Tampere University of Applied Sciences

Producing Progressive Rock

Havu – EP Record

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BACHELOR'S THESIS
December 2019

Degree Programme in Media and Arts

ABSTRACT

Tampereen ammattikorkeakoulu
Tampere University of Applied Sciences
Degree Programme in Media and Arts
Music Production

LEIPÄLÄ, JOHANNES:
Producing Progressive Rock
Havu – EP Record

Bachelor's thesis 37 pages, appendices 1 page
December 2019

This bachelor’s thesis studies progressive rock, a genre of rock music. The media part of this thesis consists of Havu’s EP record which was released independently by the artist.

The thesis begins with a look into the brief history of progressive rock music and its evolution through the decades. Additionally, the thesis examines the instruments and their uses in the genre.

The second part of the thesis investigates the methods of producing progressive rock music and illustrates the whole production process behind Havu’s EP record from pre-production to mixing and mastering. The emphasis on the production part is on examining the methods of combining elements from different eras.

The last section analyses the learning process through the author’s experiences. It explains what the author learnt and how this information could be helpful in the future productions.

Key words: music production, progressive rock, mixing, mastering, music history

CONTENTS

GLOSSARY

Equalizer	Equalizer is used in professional audio to balance the loudness between range of frequencies (Mellor 2018).
Compressor	Compressor is used to reduce the dynamic range of audio. It evens the quiet and loud parts closer together in volume making natural volume variatons less obvious. (Practical Music Production.)
DI	Acronym for direction injection. Direct injection is recorded with a direct box which converts a high-impedance unbalanced signal to low-impedance balanced signal. (Bartlett & Bartlett 2007, 265-266.)
Plugin	Plugin or plug-in is a software effect that is installed in the computer as a functional part of a host program (Bartlett & Bartlett 2007, 277).

1 INTRODUCTION

In this thesis I will look into the history and production techniques of progressive rock music. I will also explain the production process of Havu's EP from pre-production to mixing and mastering. The inspirations for the production were taken from a vast range of bands from different decades including artists like Pink Floyd, Tool, Steven Wilson, King's X, Anathema etc.

I will start by briefly investigating the developmental history of the genre and its current state. Examinating the significant artists of the past and today will help to understand the evolution of the genre. I'll also examinate the sounds from different eras.

Next I will explain the production process of progressive rock by illustrating the production methods behind Havu's EP recording. The technical production techniques themselves are not necessarely entirely unique but are nevertheless crucial part of the whole process.

The goal of the thesis is to achieve a deeper understanding of the genre and to illustrate the typical production process through Havu's EP record. The empha-zis on the production is to examinate ways of exploiting production apporaches and techniques from different eras of progressive rock music. The goal is not necessarely to produce a hybrid sound but to simply investigate the methods and their beneficial uses. The record will also be the debut release for Havu, so it holds an exceptionally meaningful role for the band, including myself as being the guitar player of the band. Its purpose is also to give professional sounding CV material for personal use.

2 PROGRESSIVE ROCK MUSIC

Progressive rock (also known as prog or prog rock) is a genre that seems to be living in a world of its own. The definition of the genre is not easy to specify but somehow everybody seems to agree who is progressive and who is not. Typically the songs are long and can end up going into a completely different direction from where they started. Prog rock also typically involves changes in time signature. (Charron.) Bill Martin, the author of Music of Yes (1996), described the characteristics of progressive rock being visionary, experimental and played by virtuosos with advanced composing skills. He also portrays prog rock being an expression of romantic and prophetic aspects of the English culture. Another typical element of the genre is the true synthesis of different styles. (Hegarty & Halliwell 2011, 5.) Nevertheless Hegartt and Halliwell argue that progressive rock does not necessarely need to be played by virtuosos nor to be English in its core essence. They explain that the more folk-based prog bands would have very little need for extreme musicianship and that they are still considered to be progressive rock. Another counter argument to Martin's views is that progressive rock arised in England but its influnces in jazz, folk, classical and Asian music are still undeniable. (Hegarty & Halliwell 2011, 9-10.) In conclusion, progressive rock can include many different characteristics and styles but does not necessarely need to have many to qualify for the genre.

2.1 Brief history of progressive rock

Progressive Rock was born in United Kingdom in the late 60s and reached its peak in the first half of the 70s. The young musicians of the era wanted to experiment with music by using new instruments and combining different genres in unexpected ways. Often times the music was also influenced by other art forms such as theatre, literature or graphic designs. The psychedelic music of the era and sometimes even hallucinogenic drugs affected the genre's development. (Progressive Rock Central.) The origin of the genre is frequently pinpointed to the release of The Beatles' 1967 album Sgt. Pepper's Lonely Hearts Club Band. This was arguable the first rock album to introduce a song-cycle that covered the album from start to finish and had an integrated conceptual cover

art. (Hegarty & Halliwell 2011, 31.) In other words Sgt. Pepper's Lonely Hearts Club Band was generally recognized as the first concept album.
Other relevant bands of early progressive rock era included The Moody Blues, Soft Machine, The Nice and Pink Floyd (Progressive Rock Central). The early 70s was the birth time of many iconic prog rock bands like Genesis, Emerson, Lake and Palmer, King Crimson and Yes. These legendary prog rock bands gained world wide audience fairly quickly. (Progressive Rock Central.)

During the early 80s many of these massively successful bands faced hiatus. Jethro Tull and Genesis were the only major prog rock bands from the 70s who continued to release albums that time. (Macan 1997, 188.) Progressive rock seemed to be desperately unfashionable. Yes departured with their vocalist, Pink Floyd was close to breaking up, Camel astrayed with their musical direction and Genesis shifted towards album-oriented-rock (AOR). At the same time American stadium rock bands like Journey and Kansas changed their style closer to prog. (Hegarty & Halliwell 2011, 181.) A new wave of neo-prog bands arised. Groups like Marillion, IQ, Twelfth Night , Pendragon, Galahad, Pallas, and Saga were influenced by 70s prog but introduced some 80s rock elements into their music. (mCLUB.) The new generation of prog rock wanted to play prolonged rock songs with prominent synthesizers and soundscapes and complex lyrical themes. Neo-prog was criticized for lacking originality and its melodiousness seemed to be in contradiction to its new lyrical orientation. (Hegarty &Halliwell 2011, 183.)

In the 90s the decade was characterized by a third wave of prog rock bands. The international new comers included bands like Ozric Tentacles and Porcupine Tree from the United Kingdom, Spock's Beard from United States and Flower Kings from Sweden. (Progressive Rock Central; mClub.) These bands were generally considereder to be the third generation of progressive rock. The 90s also had heavy metal fusion with progressive rock. The labels and agencies started to include heavy metal bands under the category of progressive rock and called it progressive metal. The name of progressive rock was also familiarly shortened to prog rock or prog. (Progressive Rock Central.) Progressive metal referred to bands which were both metal and progressive. The new progres-

sive metal coming included names like Dream Theater, Tool, Fates Warning, Ayreon, and Opeth. (Hegarty & Halliwell 2011, 259-260; mClub.)

Progressive rock has argueably influenced many contemporary artists. Many post-rock, alternative, or new prog bands incorporated elements of progressive rock and combined them to other musical directions. Radiohead for example was generally seen as a successor of Pink Floyd but have denied any associatons with progressive rock. One interesting example of contemporary prog was The Mars Volta which combined punk and progressive rock because the genres were usually thought to be opposites of each other. (mClub.) The broadly defined progressive rock can never disappear because there will always be artists who want to experiment with long songs, concepts and song structures (Sanneh, 2017).

