

Recording with Guitar Amplifier Plugins

A Guitar Teacher's Perspective

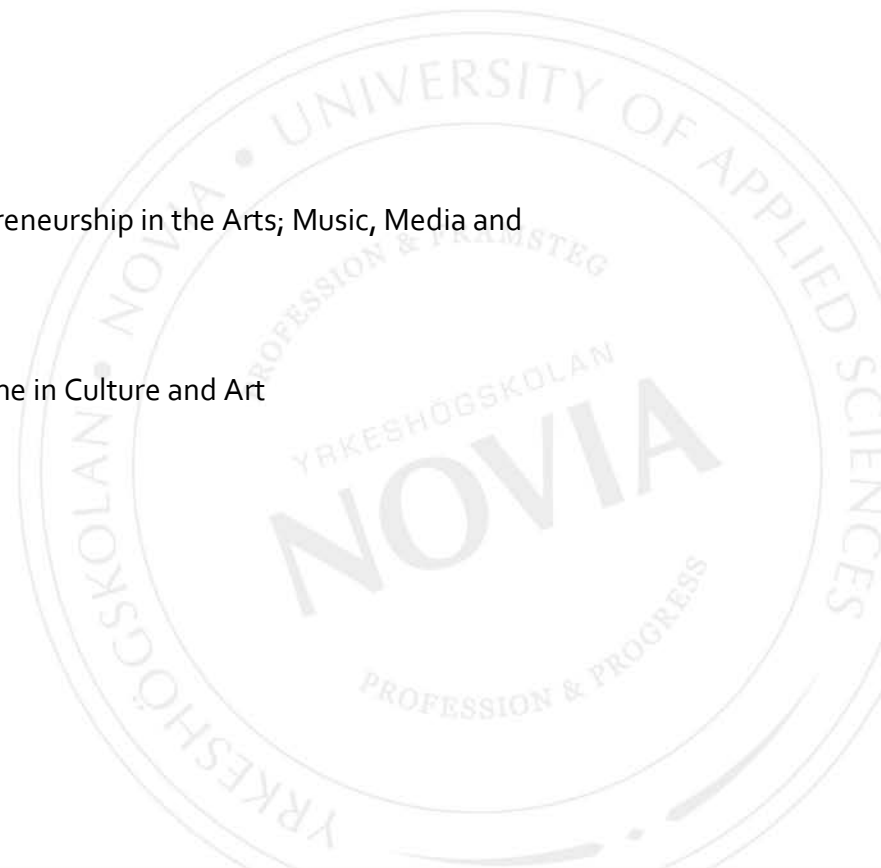
Rabbe Franzén

Degree Thesis for Entrepreneurship in the Arts; Music, Media and
Marketing

Master of Culture and Art

Master Degree Programme in Culture and Art

Jakobstad 2019, Finland



MASTER'S THESIS

Author: Rabbe Franzén

Degree Programme: Master of Culture and Arts, Entrepreneurship in the Arts; Music, Media and Marketing

Supervisor: Richard Smith and Kaj Ahlsved

Title: Recording with Guitar Amplifier Plugins - A Guitar Teacher's Perspective

Date 14.11.2019 Number of pages: 26

In this Master's thesis I compare the use of plugins and a physical amplifier and effects while recording and consider the advantages and disadvantages with a plugin. I am looking from a teacher's perspective at how recording could be used in teaching and what the benefits would be. I have recorded two versions of a song called Mr. Smith, where one can hear the differences between plugins and the amplifier.

The new basic art curriculums were renewed 2017, and one of many goals was to offer the students opportunities to get to know new technologies. Another goal of the teaching is for the students to begin producing their own musical ideas and solutions.

The aim of this thesis is to look from a teacher's perspective at the difference between using plugins and a real amplifier when recording and to gain knowledge on how to record.

This process has shown that recording in large and especially plugins could be very beneficial as a teaching tool in music education.

Language: English

Key words: plugin, amplifier, education, recording

Table of contents

1	Introduction.....	1
2	Theme and research approach.....	2
2.1	New curriculum	3
2.2	Amplifier and recording history	5
2.3	Recording at home.....	7
3	Method.....	7
3.1	Research on plugins and amplifier modelers.....	8
3.2	A Guitar teacher's perspective.....	9
4	Process	10
4.1	The song	10
4.2	My digital workstation	11
4.3	Recording with plugins	12
4.4	Guitar plugins and effects	13
4.5	Recording the melody.....	15
4.6	Recording with a tube amplifier.....	15
4.7	Mr. Smith.....	16
5	Process discussion.....	17
5.1	Plugins, advantages and disadvantages	18
5.2	Physical amplifier, advantages and disadvantages	20
6	Final discussion.....	21
6.1	Further studies.....	23
	References	

1 Introduction

For the last ten years I have been working as a guitar teacher. Besides that I have played in different bands. I enjoy teaching electric guitar and it is fun to work with young people. I work at Korsholm Music Institute. This school receives financial aid from the government to provide art education, in this case music, and it is upheld by the municipality of Korsholm. My students are mostly aged between 8 and 20, but also adults study at Korsholm Music Institute. Students come for private lessons once a week after school. They also play in bands and learn music theory. If they study hard and aspire to get an education in music, they should be able to enter for example Novia University of Applied Sciences after going through the whole study program.

Most of my students begin their guitar studies when they are young. They have grown up in an environment where digital technology is everywhere around them and is easy to use. For example, most students have smart phones which they use to take pictures, listen to music, record videos and use as a GPS. They read and send emails with it and use it as a bankcard. On tablets they watch movies or series on Netflix or HBO. They get information instantly just by being online. Everything is just a few clicks away.

During the last ten years I have noticed that, as a teacher, I am required to use the computer in my work a lot more now than previously. Students often want to show me a good song on YouTube or they have found a song on Spotify that they want to learn to play. I can recommend different artists that they should listen to and they find them on Spotify or YouTube or on some other platform. My students can easily find chord charts for most songs on the internet and they can just play along and if they need to practice improvisation they can find backing tracks in almost any chord sequence, style or tempo.

