how this sound carries sonic markers (Askerøi, 2020) related to released music associated with an artist, certain genres, or style of music.

> *Participant three*: If I'm going to write the bass, then I'd start by adjusting the sound of it and, for example, think like, wow, this sounds a lot like the band Boards of Canada; then I might need this form of delay or effect and then I start to work harmonically. It has a lot to do with the sound, right? The sound often carries a form of nostalgia or some form of connection towards the harmonic aspects.

Participant four described how he often starts with improvisation. He uses different types of audio sources and records improvised overdubs before removing the initial idea. Participant four discussed a wide selection of possible directions based on how he perceives the current musical construct, from an art installation or techno to more commercial forms of popular music.

> *Participant four*: These improvisations can be everything from playing on my Rhodes, doing midi stuff, singing into the microphone to improvising a poem". (…) I can do a lot of takes at full length,

and after five or six takes I might sit down and organize and edit and then see what happens, sort of like a lump of clay that at some point emerges.

Participant five described how he first embodies the role of a beat maker. He uses the first 10 minutes to lay down some chords or a bassline and some drums before changing to the top-liner role and starting to improvise melodies. Although he improvises mostly in gibberish English, the improvisations will inform his lyrical writings later. After recording what he believes are going to be the final melody and lyrics, he changes back to the beat-maker role in what he calls "remix-modus." In the remix-modus he tends to change harmonic and rhythmical elements. All these things happen fast, typically within the first sit-down.

Participant five: The vocal is important to me; it's important for me to have a cool melody. (…) Vocal ideas have to come quickly, preferably within 30 minutes" (…) Then I start to program around it in remix-modus. I might change the chords. You know, I grew up remixing vocals – it's what I'm fastest at (snaps his fingers and laughs a bit). It moves pretty fast. I tend to keep the vocals, but I can change everything else. If it's a complete disaster then I re-record it (…)

Although the respondents' ways of working varied greatly, there were some similarities. First, most of the participants discussed directly how the current musical composite informs their next cycle of idea generation, which relates to what Edward de Bono calls lateral thinking (2017, p. 97). Lateral thinking focuses on the ideas that emerges in relation to the current musical structure. Such a way of working would mean that the music maker tries not to succumb to working a certain idea to death; rather, the music maker will focus on the ideas that arise when interacting with the musical construct. An example could be if the instrumental is not working, but the topline written towards it is great. The music maker acknowledges that the first instrumental was essential for getting the topline idea and starts working on a new instrumental from scratch. Secondly, the participants' discussion of flow experience, by either using the term directly or describing states associated with flow experience. The

process of flow while making music has been the subject of several studies (Chirico et al., 2015). Two of the participants explained their process related to aspects of positive psychology and flow. When working with something new, participant three discusses a "zone" or a bubble in which he stays for a couple of hours:

> *Participant three*: I can sit like that for many hours, it's sort of a bubble, a zone with both conscious and unconscious choices. When I step out of this zone after a couple of hours or days, I might have a skeleton with a lot of different parts and a form of structure and arrangement. Then I start to think more critically: what's lacking, how should the mix the sound. (…) Everything runs kind of parallel, also the mix.

Participant five emphasizes the importance of the "flow and vibe" and the importance of trying to be "free like a child" when generating ideas:

> *Participant five*: For me, it's all about being in the flow, feeling the vibe at that instant (…) I sort of try to be a child again (laughs a bit).

Arguably, both these reflections relate to Csikszentmihalyi's discussions of what people tend to describe while being in flow. On the flow experience, Csikszentmihalyi lists several requirements. We will name a few here: the feeling of control over the environment, limited stimulus field, having the necessary skills to meet clear demands (Csikszentmihalyi, 2014, p. 135), no worry of failure, and that the process has clear steps (Csikszentmihalyi, 1997, p. 111). One of the affordances of working in the DAW environment is the limited stimulus field as often represented by a laptop screen and a set of monitors. The feeling of control over the environment can be the agent's ability to express and manifest what he or she desires, the knowledge of using the technology and the ideas it generates in synergy with its users. No worries of failure can be seen in the light of participant five's response on trying to be "free" like a child, and that nobody else is present to judge their ideas. Music making does not have any clear rules or steps. However, many of the respondents discussed, in relation to lateral thinking, how the current version of the musical construct gave them further ideas to pursue. Arguably, the