2.2 Instruments of progressive rock

In this chapter I will examinate the instruments used in progressive rock. The rhythmic section of bass and drums plays the same important part in progressive rock as it does in other rock sub genres but it also extended their role (Macan 1997, 38). The bassist often plays melodic lines instead of only being a rhythmic and harmonic foundation of the song. Therefore the typical progressive rock bass tone is thick and trebly. Chris Squire of Yes described the bass being as much of melodic instrument as electric guitar or even organ. (Macan 1997, 38.) These characteristics describe especially the early progressive rock sound.

The first progressive rock's guitar virtuosos like Robert Fripp, Steve Howe and Jan Akkerman were heavily influenced by blues, classical guitar music and jazz guitar (Macan 1997, 47). Pink Floyd's David Gilmour on the other hand is more known of his traditional and soulful blues guitar (Chapelle & Prown 2008). Bands like Emerson, Lake & Palmer, Yes, Genesis, Van der Graaf Generator, Egg and Gentle Giant used the Hammond to substitute pipe organ and because of its percussive properties. It was an extremely versatile instrument providing texture and multiple uses. Keith Emerson described its sound as tacky, aggressive, almost distorted and angry. At the same time it could provide very soft

tones when played without distortion and with lots of chorus. (Macan 1997, 33-34.) Flute and violin have also played a meaningful role in the early progressive rock sound (Macan 1997, 37).

The lead singer in progressive rock music is typically a tenor or high tenor but low tenors or baritones are not totally uncommon. The singing style is often clean and with relatively little amount of vibrato. The vocal style is of course also affected by the melodic compositions. It is also typical to alternate between melodic singing and unmelodic lines. (Macan 1997, 39.) The new wave of progressive metal bands like Opeth and Between the Buried and Me defenitely changed the limited vocal style and merged a heavyer adaptations lincluding growling. Many of the early progressive rock bands had more than one singer and rich vocal harmonies utilized (Macan 1997, 39-40).

Progressive rock bands were often among the first to adapt new electronic musical instruments and devices to explore new interesting sounds. The analog synthesizer is well associated with progressive rock. Emerson, Lake & Palmer used Moog modular, Yes the Minimoog and Genesis used the ARP Pro Soloist. The Mellotron seemed to be part of the early progressive rock band's signature sound. (Michelle 2010.) The Moog synthesizer also played an important role in the developing progressive rock sound (Macan 1997, 34). In the 70s Robert Fripp of King Crimson and Briand Eno developed an analog tape loop effects technique. In the 80s Frank Zappa used an early digital synthesizer calle Synclavier for recording and composing and King Crimson utilizied MIDI guitars, Chapman Stick and electronic percussion. (Michelle 2010.)

Today's modern progressive rock sound is so diverse that it is nearly impossible to comprehensively represent every instrument and sound in the genre. When it comes to prog, almost anything is possible.

3 PRODUCTION

In this chapter I will explain the production process behind the media part of the thesis. Music production is mostly about making artistic choices instead of being a strictly scientific process. In today's music production you can do pretty much anything, but this does not necessarely mean that just because you can, you should (Leviatan 2017).

3.1 Production plan

A proper production plan for the Havu EP record was made late September 2019. We had been struggling to find a proper vocalist for a long time which made the situation challenging and unpredictable. We did not exactly have any specific set of requirements for the singer but we hoped to find somebody with a versatile and dynamic voice. After a long search we finally found a singer who seemed to be perfect for the job and were finally able to plan the schedule for the production. We had been already writing songs and ideas for quite some time so now we only needed the lyrics, vocal arrangements and some final polishing for the songs. We also had limited time in our hands because I needed to graduate by the end of the semester. This was a perfect reason to create a much needed strict schedule to stick with. We ended up with the following plan.

TABLE 1. The production plan

Month	Week	Day	Plan
September	39	23.-29.9.2019	Making demos
	40	30.-6.10.2019	Making demos
October	41	7.-13.10.2019	Arranging, preproduction
	42	14.-20.10.2019	Drum recordings and possibly others
	43	21.-27.10.2019	Bass and guitar dubs/recordings
	44	28.10.-3.11.2019	Vocal recordings
November	45	4.-10.11.2019	Edits/mix
	46	11.-17.11.2019	Mix
	47	18.-24.11.2019	Master
	48	25.11.-1.12.2019	Backup

3.2 Pre-production

Pre-production is the time before the actual recording. It is the phase when the songs are chosen, arrangements are refined and song parts are practiced to a point that you only need to worry about the performance during the actual recordings. (Owsinski, B. 2015.) Many famous producers seem to underline the importance of pre-production phase. The legendary music producer Rick Rubin said that his preference is to get as much as possible done before entering the studio (Brown, J. 2009, 9). Rubin is well known to be an avid and career-long advocate of pre-production. His recording sessions and studio productions are often relatively short in time. According to Rubin it is the pre-production time that makes all the difference. It is very important to feel secure about the music and to know that it works before starting to record, he explains. This way you can only focus on capturing the best possible performance and takes. (Brown, J. 2009, 6.) Also according to the renowned musician and music producer Michael Bradford (2016), pre-production is the most important and, at the same time, most often overlooked part of the recording process. A little extra time in pre-production and record planning can save you from a lot of trouble in the long run. It is important to make sure you have a clear idea what the songs are about and to plan even seemingly insignificant things such as the list of used equipment and logistics for the recordings. (Bradford 2016.)

Once we finally found our singer, Pyry Urhonen, we were able to plan the EP's pre-production properly. We started by picking the most potential song ideas and planning a proper demo recording session for the songs. This would provide us deeper insights on the strengths and weaknesses of the songs. It is also useful to have the separate instrument tracks for refining the arrangements.

We planned a weekend demo session for early October at our rehearsal space to record the songs as multitrack recordings. The setup was made on Friday 4.10.- and the actual demo recordings were done Saturday 5.10.2019. We used our singer's Zoom LiveTrak L-12 (combined mixer, audio interface and recorder) to record directly in Cubase 10 running on my old desktop PC. Because Urhonen had just joined the band we decided to record the instrumental parts first and the vocals later. This seemed like the most efficient way because

Urhonen did not have much time to practice his parts before the demo session. The Zoom conveniently allowed us to have separate headphone mixes, so we recorded the guitar and bass straight in line which allowed us to have totally bleed free drum tracks. The setup worked pleasingly well and the whole demo recordings were very insightful.

PICTURE 1. The band demoing songs with their equipment (Leipälä 2019)

After the rehearsal space recordings I rearranged my guitar parts for some parts at home and made a rough mix for the band members to listen. Urhonen recorded his demo vocals by himself and after that I made a new mix including the vocal tracks. We refined the songs a little but no significant changes were made. We found this work process very worthwhile.