Technology is also replacing face-to-face interaction more and more. I for example keep in touch with my students' parents through different computer programs. If my students have questions and do not need an instant answer, they send a text message. The same things are happening in music technology. More and more amplifiers are digital and get regular updates. When recording music on the computer you do not even need an amplifier. You can simply use a plugin inside the recording program.

2 Theme and research approach

The aim of this thesis is to, from a guitar teacher's perspective, look at the difference between using plugins and a real amplifier when recording and consider how this new technology could be used in teaching. What are the differences and could students benefit from using plugins instead of a real amplifier in a recording situation? What are the benefits of plugins, and is there a downside? What does the updated curriculum say about the use of technology? My aim is also to question my own methods of teaching to find out if I can do something differently to make the lessons more interesting and engaging. As I am a musician and pedagogue I have knowledge of the music field. I have often found out what works and what not through learning by doing.

Society has changed a lot as new technology has been introduced on the market. Digitalization in schools is changing how we teach and use technology. Students learn how to use digital tools and they are given possibilities to be creative and to find their own way working. The use of digital tools gives the student possibilities to enhance visibility for their thoughts and ideas. And it is not only schools that are changing but also the music field has gone through enormous changes in the last decade because of digitalization. For example, at first record sales decreased dramatically because of illegal downloading. Now the customer can stream a whole catalogue of music through different streaming services and pay a small monthly fee instead of buying one record at a time.

Because the music field has changed so much, music schools also needs to change. The teaching needs to evolve so the students are well prepared if they continue to pursue a career in music. It should also change because music as a hobby competes with a lot of other popular hobbies such as sports. Music education has to be interesting, engaging and rewarding and one way to achieve that is to use more digital tools. By recording the students learn to listen to themselves critically. Recording promotes creativity and they learn how to compose their own ideas. They learn by doing and the school needs to provide the possibility for them to learn.

2.1 New curriculum

The curriculum for the basic education in Finland 2014 (Utbildningsstyrelsen, 2014) mentions how digital technology should be used and taught in class. It is called digital competence. Digital competence is an important civil skill that can be looked upon as both as a subject and as an implement for learning. All children should be enabled to develop their digital competence. Information and communication techniques are to be used systematically in all grades and disciplines and in schoolwork. Students are also taught to use digital tools as an aid in creative work.

The basic art teachings curriculum was renewed in 2017. Every music institute in Finland made new curriculums for teaching music, and separately for each instrument. The new curriculum was to get rid of all grading and the program was to become more personalized. The aim is that the studies should be more individualized and the students more able to themselves decide about their own path. Verbal feedback is increased. The guidelines from Utbildningsstyrelsen (2017, 9-58) on how to write the new curriculum state that the contents of the curriculum should evolve continuously and the organizer of the education decides what to offer their students. The studies should give the students opportunities to develop meaningful ways of expressing themselves. The learning environment should be appropriate for the subject or instrument taught, with material, equipment and the appropriate technology. One of many goals in the new curriculum is to offer the students opportunities to get to know music technology as a tool, and also to encourage the students to take advantage of the opportunities that music technology gives. Versatile ways of working are promoted by taking advantage of music technology. The new curriculum also mentions that one of the goals of the teaching is that the students will begin producing their own musical ideas and solutions. This way the students can practice basic skills in improvisation, arranging and composing. And when the students have progressed in their studies, they are encouraged to implement improvised and arranged parts in music pieces and to compose music of their own.

Being a guitar teacher, it is important to gain new information and to continue to learn. A basic understanding of how to use technology in music is vital. Recording and the use of plugins is one area that has evolved a lot. A plugin basically removes the need for a physical amplifier when recording. It is a subject that I am interested in, and I know that it

is interesting students as well. For a long time I have wanted to get more into recording and to use it as a tool in my teaching. Just using my phone to record them improvising or in a band situation to film their performance has created lots of interest. For many it can be their first time that they hear themselves play and usually they are surprised at the sound of it.

So to understand how plugins work from a student perspective, I will try to put myself in their position. An average student of mine is usually aged between 8 and 20. The student owns an electric guitar, a smart phone and a computer. If he does not own a computer, there usually is one at home. Many of my students are interested in computers and online gaming so they also have headphones, monitors etc. A student's parents will not buy expensive studio gear such as monitors or a new fast computer. But the student will not have to buy everything new, he already has some of the equipment he needs to record at home.

All this new technology is a way and possibility for students to be creative. The new curriculum (Korsholms musikinstitut, 2018, 4-5) that was approved 1.8.2018 in Korsholm Music Institute states that the teaching should support the students' growth, strengthen their personality and develop their creativity, social skills and ability to express themselves through art. Furthermore, it states that the teaching should follow its time. The curriculum underlines the students' own areas of interest and wishes and their own individual goals. The curriculum does not mention the use of technology. However it says that the teaching should follow its time and develop the students' creativity. My interpretation is that as technology evolves, new ways of teaching and various new tools can and should be used in education. Technology is advancing very quickly at the moment, and new gear and methods that suit education very well are invented. One new thing that can be used is the plugin. Music technology is not currently taught at Korsholm Music Institute, but short courses in for example GarageBand have been given. GarageBand is a free full-featured recording studio on iPad, iPhone or mac computers. It is intended for beginners who want to start to record music. It is based on Logic but has less features. When using for example GarageBand for recording, a physical amplifier is unnecessary.

By researching the difference between using plugins and real amplifiers from a teacher's perspective I will both begin to learn the technology and also, by teaching how to use the recording technology available, be able to help students to find new ways to be more creative.