song's inner logic and what the song "needs", along with typical structures in terms of instrumentation and arrangement, can serve to give the process relatively clear steps. This is especially true in the initial phase of the music-making process. However, when the musical structure starts to take form and their ideas towards the construct decline, the next steps in the process becomes more challenging to deduce. Most of the participants discussed a period of flow in the initial phase of the music-making process. We speculate that the decline of the flow experience, proportional to time spent, is related to the gradual decrease of ideas generated when interacting with the musical construct. As the next steps become more unclear, the participants rely more on their inner critic and start asking critical questions concerning their ideas and the musical construct; that simply does not occur while being in flow (Csikszentmihalyi, 2014, p. 138).

Thirdly, the participants seemed to conduct normative judgment towards their mode of thought, depending on where they were in the process. This can be seen in relation to how they try to facilitate flow at the start of the composition process, suggesting that the participants are basically seeking to block their inner critic from appearing too early. All of the participants had reflections regarding this topic. Joel Zimmerman, known as the artist "deadmau5", has an online master class made for aspiring music makers. In his master class and what he calls "the deadmau5 process theory" Zimmerman discusses his strategies for being creative and how these relate to working long hours into the night, under the headline, "Find a way to stop thinking." "I start thinking of, or not thinking, and start getting, you know, more experimental things done and writing melodies and becoming more efficient at being not so critical" (Masterclass.com, 2016). The student's reflections on seeking to postpone their inner critic can be understood as a creative strategy seeking to facilitate flow. However, the participants do not disregard the importance of their inner critic. Later in the music-making process, when they seek to finalize their music, it seems like the inner critic becomes more prominent. These reflections become more evident later, when discussing the challenge of finishing music, as participant two reflects:

> "After we make a song or come up with an idea, I take it home and take on the role of perfectionist. I start to fix things, make it sound good, before maybe heading to the studio for a mix."

Another aspect we found to be consistent in the interviews was the challenge of describing the student's music making within the framework of the traditional sequence of record production. Meaning that instead of discussing a linear process, moving from an idea to songwriting, arrangement, sound-design, recording, mixing and mastering, one can instead discuss first a process that focuses on generation of ideas and, second, a phase that focuses on evaluation and reduction of ideas. The generative phase is a process of songwriting that encapsulates traditional songwriting, sound design, programing, recording and mixing with a low degree of separation. The second phase is where the student evaluates, hones and reduces ideas, often described by the participants as a mixing phase. There are many models that discuss the different stages in creativity (Howard et al., 2008). Most of these models have four or more stages; however, one might combine these into two stages: an intuitive phase of idea generation, and a critical phase of verification (McIntyre, 2012 p. 155). Arguably, the participants share many similarities with the description of how Montagnese makes music in the DAW environment (Montagnese, 2015). However, it seems that the degree of separation between the different types of tasks increases along with the time spent on the song. Arguably, the notion of the generative and evaluative phase can be seen in light of the previous discussion of the participants seeking to postpone their inner critic.

How do the Participants Handle the Challenge of Finishing Music?

All of the participants reflected on the challenge of finishing music in the DAW environment. Participant four reflected on this challenge, as well as strategies of commitment to cope with this challenge:

> I feel there is a challenge with all these choices one has to make. I feel that with this technique that I use, where I commit to audio through tracking of

improvisation, helps. I can't go back and change the midi or the sounds. (…) I make choices while working. (…) It's a bit of a relief to have the ability to be an active decision maker in the first part of the process; that the choices I make actually have an effect. (…) This helps me to finish a song.

Later in the interview, participant four expanded upon the challenge of all the possible options the DAW environment affords:

Participant four: "It's difficult because of all the possible choices. Each song can go in so many different directions."