3.3 Recording

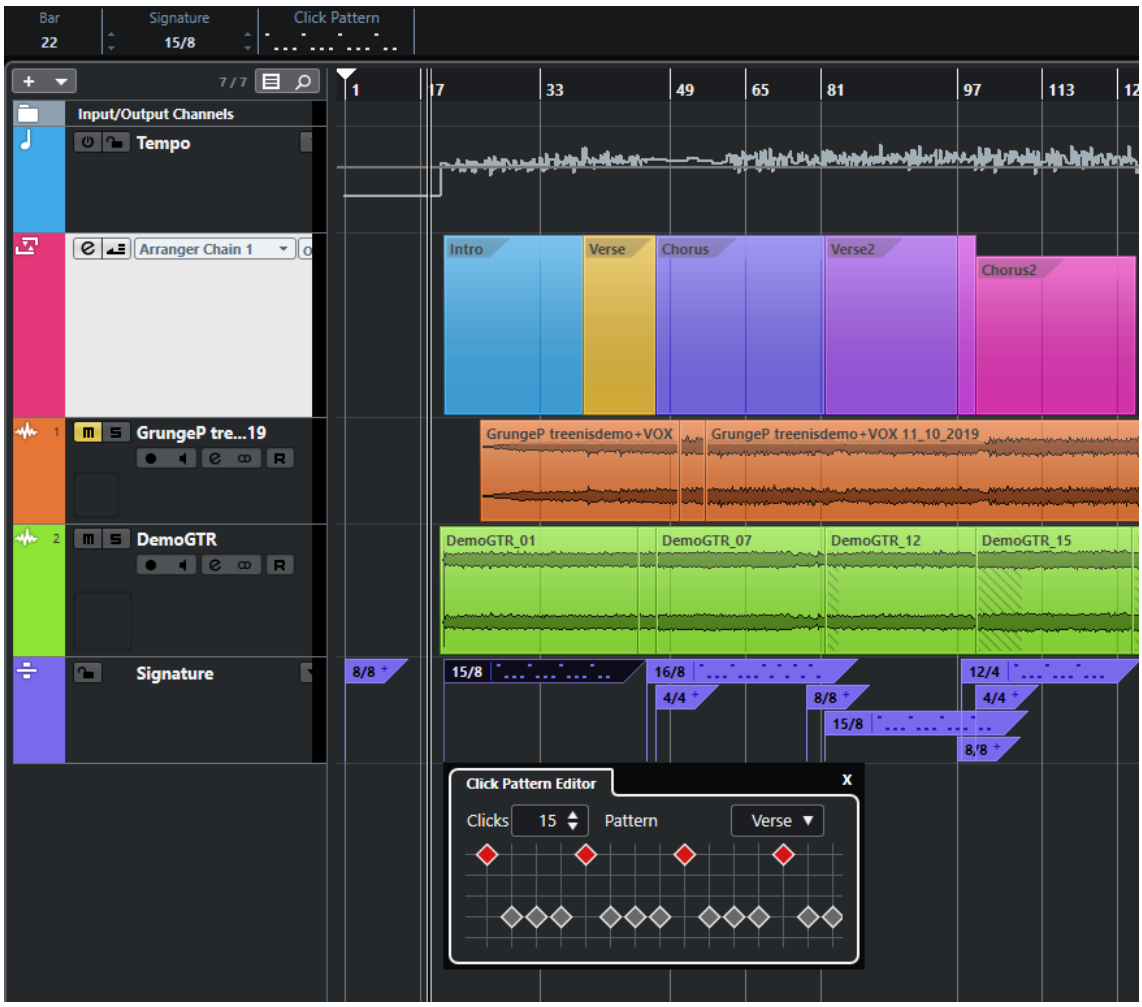
By the time we started the actual recording process I had already planned out the most important things including recording techniques, equipment, facilities and timetable. After many considerations we ended up recording drums and bass live with a demo guitar and a click track. This way we could retain some of the band's live energy and I could fully concentrate on recording and producing. Guitars and vocals were recorded separately later on. Everything was recorded in Pro Tools with sample rate of 48kHz and 24 bit depth. The only exception was the demo guitar and click track, which were done in Cubase before the actual EP recordings. In the following chapters I will explain the whole recording process in detail.

3.3.1 Preparing

After we decided the right tempos and structures of the songs I made a click track in Cubase 10. I chose to do this in Cubase because of its convenient click track functions. In progressive rock music there are often many time signature changes in the songs and the Cubase's click allows the user to make custom metronome patterns and signature changes easily. I used the demos that we made in pre-production phase to map out the structures and tempos of the songs. After this it was much easier to check where the time signature changes took place and to create custom click accents for different song parts.

When the click track was ready I played some demo guitars for our drummer and bass player to play along in the upcoming live session. Cubase also allows the bouncing of click track by just a few clicks. I exported the demo guitar and click track from Cubase and later on they were imported to Pro Tools.

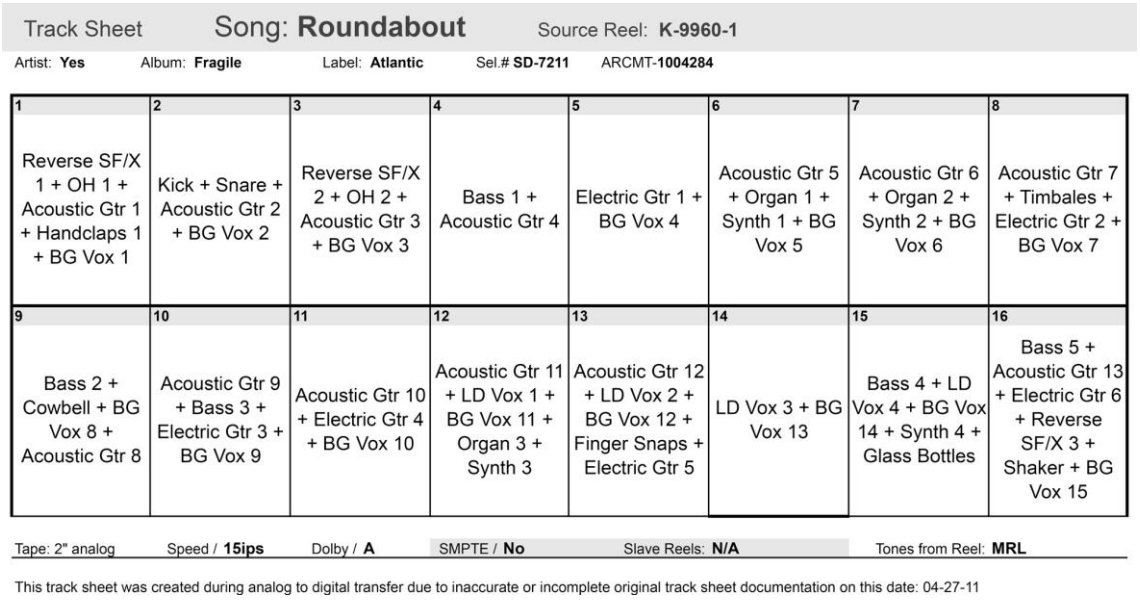
I went to the studio to check the premises and equipment few days before the recordings. Our drummer also wanted to inspect the university's drum set to decide if he wants play with that or his own drum set.



PICTURE 2. Cubase 10 song structure analysis and preparing the click track (Leipälä 2019)

3.3.2 Drums

My goal was to produce dynamic and organic sounding drums while still preserving some of the attack and punchiness of modern style rock drums. The older prog rock bands from the 70s like Yes and Emerson, Lake & Palmer were limited by the technology which sculptured the sound prominently. For example Yes song “Roundabout” was limited to only 16 tracks (Hurwitz 2018).



