



Høgskulen på Vestlandet

M120MU513: Masteroppgave

M120MU513

Predefinert informasjon

| | | | |
|-----------------------|-------------------------------|------------------------|----------------------------|
| Startdato: | 12-11-2018 10:57 | Termin: | 2018 HØST2 |
| Sluttdato: | 15-11-2018 14:00 | Vurderingsform: | Norsk 6-trinns skala (A-F) |
| Eksamensform: | Masteroppgave | Studiepoeng: | 60 |
| SIS-kode: | 203 M120MU513 1 MA 2018 HØST2 | | |
| Intern sensor: | Kari Mette Holdhus | | |

Deltaker

Kandidatnr.: 2

Informasjon fra deltaker

Tro- og lovetklæring *: Ja

Jeg godkjenner avtalen om publisering av masteroppgaven min *

Ja

MASTER THESIS

What's stopping you?: A multiple case study of impediments to incorporating music technology in Norwegian schools

Hva hindrer deg? Et multiple case studie om hindringer ved inkorporering av musikkteknologi i Norske skoler

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November 15th 2018

I confirm that the work is self-prepared and that references/source references to all sources used in the work are provided, cf. Regulation relating to academic studies and examinations at the Western Norway University of Applied Sciences (HVL), § 10.

Abstract

In a world where technology evolves rapidly, with the creation of more powerful software and hardware than ever before, the increasing selection of technology available to the consumer has implications for education. This raises an important question: Why is music technology not more widely incorporated into Norwegian schools when there are numerous technological products designed for educational purposes? This study explores four cases of music technological products: *Rocksmith 2014*, *Soundation*, *GarageBand* and *Skoog*. They create the foundation for the study's discussion.

Through interviews with four music teachers in Norwegian primary and lower secondary schools, the study explores what the participants see as impediments to utilising these specific products, as well as music technologies in general. In analysing the interviews, themes emerged from their statements, revealing four factors as impediments: *expense*, *accessibility*, *attitude* and *usability*. The findings suggest that none of the four factors is necessarily more important than the others, and each can potentially stop the entire process of acquisition and incorporation of music technologies in schools. Further, the factors of other agents besides the music teachers themselves plays a vital role in this process, such as the school's administration or characteristics of the municipality.

The results of the study identify several subjects for further investigation, such as sociological aspects surrounding upbringing and influence, public document investigation and investigation of the companies that make such technologies.

Abstrakt

I en verden hvor teknologi utvikler seg raskt, der det blir laget kraftigere programvare og maskinvare enn noen gang tidligere, har det økende utvalget av tilgjengelig teknologi for forbrukeren implikasjoner for utdanning. Dette ga grunn for spørsmålet: Hvorfor er ikke musikkteknologi mer innlemmet i norsk skole når det finnes flerfoldige musikkteknologiske produkter utviklet for utdanningsformål? Denne studien utforsker kasusen til fire musikkteknologiske produkter: *Rocksmith 2014*, *Soundation*, *GarageBand* og *Skoog*. De danner grunnlaget for studiens diskusjon rundt temaet.

Gjennom intervjuer med fire musikk lærere i norsk barne- og ungdomsskole, utforsker studien hva de anser som hindringer for å ta i bruk disse spesifikke produktene, så vel som andre musikkteknologiske produkter generelt. I analyse av intervjuene, dukket det opp temaer i utsagnene og fire faktorer ble etablert som hindringer: *utgifter*, *tilgjengelighet*, *holdning* og *brukervennlighet*. Resultatene indikerer at ingen av faktorene nødvendigvis er viktigere enn de andre, og de kan individuelt stoppe hele prosessen av anskaffelse og innlemmelse av musikkteknologi i skolen. Videre har faktorene til andre agenter enn musikk lærerne selv også en avgjørende rolle i denne prosessen, slik som skolens administrasjon eller kommunens funksjoner.

Resultatene av studien identifiserer forskningstema for videre forskning, slik som sosiologiske aspekter rundt oppvekst og påvirkning, studie av offentlige styringsdokumenter og undersøkelse av selskapene som lager musikkteknologiske produkter.

Preface

This study was written as the conclusion of my master programme in music education at Western Norway University of Applied Sciences. It has been a very bumpy road, and many significant changes had to be made to the structure, focus and purpose of this project during its course, often seemingly due to factors outside my control. While at times, the task of completing the study seemed like it was far away. The fact that I will no longer find myself practically inhabiting the study hall, especially during the last few stretches, appears surreal.

I would like to thank my participants. At a time when the project was dawdling, as the process of acquiring willing individuals proved difficult, the interviews with them aided the project further along its path. For that, and their allocation of available time to this project, I am grateful.

I would also like to thank those in my proximity, fellow students, family and friends for enduring complaining and frustration vented by myself at various occasions. Without their support, encouragement and aid in the pursuit of participants, I am unsure of how the project would have continued.

Further, I would like to thank my supervisor, Professor David Gabriel Hebert. His words of encouragement, support, guiding and asking tough questions where needed was crucial to the completion of this project, and I am grateful for his dedication of hours, irrespective of geographical location.

Finally, I would like to thank my partner, Sara. For both support and motivation, I am truly grateful. Your constructive feedback and aid provided me with an extra set of eyes where one pair would not suffice.

November 2018

Sondre Emil Skavhellen Brudvik

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1. Introduction

1.1 Background and rationale for thesis

In the recent years, the focus on music technology in an educational context has received more and more attention and focus. While sound recording technologies have been "...the biggest technological change effecting music education in the past one hundred years" (Brown, 2007, p. 3), he notes that the most visible technological change is that of computer devices. This is increasingly reflected in more and more articles and research discussing the place, capabilities and purpose that music technology can (and should) have in our modern society. Despite being something that arguably should be considered the norm, research shows that there are many factors at play that cause both technology and music technology to not be welcomed into the educational society and society in general the way that many see fit. They have, however, become a vital part of the educational context, especially for the students. Youth today, due to their comfort with technologies, are commonly known as "digital natives", and most of them have smartphones which they actively use for various tasks (Bauer, 2014, p.5). As this thesis will demonstrate, many adults are afraid of using technology, which creates a gap between the two groups of prospective users.

Music technology is presented to us in numerous ways and using different platforms. Its evolution from simple audio manipulation devices to mainstream video games has arisen seemingly from nowhere, and is now so common that one might not even stop to consider the possibilities that for instance lie within a laptop, tablet or even smartphone. In the early 2000's, musical recording programs and computer power which now inhabit one's less than 2 cm-thick laptop, were only found within the walls of a professional recording studio. Hardware and software for tens of thousands of dollars were big, some even spanned to meters in width. They often required immense patience in many cases to find ways to understand and to be able to use properly.

Today, your everyday Joe has the possibility to come home from school, open his laptop and compose, record, put together, mix, master and export a complete song before dinner is ready. Such possibilities are something many youths have taken advantage of, giving them a fair chance of competing in the international music business along long-time artists, DJs, and producers from all over the world. Local examples from Bergen include Kygo and Alan Walker

who both started making music on their laptops in their bedrooms and are now international stars with gigs all around the world.

When I grew up, I tinkered with different kind of music technology workstations (hereby abbreviated as DAW - Digital Audio Workstation) like ReBirth, Cakewalk or Nuendo at home, while music lessons at school contained classical music listening and playing the recorder. Our digital learning in primary school consisted of how to use Microsoft Word and doing basic Google searches for subjects we had to write a short paragraph about. I acknowledge that this was in the early 2000s and that the pupils today have a vastly different array of curricular goals, possibilities and tasks than what was available to me at that time. While the computer is a tool capable of many tasks, especially when connected to the internet, it also opens up a new array of possibilities, both for educational and creative purposes (Brown, 2007). Compared to classic teaching products such as whiteboards or audio equipment that are specific, stable and transparent, equipment like the computer is characterised as protean, unstable and opaque (Koehler & Mishra, 2008, p. 7), presented in Bauer (2014, p. 10). The point is, however, that such software as the DAWs mentioned above, even in a light form in some cases, was available for use, but still not widely utilised in schools. This appear to be the case elsewhere as well, such as the US. Dorfman (2008), presented in Bauer (2014, p. 9), queried music educators on the frequency of professional technology use and student learning. A small portion reported regular personal use, and the usage with students was reportedly even smaller, even though they reported being comfortable with technology products.