Following this thread, an important topic is how the respondents master the decision environment afforded by the DAW environment. Participant one discussed how working parallel on a large number of songs can be a helpful strategy:

Participant one: I feel that many struggles to finish their music. But I have arrived at the point now where I would prefer to work on ten songs a month, which are all relatively good, instead of working on one song for a month. Basically, I believe that I learn more from it. If I work on one song for a month, I end up going into too much detail and then I become unsure if it's good or not; I waste a lot of time. I'm more positive towards working with ideas. If you have ten songs each month there's a greater chance that you'll come up with a good idea than if you only have one song per month. For me, the most important thing is to come up with a good idea; the rest is about refining it.

Participant one discusses the need for quantity in order to avoid overproducing, which can be related to the law of diminishing returns: each new hour working on the song decreases the marginal output (Brue, 1993). Brue divides a process into three stages: most productive, diminishing returns, and negative returns. Arguably, overproducing in music production yields negative returns. We did not ask the participants directly what type of activity they tend to use most of their time on when making music. However, through our teaching practice and artistic practice we speculate that overproduction, as previously discussed, is in large part

constituted by polishing ideas with a minimal impact on the final musical construct. This relates to the findings of Gooderson and Henley (2017) and the tendency they find of non-professional songwriters spending too much time on one particular part or idea.

At the Department for Popular Music (DPM) at the University of Agder we observe that when students have deadlines or a clear context of where the music is to be presented, the ratio of finished songs increases. Related to the complexity of the process and the challenge of finishing music, Eno reflects upon how to finish music, "My daughter recently asked me the same thing. She was in my studio and she was looking at my archive where I have 2809 unreleased pieces of music and she said: Dad, how do you actually finish any of these? And I said: When there's a deadline" (Eno, 2018). Eno's reflection can be understood as an argument for a high frequency of music-making tasks with clear deadlines in the pedagogical setting. When we asked the participants how they know if a song is finished, most of their answers relate to time spent on the song, if they were getting bored by it, or if they were able to listen back to it without "cringing".

Participant three: When it makes me want to puke, then it's finished. But then again, I want to convey something when I write music. If I feel I'm able to do that, then it's finished (…). It's hard to know when you are finished. I guess many of us make the wrong decision in this matter.

All the participants say that their understanding of whether the song is finished or not is tied to their own experience of the given song. Participant six adds that peers as well as "normal" people inform his decision as to whether it is finished or not. Participant four reflects on how the challenge of finishing music diminishes when working collaboratively, which might serve as an interesting point of departure for further studies. All the participants draw connections between when the music is finished and when they feel they have spent too much time on the project. It is only participant three that reflects on what one might call the dangers of overproduction or overthinking, which correlates with the previously-discussed law of diminishing return.

Participants four and six have criteria outside the project itself and their own perception of it, either listening to it in comparison to other music or sending it to someone else. None of the participants discuss perceived value or quality in relation to whether it is finished or not other than how it *feels* finished. One can understand this in relation to whether the music and its inherent self-expression is something one wants to convey to the world. When asking whether other people's opinions are important in determining whether a song is finished or not, participant five replied:

> Basically no, but of course other people can affect how I feel about the song. I try to trust myself for the most part (…) I think that when you're making your own music you have to trust your own vision. You're sort of giving something of yourself when you're doing this. Of course, other people can have cool ideas that I can try out, but in the end, it is my song and it should sound the way I want it to.

A central aspect of this chapter is accounting for how the students *experience* the challenge of finishing music, which we relate to the double-edged sword of perfectionism.[3] Participant three discussed the challenge of finishing music, and some negative aspects of working in the flexible DAW environment, where it is the music maker that evaluates whether the song is finished or not. Although setting high standards for oneself can be meaningful as it gives the students something to strive towards, it can also evoke neurotic tendencies when the students set unrealistically high goals for themselves and what they are making (Hill et al., 1997). We speculate that this might be especially true if the students spend a long time on a particular project and become frustrated as the marginal output is decreasing and the time spent is sunk cost (Mankiw, 2014, p. 286). Participant three's statement below can be seen in relation to this discussion.