I have been working as a fulltime guitar teacher for about ten years but I had been teaching part time for many years before that. My dean at work has encouraged us teachers to think outside the box, that the guitar lessons I give do not always have to be private lessons. Sometimes we do group lessons instead, thus the lessons are not the same week after week. I remember my first years of teaching. Most of the material I practiced with my students came from books and we used a metronome frequently. We still do use the metronome but now in combination with backing tracks. Students nowadays want to learn how to play more songs. We practice picking out chords from a song by ear, just listening to it. I record their playing with my phone so that they can listen to it afterwards. I sometimes tell them to record my hands while I play so that they can see clearer how to play a certain part. More technology is naturally being used in lessons all the time. That is one of the reasons I have chosen to look into the use of plugins when recording. I want my lessons to be more interesting and engaging, and I think recording is one way to achieve that. With this background I think the term "action research" best describes my work. Rönnerman (2011, 53) says that "*action research builds on the assumption that professionals themselves have the knowledge about their practice and therefore also are best suited themselves to identify areas of development/change. The operational part within the frame of action research means there are different steps in a process that can be likened with 'qualitative' research. The different steps are likened to a spiral of activities in terms of planning-acting-observing-reflecting.*"

2.2 Amplifier and recording history

Let us take a quick look back at how amplifiers and recording have changed over time. John Burnett explains in his article *Instrument Amp History* (Burnett, 2010) that the moment amplifiers became available, musical instruments became amplified. Already in the 1930s there were many variations of amplifying guitars being developed. Electric guitar characterized the sound of rock and roll in the 1950s. You can still find amplifiers that are made in the same way as in the old days and they are widely used to this day.

“Nothing is like a good tube amp” is an opinion you often hear from guitar players. There is a certain sound and feel that you expect from them. When you buy this kind of amplifier, you know what it sounds like and it stays the same year after year. If you want to record with it you put different microphones in front of it and in the room, and you crank it up because tube amplifiers often sound better when they are on higher volumes.

Today you can buy amplifiers that emulate several amplifiers. There are digital amplifiers that can copy the sound of any amplifier and sound very close to the original. You do not need any guitar effects separately, they are all included in the amplifier as well. The digital amplifier usually gets regular updates. Updates mean more functions, effects, amplifier simulations and features. Christopher DeArcangelis (2017) states that it is also worth mentioning that the Line6 pod was released in 1998. The Line6 pod is an all in one amplifier simulator that has multi-effects. It revolutionized the standalone digital studio overnight. In a small package at a very low cost it offered players a horde of accurate amp tones, both vintage and modern.

Recording equipment became more compact and cheaper in the 1980s. This kicked off a recording revolution with cassette tape that continued into the 1990s. A highly popular unit was Tascam’s Portastudio, the world’s first four-track studio. In the mid 1990s the same units went digital with hard drive and disc-based recording. In 1991 Sound Tools evolved into the ProTools software platform. This was the first true DAW (digital audio workstation) (DeArcangelis, 2017).

That leads us to where we are today. Most things can be done through the computer. A physical amp is not required any more. There are plugins on the computer that can be played through when recording. Steve Wytas (2015) who is the chief engineer at Dirt Floor studios and the owner of Audio 911 says that plugins “*are software additions for your DAW to enhance the sound of your recorded audio tracks and are 'inserted' on a channel in the mix window of your DAW program*” (2015). Under the heading *Practical Uses* Wytas (2015) explains that you can think of plugins as virtual rack gear, and if you record a guitar cleanly through a direct box for example, you can add stomp boxes and virtual amplifiers when you mix. Everything is there and more besides. You can basically put any effect on your guitar and use any kind of amp there is. This intrigues me and it sounds fantastic. All the different amplifiers and effects are a few clicks away on my computer. It

sounds very convenient and it must be cheaper than buying all the amps and effects, right? What implications does this have, is the sound for example as authentic as with a real amplifier recorded with a microphone?

2.3 Recording at home

Kyran De Keijzer who is a producer and DJ writes in his article "*Evolution of Recording*" (Keijzer, 2017) that "*There have been massive shifts in recording techniques and mediums over the last century, all of which have drastically shifted the recording industry. It begs the question, 'what happens next?'. As technological innovation proceeds to happen at an exponential rate, it's difficult to foresee the changes that are to come*". The digitalization in music recording has changed the game. More music is recorded than ever before and more people are recording in their home in a home studio environment. People are recording themselves and do not necessarily need a record deal to release a record. A record does not mean it has to be a physical record anymore, you can buy the songs digitally and download them straight to your phone.

3 Method

I will make two recordings of one of my original songs *Mr. Smith*. On one of the recordings I will only use physical effect pedals and a guitar amplifier with a microphone. All the guitar tracks on this version will be recorded this way. On the other recording all the tracks will be recorded using only plugins. By doing this I will learn about the differences between these methods of recording and at the same time learn the basics for recording with plugins. It is, in my opinion, important that I as a teacher keep up with and am able to use and teach the changing technology. This is why it is I, and not my students, who will do the recordings this time. I cannot teach recording with plugins if I have not yet learned about it myself. I simply cannot tell a student why he should record with plugins, what all the benefits are by doing it if I have no idea myself. A musician's workday has changed significantly due to the changing technology and I as a teacher need to be able to guide my students in the use of digital tools as they are vital to the musicians of the 21st century.

By recording the same song in two different ways I will find out what the benefits or disadvantages of using plugins are. Is there a noticeable difference in the sound quality? What are the main differences between these two? Which one is more cost effective and which one is easier to use and learn? There are many different opinions on plugins. Rich Tozzoli, a Grammy nominated producer that has composed a lot of music for television, says *"Both technologies—real amps and plug-ins—have their pros and cons. And, like most everything else guitar related, we all have our opinions on what's good and what's not. But, from my experience, playing to the strengths of each and using them for what they do best rather than picking one side or the other is the way to go."* As technology develops, so does sound quality. Plugins are widely used in music recording today. (Tozzoli, 2012).

The recording of my song will not take place in a music studio. The tracks will be recorded individually one by one in a home studio environment. I will record all the guitar parts. The other instruments will be recorded by two colleagues. I am only studying the difference between real guitar amps and effects versus guitar plugins.

3.1 Research on plugins and amplifier modelers

Matti Raivio (2019, 58) compares the classic analog compressors Universal Audio 1176LN and Teletronix LA-2A and the plugins that simulates these two classics. He found in his research that there are differences in the sound, but that the differences are very small. So small that it can be hard for the human ear to hear.

In his Master's Thesis (2018, 75-76) Hannu Kaitilas interviews 12 persons, musicians and people who work in the field of music. These found that plugins and amp simulators make life easier, they are useful, practical and cheap. In the interviews there were very different opinions, especially among guitar players. Some of them felt that the dynamic and feel while playing a tube amplifier was very important to them, others liked the endless possibilities of the simulator. The newer simulators are much closer to a real amplifier in sound than the early ones. Still some of the interviewed felt that there were still things that the simulator could not perform perfectly, for example the dynamic range of a tube amplifier. Most of them believe that in certain genres a tube amplifier will never be replaced, for example in blues. They felt that the use of digital amp modelers will grow in the future, but there will still always be musicians who use tube amplifiers, at

least as long as certain genres exist. The digital amp modeler was thought to work well in various genres of metal music because of their narrower dynamics, which is relatively easy to make on a modeler.