Datamaskinen har nådd en utbredelse det var vanskelig å forestille seg for få år siden, samtidig som den har legitimert sin tilstedeværelse på flere og flere livs- og kulturområder, herunder folk flests mangslungne forhold til musikk. Og med dette er scenen også satt for at personer med annen bakgrunn enn som utøvende musikere i stor grad har kunnet innta det populærmusikalske feltet.

[The computer has reached a propagation that was difficult to imagine a few years ago, while it has legitimized its presence in more and more areas of life and culture, including most people's multifaceted relationship with music. And with this the scene is also set for people with a different background than practicing musicians to have largely been able to occupy the popular music field.] (Dyndahl, 2002, p. 39)

This project is intended to explore the field of music technology through the eyes of music teachers - more specifically how Norwegian music teachers in primary and lower secondary schools perceive music technology today. The reason for this is that while the availability of music technology increases to what seems no end, the potential for such technologies in schools appears in many cases to be left untapped, unused, ignored or drastically underused. Both the national and local curriculum plans have incorporated music technology into their goals, explicitly stating that the teachers need to teach students to use technology. For example, after completing the 7th school year, students are required to compose and record using digital tools (Utdanningsdirektoratet, 2006). It should further be noted that The Norwegian Directorate for Education and Training has incorporated digital skills as one of its basic skills, along with reading, writing, oral skills and numeracy in the same curriculum. Areas of focus within digital skills are that the student can *search and process, produce, communicate* and exert *digital judgement* in and with the use of digital tools (Norwegian Directorate for Education and Training, 2012). However, “digital tools” can refer to a lot of different things, and a delineation will be presented shortly. Students could merely use the "record"-function on their smartphone to record themselves playing or digitally play simple scales or compositions on an instrument such as piano or guitar on their smartphones. After finishing the 10th year, the goal becomes more specified: to use digital recording equipment and music programs to manipulate sound and put together one’s own compositions (Utdanningsdirektoratet, 2006). Despite that the terms “music technology” and “technology” are generally incorporated into the school's program, there is little research done in terms of exploring the teacher's viewpoint to this evolution and utilisation of such products. A complete rationale for the choice of method is presented in chapter 3.

It is important to delineate and define the term music technology within this context, as it can bear different interpretations based on who is asked and what aspect is focused on (Bauer, 2014, p.4). It can be understood as tools, objects or things, while also allowing interpretation towards the epistemological aspect of the word technology, taking into consideration the history of music making (Ruthmann & Mantie, 2017, p. xiv). Himonides (2012), presents how technology can be perceived as the general development of tools or musical instruments dating back to the first bone flutes. Brown (2007) characterises the first drums, harps or horns as clear examples of technology. How the technology is used, further describe its possibilities. When used as a tool, Marshall McLuhan, cited in Brown (2007, p. 7), characterise it as extending human capability. The researcher’s biased definition of the term within the context of this project is

delineated to products found on modern platforms such as mobile devices, tablets, computers or consoles that focus on creating, playing or doing music.

For data collection in this study, music teachers were recorded while discussing music technology as well as specific products. By seating two teachers together and showing them either music technological products or advertisements, the aim was to spark a conversation between the teachers on the subject at hand. It was assumed that by doing such a session more than once with different teachers, the result would be comparable statements, arguments, examples and thoughts on the use of music technology in the classroom and music technology as a field, term and subject. These discussions would give more than enough data for a unique analysis that could be illuminating this subject. It was vital for this project to inform the participants that this project was meant to be *free*, in that they are asked their thoughts, statements in their own words and general discussion as if it was just another setting where colleagues met over a coffee to chat about their day. Effort was put into making this the case, but it needs to be acknowledged that 100% normal behaviour is impossible to achieve in a research setting. This being that the participants were aware of their role and may or may not speak or act exactly as they normally would, a phenomenon that is commonly referred to as the *Hawthorne Effect*. The stressing of *in their own words* is necessary so that the participants would not seek to repeat curriculum plans and dictations on how the subject should be handled, but rather resort to their own opinions, language and structure of speech.

To spark conversation between the teachers, they were introduced to four products, all considered to be relevant examples of music technology in various forms. These cases were picked based on a personal perception of their actuality, usefulness in a school setting, and how easy they would be to procure for the interviews. The music teachers were not asked prior to the interview whether they had any knowledge or experience with any of the products so that appropriate products based on their experience could be found. The four common music technology products are: Scoog, Soundation, Rocksmith 2014 and GarageBand.

1.2 Purpose and research questions

The larger purpose of the thesis is to explore why music technologies are not more often used in Norwegian school music programs despite the fact they appear to be so accessible in a domestic environment. This concern sparked specific sub-questions which focus on the restrictions, enablers or modifiers that are perceived by teachers when it comes to using music technologies in their teaching. This study seeks to explore whether these factors are something that is out of the reach of the teachers, such as administrative guidelines, laws or regulations, or whether it had more to do with the teachers' lack of familiarity or comfort with new technologies, whether the products are poorly marketed to teachers, or whether attitudes are due to limitations of the products themselves.

The central questions guiding this research are: *Based on interviews and clinical observations of four Norwegian music teachers, what can be learned about their (a) ways of describing music technology and its relevance to education, (b) attitudes towards specific music technology products, (c) and perceived impediments to utilisation of the example products and similar music technology products in schools.*

1.3 Prospective concerns with the design

One early concern in the design of this study was that this interview arrangement might guide the participants too much in terms of the language they would use in their answers. Such a guide would maybe lead them into saying what they thought they "should" say. Most preferably, it would be ideal for research purposes (with the objective of assessing their perceptions via natural discourse) if they would talk as they would in any other informal situation, instead of reacting as they thought might be perceived by the researcher as "correct". That is why the verbal interaction between teachers is especially sought after in this study.

This study is meant to be as natural as possible, but it is nevertheless constructed clinically in order to produce knowledge and information suitable for discourse analysis. This means that it is impossible for the situation to be completely natural. The aspect of the observer effect, as previously mentioned, commonly known as "the Hawthorne effect" is also at play. This entails that the participants know that they are being monitored, or watched and are prone to altering their attitudes and behaviour. The movie *Kitchen Stories* from 2003, where an observer is sent out to map out an elderly man's kitchen habits, shows this effect in action. Nevertheless,

qualitative case studies of this kind are increasingly recognised as capable of producing important new insights, even if they are imperfect and not statistically generalizable.

1.4 About each of the technological products

Music technology is found in various forms throughout the educational sector, and more and more schools are spending money on products that will educate their students using digital tools. Two of the participants in this study talk about how their school is buying laptops for their students. This is an example of how the schools try to raise the digital literacy of students as well as computer density. The four products that are focused upon in this study were picked based on a combination of purpose, educational potential and accessibility to the researcher.

1.4.1 Soundation

Soundation was founded in 2009 by PowerFX, a small recording studio based in Stockholm, Sweden. They produce music samples, loops and sound effects and have been doing so since 1995 (Power FX, 2018). Soundation is an online sequencer and music production software, with hundreds of available loops, numerous real-time effects and virtual instruments provided by PowerFX. The online studio is found at www.soundation.com and offers customers the possibility to create a profile, giving them the freedom of working regardless of geographical location. The software is free to use, but there are also paid subscriptions available, which include even more loops, effects and instruments, the possibility to record audio live as well as saving one's projects in an online cloud. The latter gives you the possibility to not only confine oneself to a single computer, but rather to simply chose any computer, log in as a registered user on the website and continue working wherever. It also frees the user from any installation of software, dongles or encounters with technological difficulties they may have with optional equipment, as everything is found on the website. The pricing ranges from \$1,99/month to \$6,99/month depending on subscription level, and is billed annually. There is also a possibility to use Soundation with the Google Hangouts app, allowing more people to collaborate on a single project whilst not being in the same room or proximity (Soundation, 2018). Soundation is further developed to include a specific education context as they, through collaboration with MusicFirst, offer Soundation4Education. This is a variant of the software intended specifically for educational contexts and the teacher can for example create templates and songs which are then distributed to the students. When students turn in their projects, the teacher can see their work directly in the DAW and easily give feedback on this.