> Let's say you've been working on an album for two to four years and right before you release it you're so sick and tired of it that, instead of asking for feedback or help from someone else, you choose to change it. (…) It's so easy today to make

---

3   As Andrew Scheps puts it, "If you're not a perfectionist, you're not an artist" (Scheps, 2018).

music and it's so easy to change things (…) A lot of good ideas get scrapped, I guess, due to this. (…) My generation, that works with music this way, we can sit and change every MIDI clip and sample all the time. (…) It becomes a kind of vicious circle where you can keep changing everything forever and starting new things without ever finishing anything.

Conclusion

In this chapter we have investigated the music-making process of a few students of electronic music at the Department for Popular Music (DPM) at the University of Agder in Norway. After contextualizing with relevant theory, we addressed the complexity of music-making in this environment and discussed similarities and differences from the traditional linear process of record production before the digital revolution occurred in the 90s. We interviewed six students at DPM that make music in the 21st century DAW environment. In the study we focused on how they understand their role while making music, how they tended to work when starting on something new and how they handled the challenge of finishing music.

The participants identified themselves most strongly with the producer role, although their understanding of this term varied greatly. The producer role seemed to be an overarching role for the participants, incorporating a wide selection of sub-roles. It seemed that their understanding of the producer role and the sub-roles it encompasses shifts towards what the participants are actually doing. We speculate that this tendency of presenting oneself as a producer relates somewhat to the biases of self-presentation and the role's inherent power and agency over the artistic output.

The affordances of today's DAW environment are spaceless and challenge the separation between the different roles of record production as it is possible for one individual to do it all themselves and fulfill all the roles necessary for music making. Although the respondents seemed to work with a low degree of separation in the initial generative phase, this degree increased as the process evolved into a phase of evaluation and verification. In this phase, their inner critic or perfectionist become more active.

This dichotomy seemed to be consistent with all of the respondents and some of the students' strategies are tuned towards mastering this relation to their benefit.

Our participants, similar to industry professionals, reflected on how the affordances of the DAW environment, with its endless possibilities, pose a challenge to finishing music. This was something all the respondents agreed upon. Reflecting on their own practice, all the participants seemed to conduct normative judgment on their own mindset depending on where they were in the process. The clearest example of this in our interviews was how the respondents were trying to postpone the critical and evaluative mindset so it would not interfere with the generation of ideas. Furthermore, some of the participants discussed creative strategies to limit possibilities, and committed to ideas with no option of reversibility, in order to be able to finish their music.

We believe that the challenge of educating new music makers working in the DAW environment is not merely that of learning the process, but also meta-learning: learning *about* the process. Each individual needs to develop self-awareness of their own strengths and weaknesses, and which creative strategies they need, in order to tackle the never-ending cycle of iteration and doubt when making music on the computer. Teaching practices that facilitate such meta-learning are, therefore, highly relevant in higher electronic music education. This is especially relevant in the DAW environment, where discipline is required in order to stop fiddling with the details and release the student's music to the world.

Further research on the impact of collaboration in the DAW environment should be considered. We speculate that the reduction of individual agency that occurs during collaboration can reduce the perceived complexity, thereby enabling students to master the DAW environment more easily and finish their music. Hill et al. (1997) discuss how individuals that score highly on self-oriented perfectionism do not necessarily score highly on other-oriented perfectionism. This finding challenges the notion that people who make high demands on themselves also make high demands on others. We speculate that collaboration might, therefore, be one way of decreasing the students' demands towards the final product and can help with the challenge of finishing music.

References

Acker, S., & Oatley, K. (1993). Gender issues for science and technology: Current situation and prospects for change. *Canadian Journal of Education, 18*(3), 255–272. https://doi.org/10.2307/1495386

Askerøi, E. (2020). Sound i historisk perspektiv: oppdagelse, naturalisering, kanonisering [Sound in historic perspective: Discovery, naturalization, canonization]. In Ø. J. Eiksund, E. Angelo & J. Knigge (Eds.), *Music technology in education – Channeling and challenging perspectives* (pp. 53–73). Cappelen Damm Akademisk.