Opinions on this subject seem to be very subjective. There are advocates for both sides and also strong opinions from the users in general. Kaitila (2018, 76) concludes in his thesis that people's opinions are still the same as 20 years ago when the first simulators hit the market. The opinions being that simulators are still not quite there yet and the sound is only almost authentic. Younger people who have grown up in a digitalized world seem to embrace the new technology easier.

3.2 A Guitar teacher's perspective

It is important to point out that the studies that Raivio and Kaitila have done are from a professional perspective and the people they have interviewed are professional musicians and sound engineers. I approach it from a teacher's perspective. We are not talking about professional production. We are talking about learning to use recording technology as a teaching device and why a student of mine could choose to use plugins instead of a real amplifier when he records. My students are not professionals and do not have a big budget. They cannot buy expensive studio gear. They are recording at home with a basic computer, not in a professional studio.

My background is not digital. I have grown up with and used analog amplifiers until recent years. I am comfortable in using analog amplifiers and therefore I am predisposed to look at them as easier to use. In this way my preunderstanding may differ from my students' when I am learning to use plugins.

I will try to make my recordings with a low budget. If I look at it from a student's perspective, it is good if the technology would be relatively cheap as students often do not have a lot of extra money. To keep the budget as low as possible I will contact friends and colleagues and ask them if they want to participate in a demo and record a track at their location.

4 Process

The idea to write a song and record it in two different ways using plugins and a real amplifier and then compare the sounds was an idea that I got from a colleague. The few times I have recorded for some projects, I have always used a real amplifier and placed a microphone or two in front of it. I have used gear that I have used for a long time, which I know how to dial in the desired tone. That is also my main motivation for choosing to use a real amplifier. But these times somebody else has placed the microphone and done the settings on the computer. Although I know how to dial in the tone, it does not mean that it will sound the same way on the recording. And if you have not experimented with sound, as many students have not, it can be even harder to get the right sound. So when my colleague brought up the idea that plugins are being used a lot these days and it would be interesting to compare them, I got the idea to try them and see for myself what the differences are.

4.1 The song

I have composed a song that I will record two times. To make it as real as possible I have asked my colleagues to play the other instruments, acoustic drums and bass. The song is a 4,15 min long instrumental piece called *Mr. Smith*. My professor at Novia encouraged me to write my own music and to find my own style and tone. I had not composed very much prior to this project, therefore the song was a process of many months of trying different melodies and chords. I used my professor as a sounding board, and he threw my ideas back at me with new questions. I found working with this song to be a good way to get started, learning to record and putting myself in the position of a student. The song is a funky smooth jazz pop song. There are three different guitar tracks to be recorded. A clean guitar playing the chords, a distorted guitar playing the melody and a second lead guitar playing the solo. It makes a good testing ground for the plugins vs. amplifier because there are many guitar parts and the guitar has a leading role in the song.

Tuukka Aitoaho kindly recorded real acoustic drums for the demo. Drums were recorded in his home studio by himself, without a sound engineer. Aitoaho used the recording program GarageBand. Aitoaho sent me six different tracks:

1. Bass Drum

2. Snare
3. Shaker
4. Tambourine
5. Bongos
6. Overheads

Jonas Kuhlberg kindly recorded the bass guitar. The bass was recorded in his home studio by himself, without a sound engineer. Kuhlberg used the recording program Logic Pro X which is a program bought from the apple store that works on apple computers. Kuhlberg sent me one track with the recorded bass.

4.2 My digital workstation

For recording I will use a Mac mini that I bought back in late 2014. The computer is a 2,8 GHz Intel Core i5. It has 16 GB ram memory. This is clearly not the latest and fastest computer but it should be able to handle the work load as there are not many tracks and the production is not big. I am using Logic Pro X as recording program. There are many reason for this, one of them being that it has a lot of free plugins that I can try out and use. I will only use these plugins. There a lot of effects as well as guitar pedals and guitar amps. I have no experience in using Logic. I have almost no knowledge of recording programs in general. Apple states the following on their webpage about Logic pro X:

- All the power you need in production
- All the creativity you want in music
- A massive collection of effects and instruments

Logic promises a lot. For example, they claim that it is possible to reproduce the exact tones of the original amplifiers that they are modeled after. That it is possible to re-create legendary sounds.

To be able to record into Logic I have a sound card that is connected to the computer. With the sound card I can plug in my guitar directly to the computer and logic and access all the plugins and effects that Logic offers.

I have a set of Logitech Z3 2.1 computer speaker system from around 2004. There are two speakers and a sub-woofer. They cost around 80 € at the time. As real physical

amplifier I will use my Mesa Boogie Mark V 1 x 12 combo, the only tube amplifier I own. It is a three channel amplifier. For all recordings with the physical amplifier I will use a Shure SM7B microphone. It is a dynamic microphone used for voice and instrument recording. For effects with the Mesa Boogie I am using TC Electronics Nova System. It is a compact floor-based processor for guitar effects. I will only use delay and some reverb. This unit which came out around 2010, has analog overdrives and digital effects.

The gear used on the recording and for this test are things I already owned, except for the sound card. I wanted to record at home where I can do it at my own pace. At the same time, I wanted to learn how to use the DAW (digital audio workstation).

4.3 Recording with plugins

As previously stated, I had never used Logic prior to this. When you open the program you choose a new project. Then you choose a track type. One of them states that you can connect a guitar to your computer and record through virtual amps and pedal effects. At the same time, you can choose how many tracks you want the program to create. I have at least three guitar tracks so I chose that number. If you realize that you need more tracks after this, it is very easy to add more and you can choose what kind of track you want to add and how many.