1.4.2 GarageBand

GarageBand is a DAW by Apple, launched in 2004, a couple of years after Apple bought Emagic, a German software company known for its music sequencer, Logic. GarageBand came included in all new Macs as a part of Apple's iLife software suite. Today, it is free for everyone with an Apple product, as it is not compatible with any other operating system. It offered many of the features found in the higher-end DAWs when it was launched, but with some limitations, such as only being able to record on one track at a time, and the maximum recording quality was lower than what higher-end DAWs offered. However, both limitations have since been upgraded to match other DAWs. GarageBand offers a simple design, making it very suitable for beginners in the world of audio production and mixing, and what it does, it does very well (Future Music, 2011). Apple promotes the DAW with you being able to "...make music like the professionals" (Apple, 2018b). GarageBand users can choose from a large library of sound effects, loops and virtual instruments, plug in a guitar or microphone and use effects in real-time as they record. It also offers built-in lessons for learning to play the piano and guitar with the option of receiving immediate feedback on the playing. Users can save their projects in iCloud (online cloud storage system) and later access them to add, edit or pitch an entirely new project idea on the go, as GarageBand is also available on iPhone and iPad (Apple, 2018b).

1.4.3 Rocksmith 2014

Rocksmith 2014 is a video game by Ubisoft that was launched in late 2013 on Playstation, Xbox and PC formats. It is a replacement for the original game "Rocksmith" from 2011, as SVP of sales and marketing at Ubisoft Tony Key puts it:

"Rocksmith 2014 is to show that this is the new edition. This is not the second step in guitar learning. Some people might interpret it that way. If you see Spanish 1 and then Spanish 2, you think that you need to learn Spanish 1 first" (Goldfarb, 2013).

The game works much like the games in the Guitar Hero franchise in which one uses a plastic guitar with 5 buttons. On the screen, there is a horizontal board with dots approaching a line and users must press and strum the corresponding button on the guitar controller at the correct time, mimicking the act of playing a guitar. Rocksmith does this, but in a much more complex and larger scale. Instead of a plastic controller, one's own real guitar is used, connected with a

cord to the computer or console. You have the entirety of a guitar in terms of frets and all 6 strings placed vertically on top of each other, each with its own individual colour. Now, notes that come towards you are marked with a string and flow in the “fret-line” corresponding to the frets on the guitar. This important feature may be seen as an additional dimension to Guitar Hero. Rocksmith 2014 is meant for learning guitar and/or bass, and it does this with a continuing monitoring of the user’s performance. If you play very well, and hit all your notes, the game will gradually increase the difficulty, giving more and more notes to hit, until you have 100% of the notes in the actual song. If you play poorly and miss your notes, it will make it easier for you, giving you a chance to catch up. It also has several lessons on everything from changing strings and power chords, to shredding and pinch harmonics. There is also a recommended section on every song, which is updated based on your performance, giving suggestions on what should be practiced to improve one’s skills.

1.4.4 Skoog 2.0

Skoog was created by The University of Edinburgh in a research project with an educational development organisation, The Tapestry Partnership in 2006. The purpose was to address the fact that children with physical or learning disabilities had almost no musical instruments specifically designed for them. The two lead researchers, Dr. David Skulina and Dr. Ben Schögler worked with teachers and pupils to develop a prototype in 2008 which would later be known as the Skoog. The Skoog is meant to make music making fun for all children and it enables children and young people to learn and play music, even though they might have disabilities which place traditional instruments out of reach for them, by e.g. dexterity required to play the piano or guitar. Its squishy foam design and adjustable sensitivity allows everyone to enjoy the Skoog. By having integrated support on iPad through Bluetooth and used with apps such as GarageBand, Skoog allows children to learn and play music in situations they otherwise could not. The Skoog app also allows users to choose a song from their device and play along to it, thanks to the Skoog’s auto key-detection (Skoogmusic, 2018).

1.4.5 Lyderia

Although Lyderia was not one of the products the participants were introduced to and asked to discuss, it nevertheless ultimately played a role in this study. During the interviews, the participants’ focus on web-based products were clearly apparent, and so they were asked about their familiarity of Lyderia, since it is a notable product within that category.

Lyderia is a free music game which presents players with missions that must be solved through their own creativity and effort. After completing missions, new ones are unlocked with a higher level of difficulty. It was developed by Concerts Norway, which administers the musical portion of the public-funded Cultural Rucksack program that brings professional artists into Norwegian schools. According to their website, this was done to reach a higher level of dialogue and involvement with the audience, which is primarily based in schools around the country. It is used by more than 30 000 pupils and teachers in Norwegian mandatory schools (The Cultural Rucksack, n.d.). Lyderia has also received several awards, e.g. best web-based game during the Webby Awards, as well as best mobile app during European Design Awards. Each pupil and teacher creates an individual user and completes tasks and puzzles in order to progress through the game. They can also collaborate and share their music with each other. Teachers have the possibility to assign homework and tasks through Lyderia to their students, and can see their progress and their method of working in the game (The Cultural Rucksack, n.d.).

1.5 Overview of thesis structure

Chapter 2 is devoted to a presentation of previous research and literature, as well as a brief discussion on the evolution of music technology products. This is done to identify a foundation of background knowledge to which the present study contributes.

In chapter 3, a detailed account of the research method is presented. This includes information concerning the selection of participants, description of the interview setting, how the structure was developed and reflections in hindsight on how the interviews could have been conducted more effectively. Finally, a detailed evaluation of the entire method is provided

Chapter 4 is entitled “Results” and thus the findings of the study are there presented as objectively and neutrally as possible. No reflection or analytical work is offered there, as it is meant to purely show what has been found in the data, with minimal interpretation.

Chapter 5, Discussion, is dedicated to interpretation and broader discussion around the findings that were presented in chapter 4. Here, the findings are reflected upon and connected with relevant literature where possible.

Chapter 6 concludes the study and summarises its findings of the study, including implications and applications to existing theory. How the study's findings and relevant subjects can be continued upon as well as other aspects that are relevant for further research is also presented.

2. Literature review

While this study aims to explore an aspect within music education technology that previously has been left untouched, its findings can in many cases be supported by relevant research in adjacent disciplines. In the following section, an example of the evolution of data technology and the prices of music technology products is presented to help the reader visualise the development within the field. Further, an overview of relevant research is presented to show examples of work that the findings of this study can be based upon. A presentation of the relevant reports made by the Norwegian government and ministries finalises this section to indicate how the phenomenon of music technology is registered and responded to.

2.1 Change in price of technology through the years

Much has changed since 1987 in the field of computer software. Computer performance has drastically improved during the last decades, and in terms of speed and convenience it keeps improving almost annually. If we, for example, look at the portable storage mechanism of a computer, we are today familiar with USB-sticks and external hard drives. It must be mentioned that cloud storage is making an increasingly larger impact on the market because of accessibility and security. It's much easier to send something over the cloud than to bring a physical hard drive with you everywhere you go. Still, speed and amount of storage available in the hard drives are extreme developments compared to the age of the floppy disk. External hard drives today can hold anywhere from a couple gigabytes to several terabytes which easily dominates the floppy disk with its 1.4 megabyte storage from the 1980s (Liseter, 2016). That is equal to about a third of a single song in today's production quality, and also it's descendant: the CD-ROM from the late 1990s and 2000s, which could hold around 600-700 megabytes (Nordal & Rossen, 2016).¹² The fact that we have progressed from just above a megabyte to several terabytes in data storage for private use in the last couple of decades gives testimony to the

¹ For clarification on data units; a terabyte(TB) consists of 1024 gigabytes(GB), a gigabyte consists of 1024 megabytes (MB), and a megabyte is 1024 kilobytes(KB).

² For further reference on data size; the average mp3 song today is about 3-5 megabytes and a normal length movie in HD (720p) is around 600-700 megabytes.

advancement in computer power. While the example above shows how much more data modern devices are able to store, other factors such as performance and stability are relevant for the entirety of modern devices.