Auvin, T. (2017). A new breed of home studio producer?: Agency and the idea "tracker" in contemporary home studio music production. *Journal on the Art of Record Production*, (11). http://arpjournal.com/a-new-breed-of-home-studio-producer-agency-and-the-idea-tracker-in-contemporary-home-studio-music-production.

Bell, A. P. (2014). Trial-by-fire: A case study of the musician-engineer hybrid role in the home studio. *Journal of Music, Technology & Education*, *7*(3), 295–312. https://doi.org/10.1386/jmte.7.3.295_1

Bell, A. P. (2015). Can we afford these affordances? GarageBand and the double-edged sword of the Digital Audio Workstation. *Action, Criticism and Theory for Music Education*, *14*(1), 44–65.

Bell, A. P. (2018). *Dawn of the DAW: The studio as musical instrument*. Oxford University Press.

Bell, A. P. (2019). Of trackers and top-liners: Learning producing and producing learning. In Z. Moir, B. Powell & G. D. Smith (Eds.), *The Bloomsbury handbook of popular music education* (pp. 171–185). Bloomsbury.

Bennett, J. (2011). Collaborative songwriting – The ontology of negotiated creativity in popular music studio practice. *Journal on the Art of Record Production*, (5). https://www.arpjournal.com/asarpwp/collaborative-songwriting-–-the-ontology-of-negotiated-creativity-in-popular-music-studio-practice.

Bennett, J. (2012). Constraint, collaboration and creativity in popular songwriting teams. In D. Collins (Ed.), *The act of musical composition: Studies in the creative process* (pp. 139–169). Ashgate.

Bennett, J. (2013). You won't see me" – In search of an epistemology of collaborative songwriting. *Journal on the Art of Record Production*, (8). http://arpjournal.com/"you-won't-see-me"-–-in-search-of-an-epistemology-of-collaborative-songwriting.

Born, G., & Devine, K. (2015). Music technology, gender, and class: Digitization, educational and social change in Britain. *Twentieth-Century Music*, *12*(2), 135–172.

Brown, A. R. (2015). *Music technology and education: Amplifying musicality* (2nd ed.). Routledge.

Brue, S. L. (1993). Retrospectives – The Law of Diminishing Returns. *Journal of Economic Perspectives*, *7*(3), 185–192.

Burgess, R. J. (2013). *The art of music production* (4th ed.). Oxford University Press.

Burnard, P. (2007). Reframing creativity and technology: Promoting pedagogic change in music education. *Journal of Music, Technology & Education, 1*(1), 37–55. https://doi.org/10.1386/jmte.1.1.37_1

Burnard, P. (2012). *Musical creativities in practice*. Oxford University Press.

Chirico, A., Serino, S., Cipresso, P., Gaggioli, A., & Riva, G. (2015). When music "flows". State and trait in musical performance, composition and listening: A systematic review. *Frontiers in Psychology*, *6:* 906.

Csikszentmihalyi, M. (1997). *The psychology of discovery and invention*. Harper Perennial.

Csikszentmihalyi, M. (2014). *Flow and the foundations of Positive Psychology – The collected work of Mihaly Csikzentmihalyi*. Springer.

De Bono, E. (2017). *Six thinking hats*. Penguin Life.

Elo, S., Kääriäinen, M., Kanste, O., Pölkki, T., Utriainnen, K., & Kyngäs, H. (2014). Qualitative content analysis: A focus on trustworthiness. *Sage Open*, 4(1), 1–10. https://doi.org/10.1177/2158244014522633

Eno, B. (2004). The studio as compositional tool. In C. Cox & D. Warner (Eds.), *Audio culture: Reading in modern music* (pp. 127–130). International Publishing Group.

Eno, B. (2018, April 4). *Brian Eno on exploring creativity | Red Bull Music Acadamy* [Video]. YouTube. https://youtu.be/JUL8kNYmgsA

Fadel, C., Trilling, B., & Bialik, M. (2015). *Four-Dimensional education – The competencies learners need to succeed.* Center for Curriculum Redesign.