Track Sheet Song: **Roundabout** Source Reel: **K-9960-1**

Artist: **Yes** Album: **Fragile** Label: **Atlantic** Sel.# **SD-7211** ARCMT-**1004284**

1	2	3	4	5	6	7	8
Reverse SF/X 1 + OH 1 + Acoustic Gtr 1 + Handclaps 1 + BG Vox 1	Kick + Snare + Acoustic Gtr 2 + BG Vox 2	Reverse SF/X 2 + OH 2 + Acoustic Gtr 3 + BG Vox 3	Bass 1 + Acoustic Gtr 4	Electric Gtr 1 + BG Vox 4	Acoustic Gtr 5 + Organ 1 + Synth 1 + BG Vox 5	Acoustic Gtr 6 + Organ 2 + Synth 2 + BG Vox 6	Acoustic Gtr 7 + Timbales + Electric Gtr 2 + BG Vox 7
9	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Bass 2 + Cowbell + BG Vox 8 + Acoustic Gtr 8	Acoustic Gtr 9 + Bass 3 + Electric Gtr 3 + BG Vox 9	Acoustic Gtr 10 + Electric Gtr 4 + BG Vox 10	Acoustic Gtr 11 + LD Vox 1 + BG Vox 11 + Organ 3 + Synth 3	Acoustic Gtr 12 + LD Vox 2 + BG Vox 12 + Finger Snaps + Electric Gtr 5	LD Vox 3 + BG Vox 13	Bass 4 + LD Vox 4 + BG Vox 14 + Synth 4 + Glass Bottles	Bass 5 + Acoustic Gtr 13 + Electric Gtr 6 + Reverse SF/X 3 + Shaker + BG Vox 15

Tape: 2" analog Speed / **15ips** Dolby / **A** SMPTE / **No** Slave Reels: **N/A** Tones from Reel: **MRL**

This track sheet was created during analog to digital transfer due to inaccurate or incomplete original track sheet documentation on this date: 04-27-11

FIGURE 1. Track sheet from Yes Roundabout recordings (Hurwitz 2018)

This naturally resulted in a more airy and organic type of sound because everything could not be close miked. Only kick, snare and overhead microphones were used in Roundabout, as seen in figure 1 (Hurwitz 2018). The analog tape machines of the era also added their own color. The tape machines color the sound by softening the attacks and thickening the low frequencies which is commonly assosiated with “warmth” in sound (Keller). My vision was to capture overall drum kit flawlessly with overheads and room microphones and then add the attack and punch from the close microphones as needed.

The drums and bass live session was scheduled for the university’s autumn break 2019 so we could reserve a couple of long days at the university’s studios. The main goal of this session was to get the drums because bass could always be dubbed later on. I booked three days for the recordings scheduled at 18.-20.10.2019. The recordings also needed to happen during a weekend because some of us had day jobs during the week. The first day was dedicated to building the drum setup. This way we could deal with the technical stuff one day and start fresh and well rested the next day. This would leave us two full days of recording time.

It is very important to change the drum heads before recording. No matter what kind of drums you are using changing the drum heads for new ones is always adviceable. (Major 2014, 16.) Our drummer preferred to play with his own kit

and fortunately he changed the drum heads beforehand. This saved us some time for the setup.

Every room has a sweet spot where the drums sound particularly good. The simplest way to find this spot is to take a floor tom and walk around the room hitting it really hard. At a certain spot the drum will have a better resonance and low end. When you find the spot you can simply set the floor tom there and build the drum kit around it. (Salmi 2013, 30.) We located the ideal spot using this method and started to setup the drums. After the kit was assembled it was time to tune it and make sure there was no loose screws or other unwanted and disturbing elements. Most drummers would rather get shot in the face than learn how to tune their instrument (Salmi 2013, 19). Luckily I was working with a drummer who knew how to tune his drums well. According to Salmi (2013, 19) drum tuning is actually so important that if you feel uncertain about the process, you should hire a drum technician to do it for you.

After the drums were setup and in tune it was time to mic them up. I used a miking setup which Salmi (2013, 97) describes as basic setup for recording aggressive drums. This method consists of kick inside and outside mic, snare top and bottom, individual tom mics, stereo overhead miking, ride cymbal, hi-hat and stereo ambience mics. Soundwise the approach provided me possibilities to go anywhere from soft jazzy drums to extreme aggressive metal drum tones while still keeping things fairly simple. Our drummer was using only two toms so this counted for reasonable 12 mics in total. I chose the mics mostly based on my experience from being an intern at Fantom Studios in spring 2019. We did many drum recordings there during my the five month internship period and some microphones seemed to always do the trick for certain purposes. The university studios did not have all the same microphones available but I did some research and ended up with the following miking plan.

TABLE 2. Drum miking

Drum and miking	**Microphone of choice**
Kick in	AKG D112 MKII
Kick out	Shure B52
Snare top	Shure SM57
Snare bottom	AKG C451B
Floor Tom	Sennheiser MD421
Rack Tom	Sennheiser MD421
Ride cymbal	AKG C451B
Hi-Hat	Shure SM81
Overhead left	AKG C414
Overhead right	AKG C414
Ambience left	AKG C414
Ambience right	AKG C414

Kick in mic was placed and pointed about 15cm from the beater. This mic would provide the base for the kick sound but with fairly prominent attacks. The kick out mic was placed on the hole of the kick drum which gave more low end for the sound. Combining these two sources made it easy to a find balanced kick sound. The snare, toms and hi-hat were miked very traditionally from top while adjusting the angle accordingly. The snare drum had additionally a bottom mic to capture some of the higher crisple and rattle. Ride microphone was positioned underneath the cymbal and pointed towards the drummers hitting point. Miking the ride cymbal underneath with a small angle and pointed to the bell will give great separation (Salmi 2013, 54).

The overhead microphones were positioned relatively far away from each other to give a wide stereo image. The used stereo miking technique was the A-B technique, which is also known as the spaced pair. The left overhead microphone was pointed to left side cymbals and floor tom. The right overhead microphone was aimed at right side cymbals, hi-hat and rack tom. It is important to make sure that the distance and the angle from snare drum are similar when using the A-B technique for overheads (Major 2014, 143). This also reduces phase coherency problems and helps to keep the snare in center of the stereo field (Salmi 2013, 50). I measured the distance from the snare with a cable to ensure it was equal. The microphones were angled slightly away from the snare to get a better separation. When the overheads are pointing away from the snare drum they will capture less of it and also reduce the bleed from the oppo-

site side cymbals (Salmi 2013, 50). The height was approximitely one meter over the cymbals. Salmi (2013, 51) recommends keeping the distance somewhere between 45-75cm from the cymbals because going higher might result in too roomy sound. In our case this was not really a problem because the recording room was very quiet. We checked the hight with our drummer to ensure that there would not be a risk of hitting the microphones.

PICTURE 3. Drum kit fully miked (Leipälä 2019)

After the drum kit was fully miked we needed to set up the room ambience microphones. The microphones were setup with Blumlein technique. The Blumlein configuration provides 360 degree of room ambience (Salmi 2013, 63). The technique is ideal for natural, realistic and pleasant drum room sound (Major 2014. 145). The Blumlein stereo miking is done with two bi-directional microphones which are placed in 90 degrees angle (Salmi 2013, 63). I placed the microphones behind a folding screen to capture more room sound and less direct drum sound. The stereo pair was set up roughly at waist height to reduce the cymbals. The microphones were pointed directionally to the drum kit about four meters away.