In order to see how prices have evolved over the last few decades, a search for music software launched in the 1980s was conducted, and then original listing prices were compared to their listing prices today. Some products have either evolved, split into smaller products, been bought by other companies and renamed, or have rebranded as a result of such evolutions. In table 1 (p. 13) are 7 products that are connected to the market as of 2017/2018. The listing price is retrieved from www.tweekheadz.com, which is a website affiliated with zZounds, an online store that sells music equipment, instruments and production hardware. Tweekheadz is a result of many questions about home studio setup, production, etc., being sent to Rich Thurow, known as “Tweek”, founder of the site. After responding to thousands of emails and online forums on how to build home studios, he gathered all responses and tutorials and posted them on this site, for everyone to enjoy and learn from. The site is meant to serve as a resource for those wondering about home studios, providing FAQ’s, tutorials, reviews and forums to connect, share ideas and songs with, and make friends, with likeminded people. The site is managed by a small team of teachers, musicians, professors and enthusiasts after Thurow passed away (Tweekheadz Lab, 2018). In one of the articles on the site, Tweekhead Lab writes about the history of Logic from when it first arrived in the USA from Germany in 1988 as Notator 1.12. While writing about the competition Notator 1.12 faced in the market, several of the products in table 1 (p. 13) are mentioned, as well as their listing price from that year (Tweekheadz Lab, 2010). The price has then been adjusted to modern currency as of 2018. For that purpose, an inflation calculator found at www.usinflationcalculator.com was used. This is to show how expensive these products were at the time, to more meaningfully compare to our economy today. Then the listing prices in 2018 for each of the products were found online. Since all of these products are available for purchase online, their listing prices are also easily found online. The price in parenthesis shows the price adjusted to modern currency. Some difference will occur as many products have different product levels; e.g. Cubase has several versions of their program, where the ones with all available plug-ins, effects and such are much more expensive than the lowest level of the product. This is because not everyone needs the most expensive version with all imaginable tools at their fingertips. The musician who tinkers with music on his laptop from time to time, does not need the same tools as the high-end musical recording studio does to fit their needs. Where available, the lowest level of the products has been chosen

for comparison of pricing. Prices listed in table 1 (p. 13) under 2018 were gathered during November 2018 and could have changed since then. This is also the case for the adjusted price under 1987, which will continue to rise due to inflation.

According to table 1 (p. 13), all products have dropped in price. Overall, prices have decreased between 26 and 100%³, which again shows how accessible this kind of technology has become to the general public. This is again underlined if we take into consideration the size, price and performance of a computer today. The technological evolution has changed computers that once filled an entire room into easily movable objects, where some are as thin as 1.4cm and fit easily into a backpack or handbag. Details regarding specific data performance will not be elaborated, as that is not relevant to the study, but articles have discussed this aspect, many of which are based on Moore's law. It is named after the co-founder of Intel, Gordon E. Moore who noted that from 1958 to 1965, the number of components in integrated circuits doubled at a rate of about two per year, causing the amount to increase exponentially. He predicted that they would continue to do so for at least the next ten years, if not quicker. Since his prediction, the density of transistors has increased exponentially for the last half century. It has also become a benchmark and industry standard in terms of development targets, making Moore's law a "self-fulfilling prophecy". However, a problem arises in the future, as it is uncertain whether the growth rate set by Moore can be sustained. Research, development, manufacturing, tests and production costs also increase exponentially over time, and this removes the incentive from the companies to continue at this rate. It is certain that Moore's law will collapse, but the question is when. In 2003, Intel predicted its collapse between 2013 and 2018, but it has been extended decade by decade over the last 30 years (Li, 2013).

Older computers use large amounts of time to start up, and both graphic cards and processors struggle to produce a good resolution and framerate compared to the modern standard. Many of these programs have expanded massively, both in terms of what they can do and how it can be done. By streamlining actions, the products are made much more user-friendly compared to their predecessors. This again causes the product to reach out to more and more people who have an interest or dream to be able to produce music themselves. Simultaneously, online forums and interest driven websites, like www.tweekheadz.com, have given people tutorials

³ The DAW Cakewalk has been released as free software. This is a result of the DAW being purchased by BandLab. The company that originally created Cakewalk (Cakewalk), now develop another DAW called Sonar, which the free version by BandLab is based on.

and easy to learn methods on how to master these programs, as some of them are still very complex – though not compared to earlier versions. This also contributes to the ease of learning, as people no longer need to find an experienced person on a specific program, and ask to be taught how this and that is done. Manual books that follow these kinds of programs may also be very complex and hard to understand, compared to learning by interacting and socialising with others and learning by doing.

Table 1 - Change of price in 7 music technology products

| Software | Listing price (1987) | Listing price (2018) | % change |
|---|-----------------------------|-----------------------------|-----------------|
| Notator 1.12 → Logic Pro | \$649 (\$1442) | \$199,99 | -86% |
| Motu Performer v.2 → Digital Performer 9 | \$495 (\$1100) | \$499 | -55% |
| Finale 1.0 | \$1000 (\$2222) | \$600 | -73% |
| Cakewalk | \$395 (\$877) | \$0 | -100% |
| Score 2.05 → Encore | \$795 (\$1766) | \$279,99 | -84% |
| Steinberg Pro-24 → Cubase 9.5 Pro | \$376 (\$835) | \$620 | -26% |
| Master Tracks Pro | \$395 (\$877) | \$69,99 | -92% |

2.2 Previous studies of music education technology

There are many previous studies that explore different aspects of music technology and education, using an array of methods. Several of the articles included in the section below enlighten music technology and education, and some focus on a narrower aspect than others. However, none specifically address attitudes of Norwegian music teachers toward the relevance and application of specific music technology products in schools, meaning that the present study explores a subject that has previously received little or no attention. For a compressed overview of literature, see table 2 (p. 18-20).

A common connotation to music technology is that of the computer. Andrew R. Brown (2007) focuses on computers in his book *Computers in Music Education*. In it, he gives a detailed description of the history of the computer and the music educational context it can be put into. While presenting different formats of audio files, audio equipment and how music is distributed

on the internet, his reflections on how the computer can be used for research as well as his thoughts on implementation of computers in educational contexts are very useful when examining this category of music education.

Since the present study focuses on school music teachers, their acquisition is also relevant. Principals who have the responsibility for interviewing new teachers as part of the hiring process, show very clearly the traits they are looking for in music teachers, indicating the school's attitude and aspects of teaching they focus on. Using an article by Juchniewicz (2015), where he examined which interview questions school principals in the US deemed most important when interviewing prospective teachers, we get an indication of what they look for in music teachers. He references several other works that found that principals focus more on non-musical outcomes and working good in teams as the highest traits. Out of the job questions he formulated for data collection, only one of them contained technology. Where principals could include questions of their own, none of them focused on technology (Juchniewicz, 2015).

It is also relevant to look at how music teachers are being educated. Haning (2015) studied the type, quantity and effect of technology instruction provided to undergraduate music education majors. His findings showed that they in general wanted more technology instruction, and 43% indicated that they did not feel adequately prepared to effectively use technology in their future teaching (Haning, 2015).

Looking internationally, Chrysostomou (2017) describes the case with Greece, one of the countries with the lowest coverage of internet, at 82%. While they also have the lowest usage and accessibility of ICT in PISA-participating countries, she calls for a paradigm shift, referencing amongst others Jonathan Savage on the adaptive teacher and say that shifting to *thinking with technology* is the only way to achieve what is needed in twenty-first century music education (Chrysostomou, 2017). As a continuation of Chrysostomou's description of Greece's problem, Partti (2017) describe the same problem in Finland, saying that less than a fifth of music teachers in Finland rated their own know-how in music technology as "good" or "excellent", whereas almost half rated it as "poor" or "below average". She accords with Chrysostomou and her call, and say that we should have a holistic approach to technology (Partti, 2017).

It is beneficial to ask critical questions regarding the advancement of technology. Joseph Pignato is an example of such individuals who ask critical questions to this evolution, focusing on who the technology advances: technology itself, users of it, learning or the economy. He further utilises Aristotle's principle of *that for the sake of which* as a framework for critiquing or counterbalance the political implications discussed by for instance Chrysostomou (Pignato, 2017).

Where and how youth learn music is relevant in terms of how the educational system should be structured and focused. Formal education is only a very small part of the lives of youth, and most of their music learning is now done digitally, according to Peppler. She focuses on rhythmic video games and their potential to teach youth authentic music concepts and notation. In a survey conducted amongst youth, 71% reported having played such games. Peppler found that youth who played rhythmic video games had improved sight-reading skills and in performing rhythmic echoing tasks. Further, several of the youth in her Rock Band Club enrolled in private lessons after joining her club. She further states that young musicians are changing the way they create, produce, share and distribute their work, on platforms such as YouTube (Peppler, 2017). Evan Tobias has also conducted research on the field of music games such as Guitar Hero and Rock Band and has documented positive effects on hand-eye coordination as well as responsiveness (Tobias, 2012).