As I installed the Focusrite sound card, I did everything as explained and even watched four different videos on how to connect the setup, but I did not get any sound from the speakers. I tried different solutions, tried to troubleshoot and find an answer online but without success. It was still silent. Finally a friend came over to help me find the reason. It turned out that I had the wrong input selected in Logic, which resulted in no audio. Easy to fix if you know where the problem is.

My colleagues sent me the files with the drums and bass tracks through a program called WeTransfer. It is a free online program that allows you to send files. You simply write the receivers email and send the files and the receiver can download the files to their computer. You have one-week time to download the files. It is a very simple and fast way to send big files.

I quickly understood that the tracks that were sent to me automatically open in the same program with which they were recorded. Those recorded with Logic automatically open in that, but those recorded with GarageBand do not open in Logic but automatically open in GarageBand. So when I opened the drum files, they opened in GarageBand because the drummer used that program. I had to find the files and drag them into Logic, into my project (see Figure 1)

4.4 Guitar plugins and effects

After the soundcard is installed and you have added a track to record on, it is time to click on the Library button in Logic. There you can choose instrument, so I choose electric guitar. There you find different options on amplifiers and what sound you are looking for, clean, crunch, distorted, experimental etc. I needed a distorted sound for the melody so I clicked on that. There are 38 plugins with a distorted sound. I chose a sound called midrange solo which seems to be based on a Marshall amplifier.

A small picture of the amplifier you choose appears before the track you record. On the track for midrange solo you can click on a button called *Amp*. A picture of the amplifier appears (see Figure 2). The name of the amp is Logic but the amp type is Vintage British head. It looks like a Marshall amplifier from the 1970s. If you click on any of the knobs of the amplifier pictured and hold the mouse button down you can turn the knobs as you do on a real amplifier: gain, bass, mid, treble, presence and master. This head also has effects, reverb with a level control and a tremolo/ vibrato effect with speed and depth controls.

There is also a picture of the cabinet you are using to the right of the amplifier head. You can choose between 26 cabinets: different tweed, blackface, silverface, brownface, modern American cabinets, 1x12, 2x12, 4x12 etc. There are seven microphones to choose from, two condensers, four dynamic and one ribbon, and you can choose where you want to place it in front of the cabinet. I set up the sound so it sounded good to my ears. I used a Boutique Retro 2x12 cabinet with a Condenser 414 microphone in front of it. I do not know the official or "proper" method for this, I simply go by the sound I hear. There are many knobs to turn and small switches you can flip that change the sound. The range of possibilities is overwhelming.

I noticed that the program automatically puts on different effects depending on which amplifier you choose. Midrange solo has noise gate, a pedal board in front of it, a channel EQ, compressor and an echo and delay. If you want, you can change the pedals on the pedal board and also the order in which they are arranged (see Figure 3). There are 33 pedals to choose between to modulate the sound: distortion, pitch, modulation, delay, filter and more.