PICTURE 4. Miking the drum room with Blumlein stereo pair (Leipälä 2019)

The combination of wide stereo overheads and natural room ambience made it possible to balance between modern and more classical, un-hyped sound.

I encountered some technical issues when it was time to route everything to Pro Tools. One of the overheads did not receive signal. It took me some time to localize the problem but it turned out that the particular preamp channel was not connected behind the studio rack and the rack was locked. The recording days were during weekend so there was nobody at the university who could have helped us. I called the studio master and he confirmed the situation. Because of this problem some compromises needed to be done with the preamp selections. This was not the only technical problem that I encountered. The Pro Tools IO setup was pointing the in and outputs to wrong connections, and some other preamps were having issues too. I routed all the drum microphones (except overheads) through Allen&Heath GL2400 analog mixer. There was also a minor issue with the multicore cable being patched incorrectly. Running tracks through the mixer allowed me to shape the sounds already when recording. The over-

heads went through a Neve 4081 preamp. Everything was recorded in Pro Tools system.

3.3.3 Bass

The bass was recorded simultaneously with drums at the university's studio. The bass player had a very particular and fine tuned sound so I did not want to change that much. His sound was heavily based on his five string fretless bass, pedal board and a cabinet emulator. I recorded the cabinet simulated sound and a DI just for backup.

The bass sound had a wide spectrum of frequencies because of the playing style and the extended range of the five stringed bass. The bass arrangements had lots of polyphonic parts including chords and arpeggios so this needed to be considered when dialing in the sound and also later on in the mixing. The sound required exceptionally lot of mid range and high frequencies for the attack and clarity. In todays modern rock and progressive rock sound the middle frequencies are often heavily scooped to leave spaces for heavy guitars and big drums. Our approach was to aim for the big low end to give the energy and the punchiness to the overall sound but also with rich middle range and presence. The older prog rock bands like Yes and Pink Floyd had typically more middle frequencies in their bass tone in a similar way.

Most of the bass parts were recorded in the live recordings with drums but we also dubbed a few lines later on, after I had edited the playing and carefully listened the takes with the player. After we were happy with the bass recordings it was time to move on to guitars.

3.3.4 Guitars

I recorded the guitar parts at my home studio with Fractal Audio Axe FX 2 MK1. Axe FX 2 is an all-in-one preamp/effect processor which contains hundreds of realistic vintage and modern guitar amp models, speaker emulations, effects

and more (Fractal Audio). This was a perfect tool for me to create the hybrid sound that I was looking for. It also enabled me to record the guitar parts at my own pace and regardless of the time of the day. I wanted to have a fairly modern sound while preserving lots of dynamics.

I used two amp models and a drive pedal model in the Axe FX 2 to variate the dynamics and to create different rhythm sounds. All the rhythm sounds were created in one preset which contained two different “scenes”. Scenes are variations of a single preset (Fractal Audio Systems Wiki). The scenes were programmed to have different cabinet simulations of the same amp with same settings and I used an expression pedal to seamlessly blend between these two amplifier sounds. The amp models used were “Dirty Shirley” and “Friedman HBE” which are both based on Friedman amplifiers. Dirty Shirley model was used for the clean parts of the songs and HBE model for the heavier parts. These Friedman amplifiers are known to be based on classic Marhall amplifiers with a modern touch and therefore being optimal choices for combining something new and old. The different cabinet simulations were based on Diesel 4x12” and Mesa Boogie 4x12” cabinets. The idea was to double track everything with a slightly different sounds resulting from the different cabinet models.

PICTURE 5. Fractal Audio Axe-edit software sound editor (Leipälä 2019)

Double tracking is a commonly used studio technique where you record the same part twice and pan the tracks to the opposite sides of the stereo field. Double tracking enables a wide stereo image which results from the small timing differences and dynamic changes in the different takes. (Pro Audio Land 2015.)

I played all the guitar parts with Amfisound Kaira7 custom seven stringed guitar which also influenced the sound a lot. The guitar has a massive low end with lots of sustain. It is equipped with two humbucker pickups and a three-way custom pickup switch that splits the humbuckers to single coils in the middle position. The setup enabled everything from modern heavy metal to sparkly cleans and creamy blues sounds.

The lead guitars were single tracked with stereo cabinet emulation and a touch of stereo enhancer. Generally my approach was to save the processing and effect blending for the mixing phase but in this case I wanted to use the Axe FX2's build in stereo enhancer for its rich and ready sounding tone. One of the reasons for this decision was that I seemed to perform much better with processed, saturated and wide sounding lead tone. I created the solos by improvising, compiling and then arranging some parts to make them sound more composed.

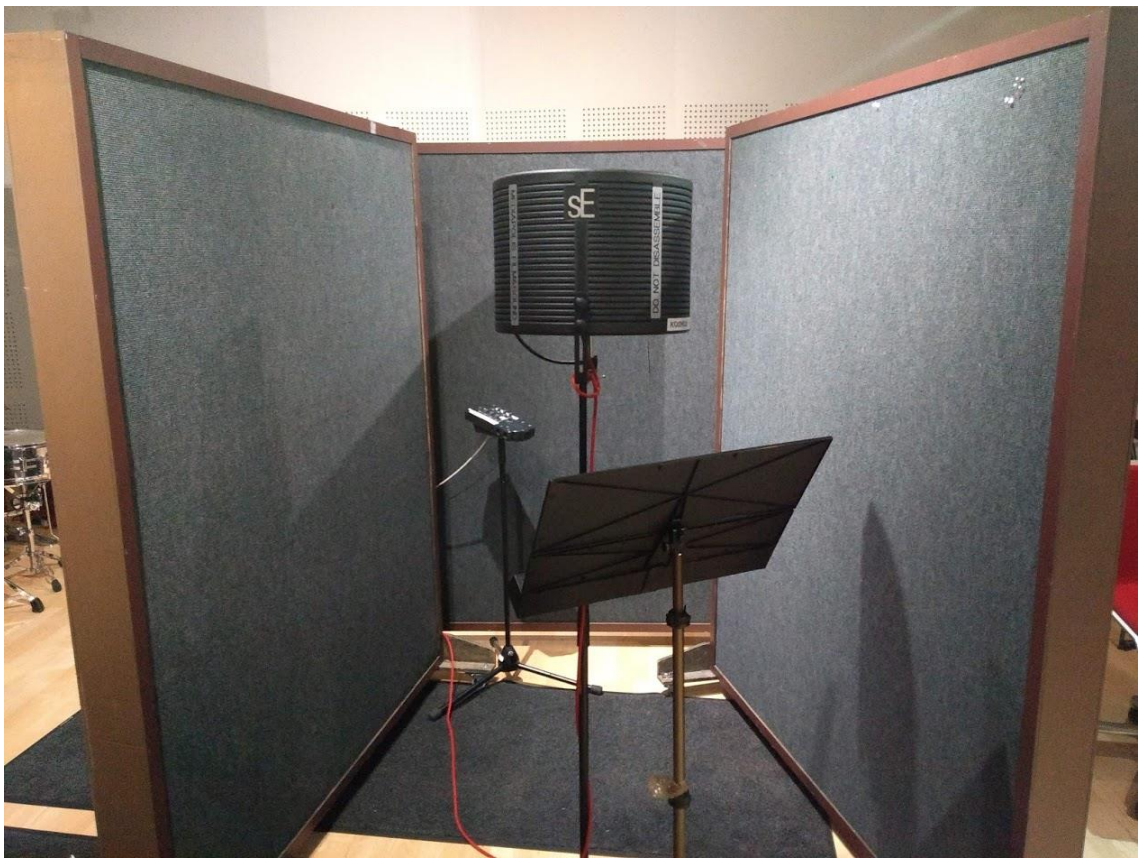
I also hade the DI tracks for reamping purposes if any of the sounds needed changing later on. Reamping is a process where you first track the dry signal of the instrument and then re-record it later by sending the signal through amplifiers and effect pedals (Radial Engineering). Reamping is also a very quick and easy process with the Axe FX2 because the whole process can be done via single USB cable. In this case the reamping was not needed but it is still beneficial to have the possibility just in case.