Several researchers express a view that technology should be in the centre, and not merely an add-on to pre-existing music programs. One of these is Valerie Peters, who discusses five issues concerning the location and context of music education technology: *curricular, sociocultural, ecological and economic, access, and gender issues* (Peters, 2017). Some of these issues are also found within this study's results and are discussed in the Discussion and Conclusion chapters.

Music technology is not necessarily restricted to the typical context and standard definition as presented earlier in this study. Himonides writes about technology in the form of evolution from flutes carved out of bones and other traditional instruments such as the violin. He further presents examples of how technology can aid people with handicaps, and refers to several studies and experiments with, for example, "atonal" people and the use of spectrogram for improved accuracy of tone replication (Himonides, 2012).

The present study briefly explores the issue of technophobia among Norwegian music teachers, and how teachers may abstain from using music technology because they fear it, or how it represents them. Ross Purves (2012) previously writes about how what we already have in terms of technologies may be enough. He also writes that teachers may feel pressured to use technology because their school has invested a substantial amount of money in it, despite their lack of knowledge about the product(s) (Purves, 2012).

The Pew Research Center published a report in 2013 which examined teachers' views of how technology shaped students in middle and high school in terms of writing and research. It also focused on the teachers' own technology use both at school and at home and their effort to incorporate new tools into their classroom. Using surveys as base for data collection, it shows quantitative data and teachers' answers can be easily compared to each other to map out this purpose. The results show, among other things, that there are generational differences in how teachers experience the impact of technology. Out of the 2462 teachers who responded to the surveys, 5% worked as music teachers (Purcell, Heaps, Buchanan, & Friedrich, 2013).

In order not to fall behind, teachers need to adapt and broaden their field of competence according to Jonathan Savage. They need to know what constitutes effective teaching and learning with music technology, as change is happening rapidly and constantly. While many teachers consider themselves to be qualified within ICT, we can see that many struggle (Savage, 2012). The adaptation of teachers is something that is also mentioned in several sections of Official Norwegian Reports, which are elaborated on below.

While searching for previous studies within proximity of this study's field, I chose to explore if and how governmental plans focused on the emergent term "music technology" and how they then structured strategies in order to nurture such a growth. Additionally, the lack of any mention of this topic, may entail a certain attitude and view on the matter as well. The natural place to look for such information is Norges Offentlige Utredninger (hereby abbreviated as NOU). NOUs are the Official Norwegian Reports that cover different topics. They are constituted by either the Government or a ministry and they then investigate and report a chosen topic. They can also include choices of action or strategies in order to develop or execute public measures to solve social problems or challenges. They have been conducted since 1972 and there are roughly 1600 of them, spanning all governmental departments (Hansen, 2018). After roughly examining around 40 NOUs, focusing on those ordered by the Ministry of Education

and Research, 5 remained as relevant. The NOU from 1996, while overall mentioning IT scarcely, state that use of IT should be a natural part of all teacher education and the goal is to have all students use IT in their future occupation. Students in teacher education who have weak knowledge in IT shall also be given supplement courses (NOU 1996:22, 1996). Technology is then not emphasised until 2013 where the focus is on digitalisation⁴. Amongst the focus points of the committee, is the incorporation of ICT. They state that ICT is not adequately incorporated into schools and that they need to focus more on knowing how ICT functions. They also need a population that understands what happens behind and between the screens (also called for by (Brown, 2007, p. 297)). A study included in the report, state that 66% of teachers in second year of upper secondary school report having little to no technical support. The committee suggests the launch of *The Digital Rucksack*, based on the model of *The Cultural Rucksack*, which will compensate for digital inadequacy (NOU 2013:2, 2013). NOU 2014 focuses mainly on results within the three major disciplines in Norwegian school: reading, writing and ICT, together with demographic and geographic statistics. It focuses on a few subjects, but not music (NOU 2014:7, 2014). NOU 2015 focuses on renewal of the subjects and competences. Here, music technology is stated to be a reason for the changed content of the music subject. This again challenges the frames set for the subject, creating a need for didactical development on the matter. The committee for 2015 suggests that future renewal of the subjects are done with heavy consideration on a cooperation between the subjects, with especial emphasis on the practical and aesthetic subjects (NOU 2015:8, 2015). The newest NOU from 2018 focuses on the education of the worker. They concluded that workers with more education, will learn more at the workplace. Workers with little education may lose productivity when technological changes are applied to the environment, probably because their competence is limited to a set form of production. Therefore, more education gives more flexibility to adapt to technological changes at the workplace (NOU 2018:2, 2018). The latter NOU is very likeminded to Savage's article from 2012.

⁴ Note that this NOU is conducted on behalf of the Ministry of Local Government and Modernisation.

Table 2 - Overview of previous research and NOU

| Author/article name | What is the foci? |
|--|---|
| (2007) Andrew Brown “Computers in Music Education: Amplifying Musicality” | Presents computers’ role in music education. The book presents context, production, presentation, reflection, and implementation. |
| (2015) Jay Juchniewicz "An Examination of Music Teacher Job Interview Questions" | Examines which questions principals consider most important when interviewing prospective music teachers. |
| (2015) Marshall Haning "Are they ready to teach with technology? An investigation of technology instruction in music teacher education programs" | Investigates the type, quantity, and effects of technology instruction currently provided to undergraduate music education majors. |
| (2017) Chrysostomou, Smaragda “Technology in the Music Classroom – Navigating through a Dense Forest: The Case of Greece” | Identifies the problem in Greece and narrates the landscape; Even though new technology surfaces daily, the teachers are unable to keep up with their students. |
| (2017) Partti, Heidi “Building a Broad View of Technology in Music Teacher Education” | Elaborates on Chrysostomou, and says the problem is found in Finland as well. |
| (2017) Pepler, Kylie “Interest-driven Music Education” | Focus on where and how youth learn music today |
| (2017) Peters, Valerie “The Impact of Technologies on Society, Schools, and Music Learning” | Discusses five issues concerning the location and context of music education technology |
| (2012) Evangelos Himonides "The misunderstanding of music-technology: a meta perspective" | Talks about all forms of technology, human evolution. Technology used as aid for amusical people. |
| (2012) Ross Purves "Technology and the Educator" | Talks about not always striving for the best, unattainable. What we have can be sufficient. Teachers can feel a pressure to use |

| | |
|--|---|
| | technology if the school has invested in it, despite their lack of knowledge. |
| (2013) Kristen Purcell, Alan Heaps, Judy Buchanan, Linda Friedrich "How teachers are using technology at home and in their classrooms" | Survey of teachers in general on how technology shaped students and teachers' own technology use. |
| (2012) Jonathan Savage "Driving forward technology's imprint on music education" | Teachers need to adapt, and broaden their field of competence in order to not fall behind. |
| (2012) Evan S. Tobias "Let's play! Learning music through video games and virtual worlds" | Education through video games such as Guitar Hero. Documented effect on hand-eye coordination etc. |
| (1996) NOU 1996:22 "Lærerutdanning - mellom krav og ideal" | Use of IT should be a natural part of all teacher education. Students with weak knowledge of IT, should be offered additional courses. |
| (2013) NOU 2013:2 "Hindre for digital verdiskaping" | The board finds that digital skills are still not adequately incorporated into the schools. Too few teachers have technical support options. |
| (2014) NOU 2014:7 "Elevens læring i fremtidens skole - Et kunnskapsgrunnlag" | In a report on education goals with focus on gender, background, geographics, etc. It also presents subareas within the school, such as reading and writing skills, and digital literacy, in addition to a few subjects. Music is not mentioned, nor any creative subjects. |
| (2015) NOU 2015:8 "Fremtidens skole - Fornyelse av fag og kompetanser" | Technological change is mentioned in music as an example of the technological advancements, but not mentioned when the actual renewal process is discussed. |
| (2018) NOU 2018:2 "Fremtidige kompetansebehov I – Kunnskapsgrunnlaget" | Employees need more knowledge, because they learn more at their place of work. Employees with little education may fall |

| | |
|--|---|
| | behind, as education offers greater ability to adapt to technological changes in the workplace. |
|--|---|

During this chapter, several examples of literature and previous research has been showcased to visualise the array of work that is done on the wide subject of music and music technology in education for the reader. While there are numerous articles and literature other than what has been presented here, they serve as parameters to show the diversity of the subject. This study focuses on a narrow aspect, but finds support within other adjacent literature and previous research. Therefore, a base of understanding of the subject area has been established to be able to rely on both for reference and data comparison.