Franco, P., & Guzauski, M. (2013, July). *Recording Random Access Memories | Daft Punk.* (P. Tingen, Interviewer*)* Sound on Sound. https://www.soundonsound.com/people/recording-random-access-memories-daft-punk

Fullan, M., & Langworthy, M. (2014). *A rich seam: How new pedagogies find deep learning*. Pearson.

Gallagher, S. (2007). The natural philosophy of agency. *Philosophy Compass*, *2*(2), 347–357. https://doi.org/10.1111/j.1747-9991.2007.00067.x

Gibson, J. J. (2014). *The ecological approach to visual perception – Classic edition*. Psychology Press. (Orginal work published 1979)

Giddens, A. (2007). *New rules of sociological method* (2nd ed.). Polity Press.

Gooderson, M., & Henley, J. (2017). Professional songwriting – Creativity, the creative process and tensions between higher education songwriting and industry practice in the UK. In G. D. Smith, Z. Moir, M. Brennan, S. Rambarran & P. Kirkman (Eds.), *The Routledge research companion to popular music education* (pp. 257–271). Routledge.

GRAMMY. (2015). *62nd GRAMMY Awards*. Retrieved from GRAMMY: https://www.grammy.com/grammys/artists/carlo-montagnese

Green, L. (2002). *How popular musicians learn – A way ahead for music education.* Ashgate.

Hill, R. W., McIntire, K., & Bacharach, V. R. (1997). Perfectionism and the Big Five Factors. *Journal of Social Behaviour & Personality*, *12*(1), 257–270.

Howard, T. J., Culley, S. J., & Dekoninck, E. (2008). Describing the creative design process by the integration of engineering design and cognitive psychology literature. *Design Studies*, *29*(2), 160–180.

Jenkins, C. (2016, April 6). Striving for perfection: *A trip through Kanye West's shifting 'Life of Pablo' mixes*. Vice. https://www.vice.com/en_us/article/rpy9pg/striving-for-perfection-a-trip-through-kanye-wests-shifting-life-of-pablo-mixes

Koffka, K. (1936). *Principles of Gestalt Psychology*. Kegan Paul, Trench, Trubner & Co.

Kuper, A., Lingard, L., & Levinson, W. (2008). Qualitative research – Critically appraising qualitative research. *BMJ*, *337*(7671), 687–689.

Kvale, S. (2007). *Doing interviews*. Sage Publications.

Mankiw, N. G. (2014). *Principles of microeconomics* (7th ed.). Cengage Learning.

Mantie, R. (2013). A comparison of "Popular Music Pedagogy" discourses. *Journal of Research in Music Education, 61*(3), 334–352. https://doi.org/10.1177/0022429413497235

Masterclass.com. (2016, November). *Deadmau5 teaches electronic music production*. [Video]. https://www.masterclass.com/classes/deadmau5-teaches-electronic-music-production

McIntyre, P. (2012). Rethinking creativity: Record production and the system model. In S. Frith & S. Zagorski-Thomas (Eds.), *The art of record production – An introductory reader for a new academic field* (pp. 149–163). Ashgate.

McIntyre, P., Fulton, J., Paton, E., Kerrigan, S., & Meany, M. (2018). *Educating for creativity within higher education: Integration of research into media practice*. Springer.

Montagnese, C. (2015, December). *Inside track: The Weeknd*. (P. Tingen, Interviewer) Sound on Sound. https://www.soundonsound.com/techniques/inside-track-weeknd

NAMM TEC. (2020, January 23). *TEC awards 2020*. NAMM TEC: https://www.tecawards.org/winners-2020

Norman, D. (2013). *The design of everyday things – Revised and expanded edition*. Basic Books.

Norton, L. S. (2009). *Action research in teaching and learning – A practical guide to conducting pedagogical research in universities*. Routledge.