3.3.5 Vocals

The vocal sessions were planned for week 44 and at this point we were still strictly on time with the production plan. I wanted to record the vocals quite clear, dry and neutral sounding. The color could always be added in the post processing. AKG 414 microphone was an optimal choice for this. I planned to compare it with Neumann U87 but the Neumann was unfortunately in maintenance during our vocal sessions. The microphone preamp of choice was Avalon VT-737SP. I used the Avalon's equalizer to cut some unwanted middle frequencies and to boost the singer's root tone and upper harmonics.

PICTURE 6. Avalon VT-737SP vocal equalization (Leipälä 2019)

The singer had a lot of dynamics with different parts so I also used the Avalon's compressor to tame them a bit. Most of the compression was still left for the mixing phase. Since the goal was to get dry vocals we created a vocal booth from three folding screens around the microphone and use a reflection filter as well. We used a hearback system so the singer could dial in his own listening mix. We did not manage to record everything during the week 44 so we took a couple of extra sessions for the next week.



PICTURE 7. Folding screens forming a vocal booth (Leipälä 2019)

Our singer had several different vocal styles varying from baritone to falsetto singing and some parts included even spoken word or rap elements. It somehow reminded me of Mike Patton, Thom Yorke and Mark Lanegan. Urhonen had very limited time to refine his parts because we were almost starting to record when he joined the band. Considering especially the limited time he had done a fantastic job with the vocal arrangements. The arrangements however still needed some refining. Combining these multiple styles with his peculiar way of phrasing we were able to create a nice combination of something new and old which resulted in interesting and timeless sounds. After the vocals were recorded it was time to move on to editing and mixing.

3.4 Editing

Editing means any process that alters the original performance in the recording. The amount of required editing is mostly dependent on the quality of the performances. (White.) According to the renowed music producer and teacher, Mi-

chael White, the performances are more related to the artist's ability to cope in studion environment rather than the level of talent. Editing can be the key to a professional sounding song (Conrad 2019). On the other hand, too much editing can drain the "life" or "feeling" out of a song. It is always better to record a solid performance rather than trying to edit it sounding coherent. If it sounds good it does not need editing. (Leviatan 2017.)

PICTURE 8. Backing vocals edited tight (Leipälä 2019)

The concept of editing was created in the 50s when analog tape machines became available. Before mid 50s the music was cut directly to lacquer and editing was not possible. The analog tape machines evolved in the 70s. Punching and compiling tracks quickly became a standard but the analog technology still had many physical and technical limitations. The digital recording technology became available late 80s and early 90s and it changed the quality and precision of editing forever (White).

My approach to editing was keeping things simple. I edited standard things like fades in clips, any disturbing noises, some minor timing issues et cetera. As a part of the aspects of retaining "natural" sound I did not want to over edit things. The older progressive rock bands had limited possibilities for editing and this was also part of their lively sound. I wanted to preserve some of that live feel.

3.5 Mixing

When all the tracks are recorded and edited it is time to mix them. Mixing is a process which includes levelling, spatial positioning, equalization, dynamic pro-

cessing and effect processing. (Huber D., Runstein R. 2005.) Generally speaking I used the Slate Digital Virtual Mixing Rack and Pro Tools stock plugins for equalizations and compression, Altiverb convolution reverb and Waves H-Delay for spatial positioning. Various other plugins were used for effect processing and for some more specific purposes.

My mixing strategy was a combination of the rhythm approach and the bottom to top method. In the rhythm approach you start with the drums and percussion and then adding the bass (Weiss 2015). The guitars, synthesizers and other rhythm elements are introduced after that. The melocid elements like vocals and lead instruments come last. The benefit of this method is that it centers the mix around the idea of groove. In the bottom to top mix you start from the deepest elements like kick, bass and low synthesizer sounds and then build up to the trebly sounds. The benefit of this method is that it makes the equalization choices clear because you are using certain frequencies for specific elements. (Weiss 2015.) I started by mixing the drums. I wanted the drums to sound like a whole instrument before checking the low end. When the drums started to sound nice I introduced the bass and spent some time making the kick and bass work well together. Then I went back to fine tune the drums for upper frequencies and proceeded with the rhythmic approach. In the following chapters I will explain the process in more detail.

3.5.1 Mixing the drums

I started the drum mixing by making some basic level adjustments and grouping. I also did volume automation curves to tom drums the same way I was thought at Fantom Studios when I was doing my internship. With this method the tom tracks are reduced by -12dB and the tom hits are brought up with volume automation. This is basically manual gating but provides much more precision. Then I adjusted the pannings to match with the overheads. By matching the stereo image of close microphones to the overheads the whole drum kit is more in phase and less equalization is needed (Barresi 2018).

Next step was to check the drum phase coherence. This step was a bit tricky because there seemed to be a lot of controversy to it. Some say that you shouldn't touch it at all and some claim that this phase is essential for having modern tight sounding drums. The acclaimed producer, Joe Barresi (2019), said he checks phase coherence in the following order: snare to overheads, kick to snare, hi-hat to snare, toms to overheads. Looking at the waveforms and matching the peaks can be visual guidance but you should always use your ears (Barresi 2019). This seemed worth investigating because Barresi has worked with successful prog influenced bands like Tool, Coheed and Cambria, Puscifer and Alice in Chains. I tried the approach and it seemed to bring more bottom end and clarity. Later on, however, I started to have problems when adding equalization and compression. Disabling the phase coherency adjustments solved these problems so I decided to not to use them. However, it was necessary to remix the drums because the phase alignments affected especially the equalization choices.

This was very time consuming because first I spent a lot of time with the whole phase alignment process. I tried it with Waves InPhase plug-in but it gave my strange and virtually impossible results. Then I did it by visual matching and time alignment plug-in in Pro Tools. This gave me a valuable lesson. It is better to keep things simple and try not to fix things that are not broken.

I did some basic equalization, compression and reverberation to the drums. The kick, snare and toms were send to parallel compression bus which was heavily compressed. Parallel compression is a great way to give the drums some extra punch while retaining the attack (Barresi 2018). The individual tracks had relatively light compression to retain the dynamics and some "organic" feel. I did however use a sample to support the snare drum on some more aggressive parts. The sample was only to give some added texture and did not replace the original snare sound. The drum bus had a touch of equalization and compression to glue everything together.