3. Method

The aim is to illuminate the general by looking at the particular (Denscombe, 2010, p. 53)

In this chapter, the research method will be presented and discussed in order to make it clear what choices were made when it comes to approach and strategy to ultimately be able to answer the research questions in this thesis. A presentation of the pilot interview, its participants and the changes that were made based on the experiences from that interview, will be presented to show how the final design came to be. The structure of the final interview will be reviewed and finally, challenges and limitations of the design will be presented.

3.1 Research approach

According to Oxford Dictionaries, *approach* in its noun form, is “a way of dealing with a situation or problem” (Oxford Dictionaries, 2018). Using that definition, a research approach can then be seen as how this particular situation, or research problem, is going to be researched. Creswell & Creswell (2018, p. 3) defines research approach as a plan and procedures for research. By explaining the research approach of the thesis, it helps support the validity of the research as well. The most commonly used types of research approaches are qualitative and quantitative. Creswell & Creswell (2018) also presents mixed methods in their book, which incorporates elements from both qualitative and quantitative approaches. The distinction between qualitative and quantitative research is simple, but there are numerous examples and rules of thumb for what generally distinguishes the two. One example is that qualitative

emphasises depth and quality, whereas quantitative focuses on width and numbers. Another one is closed quantitative questions versus open qualitative questions. In this study, the pre-existing literature on music teachers' viewpoint on music technology is scarce. Therefore, a qualitative approach comes naturally, where the intention is to explore a phenomenon that has previously been researched insufficiently.

Further, there is not a theory that is attempted to be falsified or verified using a quantitative approach. The research questions entail that the teachers' opinions, stories and experiences revolving using music technologies in their teaching are in focus. This is not something that can be measured by numbers using instruments, and therefore disables a quantitative approach as a possibility. Creswell & Creswell characterises qualitative research as "... an approach for exploring and understanding the meaning individuals or groups ascribe to a social or human problem." (Creswell & Creswell, 2018, p. 4). By using interviews as a method of data collection, we get an insight into the participant's point of view on a specific problem, item or phenomenon which is the intention of this study.

3.2 Research strategy

To be able to answer the research questions in a study, a research strategy needs to be applied. Creswell & Poth list five different strategies within qualitative research: narrative research, phenomenology, grounded theory, ethnography and case study. They present the research focus of each of the aforementioned approaches in a table. It states that: *narrative research* focuses on exploring the life of an individual, *phenomenology* focuses on understanding the essence of the experience, *grounded theory* develops a theory grounded in data from the field, *ethnography* describes and interprets a culture-sharing group, and *case study* develops an in-depth description and analysis of a case or multiple cases (Creswell & Poth, 2018, p. 104).

The aim of this study is to explore a field and describe what is being found to discover possible reasons why. When comparing the research focus of approach presented by Creswell & Poth, both case study and grounded theory are viable strategies for the intention of this study. While grounded theory could be an approach viable for this intention, the focus is on the music technological products, presented as four individual cases. Therefore, the strategy of grounded theory is not ideal for this purpose. It should further be noted that case study and ethnography share several characteristics. To distinguish the two, Creswell & Poth define the intent of

ethnography as to “...determine how the culture works” (Creswell & Poth, 2018, p. 96). This study aims to describe and explore a specific situation (selection and application of music technology products), which causes ethnography to be insufficient, or even “overkill” since it would be very inefficient for such a focused purpose. The purpose of a case study is to gain a deeper understanding of a single case, or explore an issue or problem. Therefore, it is natural to select case study as the research strategy. Creswell & Poth also reference Yin, who say that case studies focus on a case or cases in its natural setting and context (Yin, 2014) This is also noted by Creswell & Creswell (2018, p. 181). The case study examines something that already exists, and not like an experiment that is dedicated to imposing control and variables (Denscombe, 2010, p. 54). The study attempts to conduct the interviews in such a setting, making it as natural as possible while yielding empirical data. The first section of the interviews serves as an attempt to that, where the teachers are isolated without the interviewer’s presence to influence them. In line with the purpose of this study, the choice of case study is reinforced by Denscombe: “the real value of a case study is that it offers the opportunity to explain *why* certain outcomes might happen – more than just find out what those outcomes are” (Denscombe, 2010, p. 53).

In presenting the types of case studies, Creswell & Poth (2018, p. 98) presents three variations, instrumental case study, the collective or multiple case study and intrinsic case study. Since this study is focusing on several cases, it is natural to use a collective case study variation.

3.3 Collection of data

This section serves as a presentation of how the data was collected, analysed and what tools were used in doing so. Because this subject has been scarcely researched prior to this study, data had to be collected to use in analysis. Primary data serves as the main base for analysis and discussion in this study, but secondary sources such as online review articles and reviews found at online stores were used to supplement lack of primary data in the case of the Skoog. During chapter four, the raw data collected from interviews will be presented and later discussed and reflected upon in chapter five.

3.3.1 Selection of pilot participants

The first interview served as a pilot for this type of interview. By pilot testing the structure of the interview, it was easier to discover what should or could be changed in order to make it

more specified and better in general. In the pilot interview, the type of participants was different than that which was planned to be used in the study. The reason for this was a desire to be able to conduct the interview as best and quick as possible and use this pilot as a test to see if anything had been overlooked or what could be improved upon. The type of participants still should be as similar as possible, which reasons the choice of music education students - specifically 3rd year students. They have classroom experience through their practice periods and learning theories and educational structures are freshly imprinted.

3.3.2 Selection of final participants

The participants all teach in the Bergen area. Three of them teach at primary school level while one teach at a lower secondary school. The participants consist of three men, and one woman. The teachers are all in between 25 and 40. They have been active as teachers in varying amounts and the primary school teachers combined cover all 7 years of primary school.

The first interview was conducted with Karl and Hege, two colleagues working at primary school level. One of them was acquired through a personal contact who volunteered to aid me in the search for participants. The teacher then said he had a colleague who he could bring to interview, which I agreed to. Reflections on how their established relationship could influence the interview will be discussed in section 3.3.5.4.

The second interview was conducted with Ole and Tor, two male teachers working different levels of schools: one teaching the younger layers of primary school and one teaching lower secondary school, respectively. This is the most contrast that could be achieved when it comes to interviewees in this study. The teachers had had no contact prior to this interview. They were both acquired through personal contacts as well.

3.3.3 Interview as method of data collection

This study uses interviews with participants as a form of data collection, which are further analysed. Brinkmann and Kvale (2015) say that in the interaction between the interviewer and the interviewee, knowledge is constructed, when talking about interviews. They further say describe qualitative interviews as "...attempts to understand the world from the subjects' point of view... (Brinkmann & Kvale, 2015, p. 3). In the preparation and implementation of the interview, a model presented in Creswell & Poth (2018, p.166) was used. They present an

approach to qualitative interviewing as procedures and steps for preparing and conducting interviews.

Following the procedures presented by Creswell & Poth, the interviews in the study were prepared and conducted respectively. After narrowing a subject to research, the type of participants was chosen. Since the intention was to engage in a discussion with two teachers at the same time, a group interview was chosen as most suitable method for that purpose. Allowing the participants to guide the discussion themselves, and jumping between topics if their statement required them to, entailed that a semi structured interview would yield the data required. This is because there were some topics that needed to be covered, but their order did not need to be followed rigidly. The interview guide and recording equipment were both made ready for the interviews, in line with the procedures presented above, and a neutral location was located. The interview room will be discussed in section 3.3.5.3. The interview was pilot tested before the final interviews, to eliminate flaws and evaluate the interview's structure. A form of consent was given to all participants, briefing them about the interview, their rights and that everything was voluntary. The interview was conducted with good interview procedures, following the interview's theme and time limit. Finally, the interview was transcribed for analysis.

3.3.4 Interview guide

To be able to have an overview of the interview setting, an interview guide was developed. It further made it possible to reel the conversation back on track if it derailed into other subjects irrelevant to the interviews as well as assisting in keeping track of which subjects had been talked about and which subjects remained for discussion. The interview guide consisted of an introduction, where the participants were formally welcomed, informed about the project, its aim and purpose. It also informed about the structure of the interview and what was to be expected of the participants. The fact that any personal details would be anonymised in the transcripts for data analysis later in the project was accentuated. The background information they were asked for was: name, age, background, experience in school, musical background, why they wanted to become teachers, if they enjoyed their work and what they considered their most important task as music teachers. They were then asked what they thought of when presented the term "music technology".