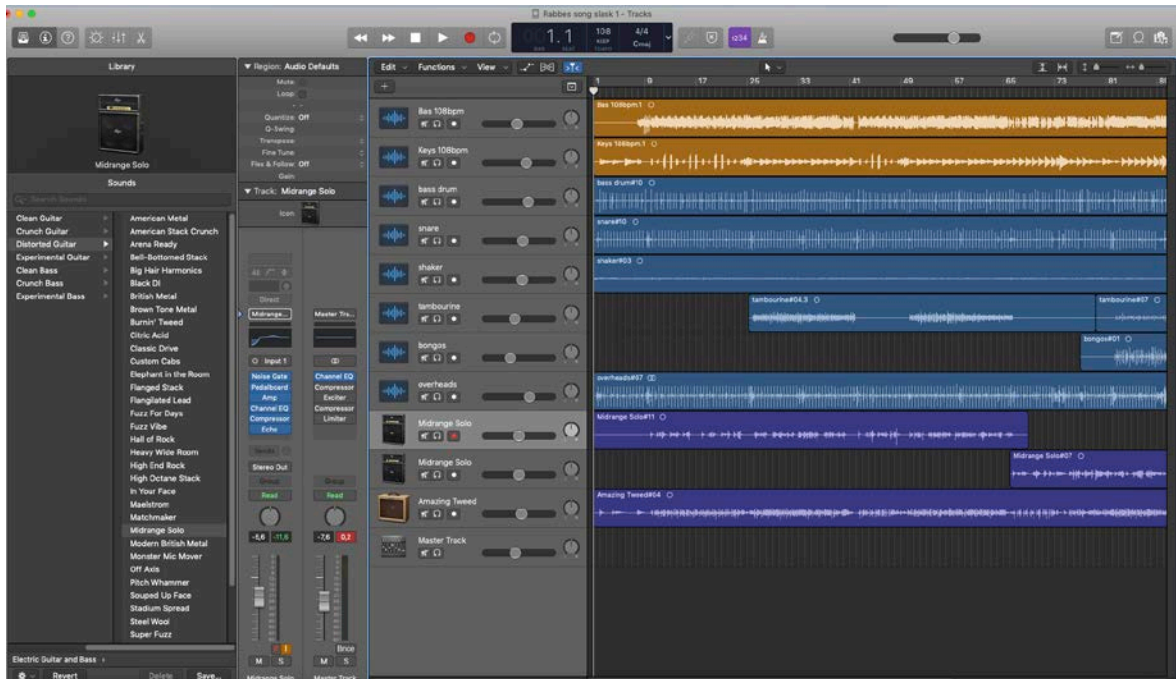


Figure 1. Logic worktable with soundtracks

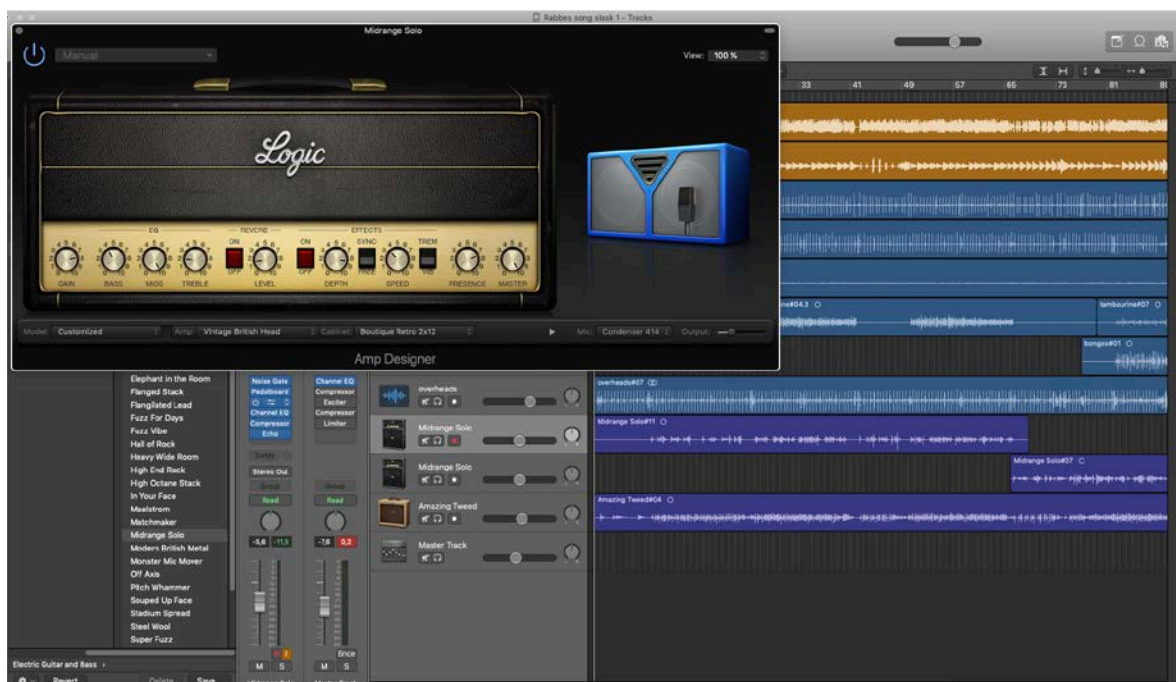


Figure 2. Plugin amplifier in Logic



Figure 3. Pedal board in Logic

4.5 Recording the melody

It was a demanding process to get the desired tone. There are so many possibilities and as a beginner it is hard to know which buttons to press. Also, I had to record everything in one take because I did not know how to cut and paste the tracks together. But after a while when I had tried to click on a lot of buttons, I learned that by using the scissor tool on the highlighted track I could erase certain parts and redo just that part instead of the whole song. It made everything a lot easier. I recorded the melody twice, the first version I sent to the bass player Jonas Kuhlberg, so that he could record the bass. He wanted to know what kind of feel the song had, and it is of course easier to record when you hear the melody. When I recorded the chords I found a clean sounding amplifier called Mini Tweed Amp. I used the Tweed 1x10 cabinet and a Dynamic 421 microphone. It was the same with this amplifier. When you choose it there are a lot of effects available and a pedal board in front of it. I had a click on when I recorded as it felt easier to get it right.

4.6 Recording with a tube amplifier

When I record with a real tube amplifier I want to be able to have it fairly loud. A good amount of volume opens up the sound. Because of that I needed to put the amplifier in another room. I had two doors between the amplifier and my recording spot. I put the

Shure SM7B microphone in front of the amplifier. I used the TC Electronics Nova System for effects. There were a lot of cables leading from the room where the amplifier was to the room where I recorded, and because of that I could not close the doors. That meant I both heard the amplifier from the monitors and also some from the room through the doors.

Again I had trouble to get the sound adjusted so I could hear the guitar through the speakers. I chose a new track and recorded using a microphone or line input. The signal was very weak and it sounded very distant. I checked the Focusrite control panel, input settings and everything seemed right. Nothing changed when I changed the settings. This went on for quite some time until I realized I had to turn up the volume on the soundcard to hear the guitar well. After this, everything worked out fine and there were no further problems.

I set up the TC electronic effect unit with delay. I changed the settings, tried to get a delay that is not so long and loud but a fine delay that would not obstruct the melody. The hard part was to set it right because when I recorded it, it sounded different to my ears. And for the solo I wanted more delay and so I needed to change it again. The difference here is that for every time I needed to change something I had to get up and make the change on the TC electronic. With a plugin I just make the change on the computer, which is obviously less time-consuming.

4.7 Mr. Smith

The result of my recording can be found here: <https://youtu.be/rDBANoDOwao>

5 Process discussion

In my thesis I have approached plugins and amplifiers from a teacher's perspective and I wanted to find out the differences between using plugins and using a real amplifier with a microphone when recording music. I wanted to discover what the differences are and if the sound and nuances of a tube amplifier can be replicated by a plugin on the computer.

As seen from previous publications on similar subjects, people feel that the sound is very similar. There are only small differences, so small that if you do not think about it you are unlikely to recognize the difference. Many felt that modelers worked well, especially in metal music, because of the compressed sound. In more traditional styles, like blues, there is an obvious place for a tube amplifier because the nuances and feel are not quite there yet with a modeler. Guitar players are very conservative and if you have grown up with the sound from a non-digital age, it is more difficult to embrace new technology, mostly because of how a modeler or plugin feels to play, but also because of how it sounds.

The interviews done in the previous studies are opinions from professional musicians and sound engineers, people who have been working professionally for many years. My study is from a novice's perspective. A student who has not used the technology very much and is just beginning to record music on his own in a home environment. As a beginner you do not know exactly how to shape the sound to your liking. As a student you do not have the latest and best equipment. You use what you have at home and it is usually not the same quality as you find in professional studios. Often the equipment you have at home was not specifically designed for producing music.

For me there was a lot to learn as many things were new to me. When something did not work my way, I watched videos on YouTube to figure things out or tried to find the right topic on different forums. Often it was hard to find the answers on the forums. The problems were usually some setting that was not right. I was fortunate to have a friend who came over to help me figure out some problems.

Maybe GarageBand, which essentially is a lighter version of Logic, would have been a good recording program to begin with. The problem with GarageBand is that you do not have as wide a range of plugins to choose from. I think it would have been a good thing

to buy at least one plugin to see if they are significantly better than the ones I had in Logic. Logic had several different plugins to choose from and that was one of the reasons I did not want to buy any. That is also why it seemed like a better idea to use Logic from the beginning. When I got used to the program a little bit, it worked well for me. Getting the files together into the project was relatively simple. Still, I know there are a lot of things I do not know how to do and that I must learn. It can be very frustrating to know what you want to do, yet be unable to achieve it, simply because you do not know the program well enough. This was the case for me on many occasions.