PICTURE 9. Drum bus processing – Slate Digital Virtual Mixing Rack (Leipälä 2019)

3.5.2 Mixing the bass

The bass guitar provided some challenges for the mixing. The extended range of five strings, arrangements which included polyphonic, melodic and high pitch lines required some extra consideration for mixing choices. I wanted to take the lowest frequencies mainly from the kick drum so I used a sidechain compressor to trigger the a compression for frequencies below 70Hz. Sidechain compression is a type of compression where the level of one instrument is controlled by the level of another instrument (MasterClass 2019). This technique helped to keep the lowest end of the mix clean.

The arrangements and style of playing required a lot of middle and high frequencies. The recorded sound was quite ready so only minor equalization was necessary along with compression and parallel compression.

3.5.3 Mixing the guitars

The guitars did not require much of processing. I cut some low frequencies to leave space for bass and boosted some high middle frequencies few desibels to make them cut through in the mix. The rhythm guitars were panned hard right and left to make a wider stereo image and to leave space for the vocals in the center.

3.5.4 Mixing the vocals

The first step of equalizing vocals is to clean the problematic frequencies (Waves Audio 2018). Even though I equalized the vocals a bit in the recording phase the tracks still had too much middle frequencies. At first I removed the unpleasant resonant frequencies with subtractive equalization and then I used additive equalization to emphasize the pleasant qualities.

The vocal tracks provided some challenges with the amount of dynamics and different singing styles. Vocals are often among the most dynamic instruments in the mix (Waves Audio 2018). To avoid over compression, it is best to start with roughly evening out the dynamics with clip gain (Waves Audio 2018). I adjusted some clip gains, used two serial compressors in every individual vocal track and even some parallel compression in a bus group. Every vocal track and the parallel compression was routed to vocal master bus. The vocal master bus also had tiny amount of compression to even out the parts with backing vocals. I also used the Slate Virtual Digital Tape Machine plugin in the vocal master bus to give the vocals some pleasant analog vibe. The plugin adds tape saturation which is generally associated with “warmth”. Using the Virtual Tape Machine plugin in tracks makes them warmer, smoother, punchier and more analog sounding (Slate Digital).

3.5.5 Spatial positioning and effects

Every instrument needs its own space in the stereo field. There should be a natural ambience to each instrument and the ambiences should fit well together. (Keller.)

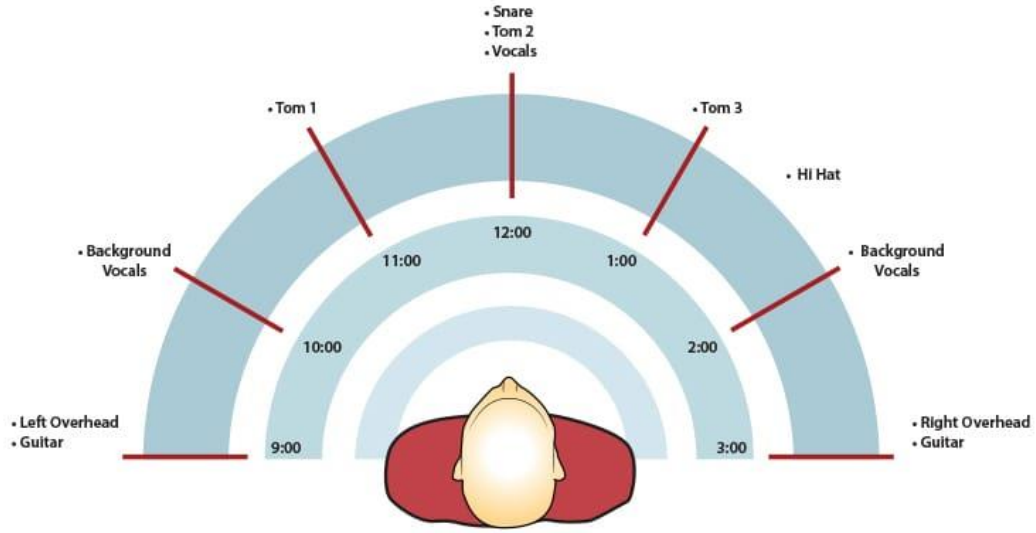


FIGURE 2. Stereo mix spatial positioning (Keller)

The feeling of spatial depth can also be created by levelling, equalizing or using a reverb effect (Sonible). With only four instrument types (drums, bass, guitar and vocals) it was fairly easy to find spatial positionin for everything. Figure 2 (Keller) illustrates my panning choices except I had only two tom drums instead of three. They were panned accordingly to support the stereo image from overhead microphones.

I used two convolution reverb plugins and a tape delay plugin in separate bus tracks to create the main spatial effects. Some parts also needed a second, longer delay effect. The first reverb was to create the early reflections and the second reverb was used for the tails. You can experiment with mixing the early reflections and tails to create a custom ambience (Doctor Mix 2017). This approach allowed me to create different spaces for each track while still blending well together. Only the drums had additional reverbs, one for snare and one for the whole kit to create a bigger room ambience.

3.6 Mastering

Technically speaking mastering is simply the step of taking a mixdown and preparing it for the distribution. It is the process of making a collection of tracks sounding like they belong together. (Owsinski 2008, 9.) Mastering is also the final step of post-production. Traditionally it is done by using tools like equalizer, compressor, limiter and stereo enhancer. After mastering the audio should sound unified, complete and balanced. (LANDR.)

The band was already pleased with how the EP sounded so I did not want to alter it much. I tried several things including compressing, equalizing and adjusting the stereo image but none of these seemed to actually improve the end result. I used only a mastering limiter and the tool of choice was Slate Digital FG-X Mastering Processor plugin. The main purpose of mastering in this case was to get the volume levels unified and up to commercial levels. FG-X Mastering Processor was an excellent choice for this and I managed to add almost +11dB of pure volume without altering the mix noticeably.

4 DISCUSSION

I wanted to do a thesis with a practical media part. I had been listening progressive rock and metal music for approximitely twenty years so the genre was somewhat familiar to me. I also happened to be in a recently formed progressive rock band and we were planning of making an EP so this seemed like a good direction to pick a topic. One of the challenges was to choose an interesting research question. Our band had mostly modern sound but also elements from older progressive rock so I decided to investigate the production from that aspect.

I also wanted to gain a deeper knowledge of the genre. The genre is extremely diverse so it was challenging to try to study it comprehensively. Another challenge was the tight timetable and our problems to find a good singer. During the summer 2019 we had three candidates and it did not work out with any of them. We also had a couple of auditions before those which did not lead anywhere. The situation seemed very frustrating. Eventually we found a competent singer in early September 2019 but this left us very little time to work with the vocal arrangements. We also did not have any lyrics at that time so a lot of work needed to be done in a short time.

The production process itself was very insightful and educational. I already knew that the pre-production phase is importan but its fundamentality became obvious during the production. Demoing the songs was very helpful and in retrospect we probably should have done that earlier. We ended up doing a lot of arrangements also in the recording phase which was not an optimal situation. Changing the arrangement in the middle of recording process affected performance and consumed extra time. This was still very much needed. In the future productions we will include the singer in early phases of songwriting and start demoing the songs right away. I learnt that it is important to have diverse problem solving skills and to be able to make quick decisions. The productions can provide many type of problems for example with technology and people and it is the producers job to deal with them.