The interview guide was further sectioned into four, focusing on each of the technological products and guiding questions to each of them. By sectioning, it was easier to adjust question if the discussion suddenly changed topic. See appendix 2 for the full interview guide. The interview guide remained unchanged for all interviews as the structure seemed to work as intended during the pilot interview. Therefore, a change was not deemed necessary. If needed, questions could be either skipped or added, resulting in the interview guide being used as just that: a guide.

3.3.5 Detailed description of interviews

A total of 3 interviews were conducted, including a pilot interview. This was done to be able to evaluate the interview structure and improve on any weaknesses or flaws. The intention of the pilot interview, as well as bias discovered after the pilot interview was completed will be discussed. The final interviews, their structure and limitations with the design will conclude this section.

3.3.5.1 Pilot interview

The idea of the pilot interview was to simply follow the flow and see how the interview developed itself. The predetermined design was not attempted to be followed to the point, but it was decided to rather see how the situation would naturally unfold itself. I sat with the participants, but still instructed them in the beginning of the interview to try to keep the discussion between themselves as much as possible. I soon realised that this would be impossible, as both participants kept including me in their discussions.

The pilot interview did not include a section where the participants were left on their own to explore the products. It was not yet finally implemented in the design, and the focus lied within the structure of the interview, and an exploration of the products for the participants in the pilot was not deemed necessary. Another detail that was changed from the pilot interview to the final interviews, was the setup of Rocksmith. While originally the participants were to be included in the setup of Rocksmith, it was found to be too time consuming and was done beforehand instead.

A bias discovered in hindsight of the pilot interview, was the relationship between the researcher and the pilot interviewees. They were sourced based on personal contact and

relationship prior to the study. However, it needs to be emphasised that their education as music educators, educational framework and future profession served as the base for their sourcing.

3.3.5.2 Final interviews

The interviews were conducted in February and March of 2018. All contact prior to the interviews was done through e-mail. In the first e-mail to the participants, they were briefly explained what the study's foci was, what was required from them and how long the interview would take at the most. For audio recording, I used a Zoom H1 recorder, which I instructed the participants to keep in proximity so that their voices would be easily captured by the device.

In advance of the interviews, all the equipment had been set up in working order. This was done to minimise any inactive time during the interview itself and reduce the risk of technical problems. The sound of all products was then tested to make sure that they worked as intended for the interview. Before the audio recorder was started, the participants were presented with a formal paper of participation, which informed them about the background and purpose of the study. Further, it explained what participation in the study entailed and how it would be recorded. It also informed them about what would happen to their personal data and that all recordings would be deleted after the project was finished. Finally, it stressed that participation in this study was completely voluntarily and the participants had the choice of withdrawing their participation at any time, without being asked for a reason. After they had read through the document and agreed to participate, the interview guide, as described earlier, was used.

The interview was started by letting the participants introduce themselves. They were asked to provide background information such as name, age and how long they had been teaching. They were further asked for their personal connotation to the term music technology to let them self-asses their own digital literacy. They were given simple instructions to keep the audio recorder with them if they were to move around the room, as well as introduced to where they could find the different products in the setup. They were told that they had 30 minutes to explore, but could extend to 45 minutes if they wanted to. This was to allow them to finish if they were in the middle of a discussion, or if they had another product left that they wanted to try before ending the session. By leaving the interview room and leaving behind the four products with the participants for them to choose and talk about their own leisure, they were given the opportunity to explore at their own pace and comfort. It also removed the effect of the interviewer's presence, in an attempt to minimise influence towards the participants.

After a 15-minute break with coffee and light snacks, I joined the participants and participated actively in the exploration of the products. I consciously tried to not promote any aspect, but focused on promoting discussion of the products. During this session, a possible weakness with the interviews made by the interviewer was discovered during transcribing, and will be discussed in section 3.3.5.4.

3.3.5.3 Interview setting

All interviews were conducted in the same classroom in the music department at my institution. Originally, the suspicion was that the room the interviews were conducted in could affect how the participants acted and spoke. This was based on Schei's article on discourse and discourse analysis, where even the content of the room affects the participants, as well as the interviewer (Schei, 2010, p. 26). Based on the experience from the pilot interview, the room indicated no registerable effect on the situation. The chosen room also served as a neutral common ground since the participants comes from several locations. This also entails that both the other participant and myself would not have to travel to a location where the other participant was situated and I would also have to spend a lot of time transporting equipment for the interviews and setting it all up for the interviews. See appendix 1 for an illustration of the interview room.

3.3.5.4 Limitations of the interviews

In the case of the two colleagues as participants, it was considered to be interesting as it provides the interview with a slightly different setting than the other pair. They would be comfortable around each other and the level of formality may be different than if two strangers were to converse in the same situation like Tor and Ole, the other pair. There will most likely be no uncertainty about what the other person means when speaking as the two will be more in tune or on the same train of thought, being employed at the same institution and having an established relationship. However, this does not mean that two teachers from the same institution will not have different ways of teaching, different philosophies or different opinions on topics.

The second pair of participants encountered a sound problem with the computer where both Rocksmith, Soundation and the video of Skoog was located. The sound from Rocksmith was the only thing coming out of the speakers, even when the program was minimised, which it had

never done prior to this interview. They spent a lot of time trying to troubleshoot and fix the problem themselves, before they called me to try and fix the problem. I was unable to fix the problem, and so the problem persisted throughout the rest of the interview, but a lot of time was spent in search of the problem source by both the participants and myself. A theory that was briefly discussed was that Rocksmith was dominating the sound output of the computer. If the other programs were to be heard, Rocksmith would have to be closed. The problem is odd, as I have never experienced it before, neither in the first or pilot interview, or in the years I have used Rocksmith myself. Both final interviews encountered problems with the playback of the video of Skoog, found at the Skoog homepage. A theory is that it is connected to the Rocksmith sound problem. The first pair of participants did not experience the sound problem like the others, which gives reason for wonder. However, the first pair solved the Skoog-problem by watching it on their mobile device.

When listening through the audio recording of the interviews, sounds and words such as “mmhmm”, “sure” or “great” occurred quite a lot, as they are considered normal and occur naturally in most conversations. However, they could be interpreted by the participants as confirmations to them, letting them know if they answered “correctly” to my questions. This may not be the case at all, but it needs to be accounted for nonetheless.

The length of the interviews was maxed out at 2 hours in both cases, to cover the four products. However, in retrospect, there may have been too many products for the participants to focus on, not allowing them to dive deeper into each product, but merely scratching the surface of each one. To be able to delve deeper, a maximum of 2 products should therefore be focused on. That would still offer data for comparison between the two, and the participants would be able to get a deeper understanding of each product.

3.4 Data analysis

A crossroad in research science and the use of qualitative research is inductive and deductive data analysis. The most common for qualitative researchers is to utilise inductive data analysis in order to build a theory from data that they have collected. While inductive analysis works by working towards a theory based on the data, a deductive analysis works towards the data based on a theory, which then becomes commonly found in quantitative research. Creswell & Creswell still underlines that it is very useful to work back and forth between the data and theory

– while an analysis began using an inductive method, the researcher can reflect and look for more aspects and themes in their data using their established theory, thus working deductively (Creswell & Creswell, 2018, p. 181). During the analytical work in the study, an inductive analysis was utilised to create theory based on the data collected in the study. A completely deductive analysis could not be done as there were no prior theories on the subject that could be attempted falsified. However, a combination was used during and after the analysis to confirm or reassure that the theory that was being built remained rigid.

3.4.1 Transcription

The data analysis is based on the statements by the participants. To be able to analyse the interviews, they needed to be transcribed. This was done to obtain a more structured overview of the data material and to make analysis easier. A transcription was therefore deemed necessary for further analysis of the data. For transcribing, I used InqScribe, which is a free, online program that features both an audio player and a blank paper to write. It also allowed the audio file to be either slowed down or sped up for easier workflow, and using integrated hotkeys, pausing and rewinding was done easily. During the transcription, the participants were anonymised by being given a number instead of their name, including myself. This would not only follow the contractual guidelines of conserving the participants' anonymity, but also voids me of having to write out their full name every time they say something on tape, which would be time consuming. The transcriptions are aimed to be very accurate and true to the recording of the interviews. This entails that everything was transcribed like it was said, and non-verbal words such as sighing and laughter was also included. While listening to the recordings, a high occurrence of *mmhmm* and *yeah* was noted. Not all of them were included, but they were reduced to only occur where they appeared to be relevant to the conversation or point being made. Examples of this are places where they would be confirming a view or thought from another participant, showing a sign of agreement to the statement being said.