For a student it would make sense to begin with GarageBand, as it is simpler. There the student can record demos and try out different things. I also understood quite quickly that it makes everything easier when you can call someone and ask for assistance instead of sitting for hours trying to figure something out by yourself. Because usually it is some setting that is the problem and that is quickly fixed if you know where to look.

5.1 Plugins, advantages and disadvantages

Working with the plugins was convenient. There were an unbelievable amount of options and configurations. You can combine different amplifiers with different cabinets, place the microphone where you want and replace it with a different one if you are not satisfied. Then you can start to put different pedals and effects on the pedal board. Rearranging pedals in the signal chain or changing the amplifier or microphones is very easy. You can basically do anything you want. All you need in order to record is a computer and a sound card. There is no time wasted on walking back and forth to a separate room to change settings on the amplifier or changing the position of the microphone. It basically takes up very little space when you work with plugins.

If you think about how many amplifiers you have in your computer with plugins, it is a really cheap way to record compared to having to buy physical amplifiers. It would cost tens of thousands of euros just to buy all the amplifiers and cabinets, even without counting the additional cost of pedals and microphones. The plugins I have used are all in Logic, but if you do not find anything you like you can always buy different plugins separately, which is also an option to consider if you are not satisfied with the sound. There is often a trial period so you can try them out before buying them.

When you record with plugins they sound the same on any volume. You do not have to crank up the volume for them to sound better. You can record in the middle of the night and you will not disturb your neighbors as you do not have a tube amplifier to crank up. You just put on your headphones and you are in the studio. The sounds from plugins are very good so the listeners do not usually think about whether or not a real amplifier was used or not when recording a certain song.

There is a bigger chance that you experiment more when you record with plugins. You can come up with unusual combinations of amplifiers and pedals which leads to unique sounds that you would almost never come up with or be able to achieve otherwise as you do not have the physical gear. You can build different rigs and store them on your computer. That means you can recall the sounds you want in a matter of seconds, there is no need to adjust knobs on the amplifier or rearranging pedals.

What made it hard for me were that there are so many options and settings. You can sit for hours and try different things and try to get a better sound. After a while everything begins to sound the same, so you really have to know what kind of sound you want and how to shape your sound to get it right.

One thing that felt strange was to play through monitors instead of a guitar amp. The touch and feel while playing felt flat. The sound was very even all the time. It did not respond the same as a physical amplifier. The fine details and nuances were not there in my opinion. The sound was satisfactory but it did not feel as if you were playing through an amplifier. I am fully aware that there can be different reasons for this. For example, I do not know how to properly set up the sound. My monitors are old and cheap and not made for music production.

For someone that has not worked with computers there is a lot to learn. You have to know how Logic works, and how you use the plugins and setup the soundcard so you can use them. If there is a problem, it can be hard to find what it is and which setting to change to fix it.

It is good to learn how to record and use plugins because they are here to stay. As technology moves forward so will plugins and they will sound even better with additional updates.

5.2 Physical amplifier, advantages and disadvantages

You know your amplifier and how to set up the sound you want. It does not take long to do it. It is always easier to play with your own equipment. Your amplifier is easy to play on, you know how it reacts regarding dynamics and touch. It is more hands on. You do not have to experiment so much with different settings, you just set up the amplifier and the sound you like and press "record". When you do not have many amplifiers and around 30 pedals to choose between, you work with what you have. You play better with your own gear and that also makes you a more confident player. That in turn makes you more relaxed and you play better still.

On the other hand, you do not have as many options with a physical amplifier as with plugins. There can be a lot of walking between the rooms if the amplifier is in a separate room. You have to change the settings on your amplifier or change the position of the microphone. Then you record short clips and listen to them and you go back again to change something. It can also be very loud and disturb people if you record at home close to family members or neighbors.

When you record with an amplifier you get the natural sound of the room from the microphone. Depending on where you place the microphone and the size of the room you get natural reverb. You can setup many microphones in the room to get different sounds. Still there is no guarantee that it will sound good just because you record with a real tube amplifier. If you do not know where to place the microphones and how to do the setup it will not sound good.

It can be very expensive to have all the gear if you want different setups of amplifiers and cabinets, combos, choice of microphones and pedals etc. Especially when it comes to the cost of vintage rare tube amplifiers and pedals, the sky is the limit.

6 Final discussion

As we can see there are differences between recording with plugins and with a physical amplifier. After having learned the basics of the recording program it is not more difficult to record with plugins than with an amplifier, but if we look from a beginner's perspective there is a lot to learn either way. Getting equipment connected to the computer takes time and is an acquired skill. Troubleshooting is another thing. If something does not work, it is good to know where to look for help. There are a lot of forums and answers on the internet but to find the topic is not always easy. In the end it is good to have a friend or someone else to ask for support. The problem is usually easy to fix for someone who knows the program. This is a good reason to teach the basics of the program in a music school environment where students can ask for advice when something is difficult.

It is very clear that if you are new to recording it does not matter if you use plugins or a real amplifier. It is equally hard to dial in a good tone on the computer as on the physical amplifier. As recording was new to me, I had trouble getting a good tone from my physical amplifier although I otherwise can dial in the tone that I want when playing live. It did not sound the same when I listened to the recording. I tried to move the microphone around but it did not make significant difference. When I recorded with the physical amplifier the sound also came from the monitors and it felt a little flat and even. The main reason for that might be that I am a beginner so I do not really know how to set up the sound.

To set up a studio at home for recording does not have to be expensive. If you have a computer, which most students do these days, it will probably work well. You can use your gaming headphones or buy a cheap pair if you do not have monitors. There are free recording programs to download and there is often a light version of a recording program included when you buy a soundcard. If you go with plugins, you do not have to buy a microphone or an amplifier.