Pat, L. (2018, October 15). *DAW syndrome or why my album sucks*. Medium. https://medium.com/@leepat/daw-syndrome-or-why-my-album-sucks-67f8353cc59b

Paulhus, D. L., & Trapnell, P. D. (2008). Self-Presentation of personality: An agency–communion framework. In O. P. John, R. W. Robins & L. A. Pervin (Eds.), *Handbook of personality* (3rd ed.) (pp. 492–518). The Guilford Press.

Pierce, D. (2017, April 14). *The hot new hip-hop producer who does everything on his iPhone*. Wired. https://www.wired.com/2017/04/steve-lacy-iphone-producer/

Pras, A., Guastavino, C., & Lavoie, M. (2013). The impact of technological advances on recording studio practices. *Journal of the Association for Information Science and Technology*, 65(3), 612–626. https://doi.org/10.1002/asi.22840

Roads, C. (2015). *Composing electronic music – A new aesthetic*. Oxford University Press.

Scheps, A. (2018, January 8). *Andrew Scheps at the University of Oxford – "What comes out of the speakers"*. [Video]. Youtube. https://www.youtube.com/watch?v=HVCdrYbUVW8&t=392s

Schwartz, B. (2004). *The paradox of choice*. Harper Perennial.

Seabrook, J. (2015). *The song machine: Inside the hit factory*. W. W. Norton & Company.

Sewell, W. H. (1992). A theory of structure: Duality, agency and transformation. *American Journal of Sociology*, 98(1), 1–29.

Smith, G. D. (2014). Popular music in higher education. In I. Papageorig & G. Welch (Eds.), *Advanced musical performance – Investigation in higher education learning* (pp. 33–48). Ashgate.

Swedien, B. (2011, July 1). *Mixing "Billie Jean" with Bruce Swedien at Full Sail University*. [Video]. YouTube. https://www.youtube.com/watch?v=8OjqM6uHsY4

Sørbø, E. (2020). Balancing educational purposes within higher electronic music education – A Biestaian perspective. In Ø. J. Eiksund, E. Angelo, & J. Knigge (Eds.), *Music technology in education – Channeling and challenging perspectives* (pp. 211–232). Cappelen Damm Akademisk.

Sørbø, E., & Røshol, A. W. (2020). Teaching of aesthetics in popular electronic music – A case study of a one-to-one tuition in popular electronic music in higher education. In Ø. J. Eiksund, E. Angelo, & J. Knigge (Eds.), *Music technology in education – Channeling and challenging perspectives* (pp. 257–278). Cappelen Damm Akademisk.

Söderman, J., & Folkestad, G. (2004). How hip-hop musicians learn: Strategies in informal creative music making. *Music Education Research*, 6(3), 313–326.

Théberge, P. (1997). *Any sound you can imagine: Making music/consuming technology*. University Press of New England.

Thompson, P. (2012). An empirical study into the learning practices and enculturations of DJs, turntablists, hip-hop and dance music producers. *Journal of Music Technology and Education*, 5(1), 43–58.

Tobias, E. S. (2013). Composing, songwriting and producing: Informing popular music pedagogy. *Studies in Music Education*, 35(2), 213–237.

Toynbee, J. (2000). *Making popular music – Musicians, creativity and institutions*. Oxford University Press.

Watson, A. (2014). *Cultural production in and beyond the recording studio*. Routledge.

Wiggins, J. S. (1991). Agency and communion as conceptual coordinates for the understanding and measurement of interpersonal behavior. In D. Cicchetti & W. M. Grove (Eds.), *Thinking clearly about psychology: Essays in honor of Paul E. Meehl: Vol. 2. Personality and psychopathology* (pp. 89–113). University of Minnesota Press.

Withagen, R., & Van der Kamp, J. (2018). An ecological approach to creativity in making. *New Ideas in Psychology*, *49,* 1–6.

Withagen, R., Poel, H. J., Araújo, D., & Pepping, G.-J. (2012). Affordances can invite behavior – Reconsidering the relationship between affordances and agency. *New Ideas in Psychology*, *30*(2), 250–258.

Yin, R. K. (2018). *Case study research and applications*. Sage Publications.

Zagorski-Thomas, S. (2014). *The musicology of record production*. Cambridge University Press.