The mixing phase also provided its own challenges. Adjusting the drum phase coherence created unnecessary problems and I spent a lot of time trying to fix the problems by equalizing and compressing when the actual problem was in the phase coherence. This also provided me a valuable lesson: keeping things simple is often better.

In the end the EP production was a successful project and the band was happy with the results. I think this will defenitely help us to proceed with the next steps: getting our music published, acquiring gigs and receiving some interest from the labels. In my opinion we also managed to create an interesting sound with combining the elements of mixing musical styles, peculiar performing and also blending sounds from different eras while still sounding quite modern. That being said, I feel that I could have focused more on the research question about examining and comparing the different production methods of different eras. Personally my main goals was to gain a deeper knowledge of the genre and especially producing a professional sounding EP record for Havu. These objectives were achieved well. I also think the research part can be beneficial to anyone interested in the genre or its production process.

REFERENCES

Barresi, J. In the Studio with Tool and “Evil” Joe Barresi. 7.11.2019. Interviewed by Ampong, D. Waves Audio. Read on 6.12.2019.
https://www.waves.com/in-the-studio-with-tool-and-evil-joe-barresi

Barresi, J. How to Approach Mixing Drums | Joe Barresi (QOTSA, Tool, Soundgarden). 11.7.2018. Video. Waves Audio. Watched on 6.12.2019.
https://www.youtube.com/watch?v=--yplE1dvYk

Bartlett, B., Bartlett, J. 2007. Recording Music on Location - Capturing the Live Performance. Burlington: Focal Press.

Bradford, M. Musician and music producer. 2016. Interview on 14.11.2016. Interviewer Earnshaw, L. Cornel School of Contemporary Music at Shepherd University. Los Angeles, CA.
https://diymusician.cdbaby.com/musician-tips/pre-production-tips-artists-plan-music-production-prevent-problems/

Brown, J. Rick Rubin: In the Studio. 2009. Toronto, Ontario, Canada: ECW Press

Chappell, J. Prown, P. When Guitars Went Gargantuan: A Prog Rock Primer. 25.3.2008. Updated 15.11.2017. Guitar Player. Read on 5.12.2019.
https://www.guitarplayer.com/technique/when-guitars-went-gargantuan-a-prog-rock-primer

Charron, A-J., Guitar Noise, A Brief History of Progressive Rock. Read on 8.9.2019. http://www.guitarnoise.com/lessons/brief-history-of-progressive-rock/

Conrad, J. How editing can save you from a mix disaster. 21.10.2019. Musicians on a Mission. Read on 4.12.2019
https://www.musicianonamission.com/the-importance-of-editing/

Doctor Mix. How To Use Reverbs. 26.1.2017. Read on 11.12.2019.
https://www.doctormix.com/blog/weekly-injection-reverbs

Fractal Audio. Read on 2.12.2019.
https://www.fractalaudio.com/p-axe-fx-ii-preamp-fx-processor/

Fractal Audio Systems Wiki. Scenes. Read on 2.12.2019
https://wiki.fractalaudio.com/axefx2/index.php?title=Scenes#About_scenes

Hegarty, P. Halliwell M. 2011. Beyond and Before: Progressive Rock since the 1960s. New York: The Continuum International Publishing Group

Huber D., Runstein R. 2005. Modern Recording Techniques. Sixth Edition. USA: Focal Print

Hurwitz, M. Classic Tracks: Yes - Recording a Yes Classic. 6.1.2018. Mixonline. Read 3.12.2019. https://www.mixonline.com/recording/ct-yes-goodpeople-roundabout

Keller, D. Analog Tape Recording Basics. Univeral Audio. Read on 4.12.2019. https://www.uaudio.com/blog/analog-tape-recording-basics/

Keller, D. Mixing in Stereo: Adding Width and Depth to Your Recordings. Univeral Audio. Read on 8.12.2019. https://www.uaudio.com/blog/studio-basics-mixing-stereo/

LANDR. What is mastering?. Read on 11.12.2019. https://www.landr.com/en/what-is-mastering

Leviatan, Y. Making Music: The 6 Stages of Music Production. 27.7.2017. Waves Audio. Read on 20.9.2019. https://www.waves.com/six-stages-of-music-production

Macan, E. 1997. Rocking the Classics: English Progressive Rock and the Counterculture. New York Oxford: Oxford University Press

mCLUB, History of progressive rock, Read on 17.9.2019 https://mclub.wordpress.com/music-styles/progressive-rock/history-of-progressive-rock/

Major, M. Recording Drums: The Complete Guide. Boston, USA: Course Technology PTR

MasterClass 2019. Music 101: What Is Sidechain Compression? Uses, Tips, and Tricks for Sidechaining. Updated 22.10.2019. Read on 7.12.2019. https://www.masterclass.com/articles/music-101-what-is-sidechain-compression-uses-tips-and-tricks-for-sidechaining#what-is-compression

Mellor, D. What is an equalizer? (For beginners).14.7.2018. Read on 12.12.2019. https://www.audiomasterclass.com/newsletter/what-is-an-equalizer

Michelle, D. Musical characteristics. 20.7.2010. The Masters of Progressive Rock. Read on 5.12.2019 http://the-masters-of-progressive-rock.blogspot.com/2010/07/musical-characteristics.html

Owsinski, B. 2008. The Audio Mastering Handbook. 2nd edition. United States of America: Thomson Course Technolody PTR.

Owsinski, B. Excerpt of The Music Producer's Handbook. Bands: Here's Everything You Need to Know About Pre-Production. 7.12.2015. Sonicbids Blog. Read on 27.9.2019
http://blog.sonicbids.com/bands-heres-everything-you-need-to-know-about-pre-production

Practical Music Production. What is an Audio Compressor?. Read on. 12.12.2019.
https://www.practical-music-production.com/audio-compressor/

Radial Engineering. Reamp Basics. Read on 3.12.2019. https://www.radialeng.com/reamp-basics

Romero, A., Taylor, D. Progressive Rock Central, Read on 8.9.2019. http://progressiverockcentral.com/resources/progressive-rock-history/

Safford, A. Pro Audio Land. Recording: Double Tracking Guitar. 7.1.2015. Read on 2.12.2019.
https://www.proaudioland.com/news/double-tracking-guitar/

Salmi, S. Aggressive Drums, The Recording Guide, 2013

Sanneh, K. The Persitence of Prog Rock. 12.6.2017. The New Yorker.
https://www.newyorker.com/magazine/2017/06/19/the-persistence-of-prog-rock

Slate Digital. Virtual Tape Machines. Read on 8.12.2019.
https://slatedigital.com/virtual-tape-machines/

Sonible. Adding depth: How to bring your mix to life. Read 8.12.2019.
https://www.sonible.com/blog/adding-depth/

Waves Audio. 12 Essential Steps to Mixing Lead Vocals. 18.4.2018. Read on 7.12.2019. https://www.waves.com/essential-steps-for-mixing-lead-vocals

Weiss, M. 5 Ways to Approach the Beginning of a Mix. 26.10.2015. Pro Audio Files. Read on 7.12.2019.
https://theproaudiofiles.com/5-ways-to-approach-the-beginning-of-a-mix/

White, M. Music Production Guide. Read on 4.12.2019.
https://www.music-production-guide.com/editing-music.html

APPENDICES

APPENDIX 1. Havu – EP Record (Audio-CD)