Recording your own ideas is helpful. You hear your own playing in a different light when you record. You become more aware what kind of sound you are using. It is easier to hear what is not good. For example, to play in time is often a big thing for students when they hear themselves play and they are sometimes shocked by how bad it sounds. It also spurs your creativity to be able to try out different things, you create your own sounds by

combining pedals and amplifiers you could not normally use. I really think this is something that could help younger students become really enthusiastic about playing. Combining technology with music could make playing an instrument more interesting to young people. We need to show young people that learning is not boring. I also think that recording and coming up with your own ideas fits the learning aims of the new curriculum very well. The new curriculum states that the teaching should support the students' growth, strengthen their personality, develop their creativity and social skills and to help them express themselves through art. Furthermore, it states that the teaching should follow its time and preserve and develop the national culture of arts. The curriculum emphasizes the students' own areas of interest, their wishes and own individual goals. For example, working on a song with another student develops your social skills. Recording your own ideas and music is a way to express yourself through art. Trying out and coming up with your own sounds and ideas develops your creativity. There are a few things that possibly could be negative about introducing plugins to students. If you record by yourself at home, you actually often end up playing your instrument less. You spend so much time shaping your sound and looking at small details that the instrument practice suffers from it as a result, and it will probably therefore be difficult to reproduce the song live. Working and practicing together in a band is socially good for students. You discuss with the band what works and what does not. It is completely different to play in a band and to have to compromise than to decide everything yourself at home while recording.

As this was the first time that I had used plugins I have to say that I am very impressed. It came as a surprise to me how easy it was to record with them. The possibilities are endless for a relatively cheap price. Some aspects of touch and feel were not completely there in my opinion. One reason could be the monitors, as the difference was very small. You do not have to get up to change anything in another room, which often was the case when recording with the amplifier. If you know what kind of sound you need it is easy to find and tweak to your taste with effects. And the sound is so close to that of the physical amplifiers that you do not hear or think about the difference. Plugins do not take up any space in the room as amplifiers tend to do. You can save your sounds on the computer and recall them instantly when you need them. The plugins will get updates so they will continue to improve. A good thing to think about when recording with plugins is how to

play the song live, and whether the sounds you are making with plugins can be produced with a real amplifier or not.

This process has been very interesting and beneficial to me. I have spent many hours learning how to record and using plugins and looking into why something is not working as it should. After you get over the first obstacles it gets easier. I have learned so much but I realize that there is still so much to learn. The process of composing, arranging, recording and perfecting has been very rewarding and enjoyable. You hear your own composition from beginning to end. Considering that I have learned so much these last months, I think a student can also benefit greatly from similar projects. I have discovered many new tools that I can use as a teacher that will make the lessons more interesting and diverse.

6.1 Further studies

It would be good to interview young students in music to hear what they think about recording and if, in their opinion, it is more creative or inspiring to work that way. Another relevant question is how learning and using recording with plugins affects the students' learning of their instrument.

It would also be interesting to hear the thoughts of other music teachers and to find out how many of them use technology in their teaching and why. Furthermore, it would be valuable to compare bought plugins to those that are free and already in the recording programs and see how much they differ in quality.

References

Apple logic pro X, 2019. [Online]

www.apple.com/logic-pro

[Hämtat: 8.9.2019].

Kaitila Hannu, 2018. *Kitaravahvistimien digitaalimallinnus putkitekniologian korvaajana.*

[Online]

https://helda.helsinki.fi/bitstream/handle/10138/236376/Kaitila_Hannu_Pro_gradu_2018.pdf?sequence=2&isAllowed=y

[Hämtat: 6.8.2019].

Keijzer, Kyran,. 2017. *Evolution of recording.* [Online]

<https://www.nrgrecording.com/post/the-evolution-of-recording>

[Hämtat:10.3.2019].

Korsholms musikinstitut, 2018. *Läroplan för grundläggande konstundervisning.* [Online]

<https://www.korsholm.fi/assets/MUSIKINSTITUTET/Laroplan-KONST-sv.pdf>

[Hämtat: 9.11.2019].

Mark V | MESA/Boogie. [Online]

<https://www.mesaboogie.com/amplifiers/electric/mark-series/mark-five/index.html>

[Hämtat: 22.7.2019].

Raivio Matti, 2019. *Analogisten kompressorien ja niitä mallintavien ohjelmistoliitännäisten subjektiiviset ja objektiiviset eroavaisuudet*. [Online]

https://helda.helsinki.fi/bitstream/handle/10138/302991/Raivio_Matti_Pro_gradu_2019.pdf?sequence=2&isAllowed=y

[Hämtat: 7.8.2019].

Stent Elliot, 2019. Are guitar plugins better than amps for recording. [Online]

<https://blog.andertons.co.uk/learn/are-guitar-plugins-better-than-amps>

[Hämtat: 6.10.2019].

Tc electronic Nova system. [Online]

[https://www.tcelectronic.com/Categories/Tcelectronic/Guitar/Effects-Processors/NOVA-SYSTEM/p/PoCLX#googtrans\(en|en\)](https://www.tcelectronic.com/Categories/Tcelectronic/Guitar/Effects-Processors/NOVA-SYSTEM/p/PoCLX#googtrans(en|en))

[Hämtat: 11.9.2019].

Tozzoli, Rich, 2012. *Pros and cons of real amps VS. Software amps*. [Online]

https://www.premierguitar.com/articles/Pros_and_Cons_of_Real_Amps_VS_Software_Amps

[Hämtat: 12.3.2019].

Rönnerman Karin, 2011. Aktionsforskning – kunskapsproduktion i praktiken. I S. Eklund (Red.) *Lärare som praktiker och forskare – Om praxisnära forskningsmetoder* Stockholm: Stiftelsen SAF i samarbete Lärarförbundet.

Utbildningsstyrelsen. 2014. *Synen på lärandet*. [Online]

<https://eperusteet.opintopolku.fi/#/sv/perusopetus/419550/tekstikappale/426526>

[Hämtat: 9.11.2019].

Utbildningsstyrelsen. 2017. *Taiteen perusopetuksen laajan oppimäärän opetussuunnitelman perusteet 2017*. [Online]

[Hämtat: 9.11.2019].

Wytas, Steve, 2015. *A complete guide to plug-ins for your home studio*. [Online]

<http://performermag.com/home-recording/recording-plugins-apps/a-complete-guide-to-plugins-for-your-home-studio/>

[Hämtat: 12.3.2019].