After the transcription was finished, the entire transcript was moved over to a Word-document for easy storage, as the free version of InqScribe did not allow for saving the written text unless paid for. All the participants were offered a chance to read through the transcriptions, comment, or delete statements if they wanted to, but none of them seized said opportunity.

3.4.2 Analysis

During the transcription process, I noticed that participants kept returning to themes in their statements. When reading repeatedly through the transcripts, I therefore extracted statements linked to each of the themes identified – this served as the coding. Creswell & Creswell (2018, p. 196) presents Tesch's (1990) eight steps in the coding process: (1) *get a sense of the whole*, (2) *pick one document and ask yourself what it is about*, (3) *make a list of all topics*, (4) *compare the list to the data and abbreviate the topics as codes*, (5) *find the most descriptive wording for the topics and turn them into categories*, (6) *finalise decision on abbreviations*, (7) *assemble data material to corresponding category and perform preliminary analysis*, (8) *if necessary, recode existing data*. Inspired by these steps for forming codes, four themes were established based on the data: *expense*, *accessibility*, *attitude* and *usability*. They will be elaborated in chapter 4.

Creswell & Creswell state that there generally are three categories of code: expected codes, surprising codes and codes of unusual or of conceptual interest. Expected codes are codes that readers would expect to find, based on for instance literature and common sense. Surprising codes are codes that could not be anticipated beforehand. Codes of unusual or of conceptual interest are those that are, in and of themselves, of conceptual interest to readers (Creswell & Creswell, 2018, p. 195). According to them, it is common to allow codes to emerge, but combination of predetermined and emerging codes can also be utilised instead of fitting the data into predetermined codes. Given the purpose of this study, a focus on emerging codes appears more fitting as an exploration entails little predetermination on what to find – though some expectations can be formed on preconceptions and personal experience. After repeatedly reading through transcripts of the interviews, and extracting statements that correlated to the themes that was identified, notable data from the interviews was compared. Because some participants focused more on a product or aspect than the others, the emphasis on the products is not always equal. An example of this is the case of Skoog, in which one pair of participants experienced difficulties in playing the video, resulting in them moving on to other products while the other pair discussed the product.

To counter this uneven presentation of the products, resulting in having lots of data material on Rocksmith, GarageBand and Soundation, I searched online for reviews and comments about Skoog and used those to base my discussion and reflection on. This allowed for either support or contrast of the statements made by two of the participants, who were the only ones to talk

about Skoog and its usability. In the contrasting of Skoog I used product reviews found on Amazon UK, the Apple Store and a random selection of reviews found on different sites.

3.5 Evaluation of method

To be able to evaluate the extent of which the collection of data is coherent with the demands on use of method, the data and the method of data collection needs to be examined with focus on validity. This is done to evaluate if the study is to be considered valid, and evaluate the validity of the conclusion. Further, details that could be of relevance, such as the difference in final participants is discussed.

3.5.1 Validity and evaluation criteria

Different researchers create standards for validating research in different ways. Thus, many perspectives on the importance of validation has been described through the years, both following traditional and contemporary ways of thinking. One example of this is Lincoln and Guba (1985), who are cited in Creswell & Poth in their use of terms such as *credibility*, *authenticity*, *transferability* in their quest for establishing *trustworthiness* instead of the commonly used terms *internal* and *external validation*, *reliability* and *objectivity* (Creswell & Poth, 2018, p. 256). To check if the approach is valid, Creswell & Poth recommend that the researcher engages in at least two of their nine strategies that are frequently used: *triangulation*, *disconfirming evidence*, *researcher bias*, *participant feedback*, *prolonged engagement*, *participant collaboration*, *external audits*, *thick description* or *peer review*. This study has been continuously focused on peer review, which Lincoln and Guba define as the “devil’s advocate”. It should be someone who takes the role seriously, even it means that it “...produces pain for the inquirer.” (Lincoln & Guba, 1985, p. 309).

The “peer debriefer” in the case of this study the researcher’s mentor, who is tasked with asking tough questions about method and meaning to make sure the researcher stays honest to the research and its methods. The other validation procedure used in this study is the disclosing of the researcher’s bias. This is done so that the reader can understand the position that the researcher takes in the inquiry. Weiner-Levey and Popper-Giveon (2013), cited in Creswell & Poth (2018, p. 261), calls this “dark matter”, that is illuminated by the researcher, and too often omitted in qualitative research.

Given the background and motivation for conducting this study, the researcher's bias is clearly a factor in the study that could have an impact on interpretations. As an active user of various music technology products, my intention to promote music technology may have been embedded in the study, both subjectively and unconsciously. During previous education programs within the field of music, the subject of music technology has repeatedly been favoured, which may have strengthened this bias. Throughout the interviews, as well as in analysing of the data collected, a neutral common ground has been attempted, voiding any colouring of statements and opinions expressed. As this is disclosed, there may certainly be occurrences that have slipped through, in either conversing during the interviews, or in discussion during analytical procedures.

In their book, Creswell & Poth (2018, p. 279-280) write about evaluative criteria for a good case study. As an example of that, they present Stake's (1995) criteria for assessing a good case study report. Examples of these criteria are: *Is the report easy to read? Is the case adequately defined? Were sufficient raw data presented? Are personal intentions examined?* (Stake, 1995, p. 131). The characteristics of an exemplary case study according to Yin (2014) are also presented, which focus more on the description presented in a case study (Creswell & Poth, 2018, p. 280). They emphasise how the researcher has focused the case, if the case's boundaries are clearly defined, if sufficient evidence is displayed and if the case is presented in an engaging manner (Yin, 2014).

3.5.2 Acquisition of final participants

According to Statistics Norway (abbreviated as SSB), nearly 40% of teachers in the music subject at mandatory schools (primary and lower secondary) do not have any formal education in the field of music. 17% have between 1-29 credits (Lagerstrøm, Moafi, & Revold, 2014), which is just below the official requirement of 30 credits to teach music at lower secondary schools and at primary schools in Norway (Ministry of Education and Research, 2015). This may have been a possible reason for the lack of willing participants for this study, as some teachers may not be comfortable participating in a study on a subject where they have little to no formal education. Another possible reason could also be lack of available time, which is also something that is mentioned during the interviews by participants. The e-mail that was sent out to acquire participants may not have reached the desired teachers in the first place. This is because the contact websites to the different schools do not display who works as a music teacher, and the schools would not give out that information when phoned either. This forced

me to rely on the schools' forwarding system from the general email inbox. In some cases, the principal replied, telling me that their teachers were too busy to participate, and indicating that they decided on behalf of the teacher. This initial lack of respondents, for several months, caused me to inquire with my personal contacts for aid.

3.5.3 Difference in selection of participants

Because gathering participants proved unusually difficult for this project, I did not have the luxury to pick and choose and partner with whomever I wanted. The task of finding available time for two teachers at the same time as well increased the difficulty of the task. This is the main reason for the two interviews and participants being so different from one another as well as the small selection. If the participants had been more similar, worked at the same school level, for instance, the interviews would have been more easily comparable to each other. However, given that they differ, more factors come into play than if this had not been the case. There are obvious differences between primary schools and secondary schools when it comes to teaching, the students and in general how one acts as a teacher. Still, the interviews are nonetheless comparable for the purpose of this project, but with the bonus of having different participants and interview settings. If more elements or aspects were to be included in this study or future studies on the subject, for instance gender and school level, such a differentiated selection of participants would be very suitable.

4. Results

In this chapter, the categories found when reading through the transcripts of the interviews will be presented. An early section will disclose how these factors were established and what each of them signify. The four categories are then presented and statements by the participants are placed within them. In the next chapter (Discussion), these statements will be analysed, discussed and reflected upon, as this chapter (Results) is solely intended for presentation of the data that was collected.

In the presentation of statements by the participants, the use of “...” and “(...)” signify words that have been left out of the extract. “...” is used where just one or two words have been omitted, normally filler words such as “yeah”, “ok”, and so on. Where more than one or two words have been omitted, up to complete sentences or more, “(...)” is used. This is used both within the sentences or vertically to show where complete statements have been omitted to

shorten the length of the extract. Generally, the formulation used by the participants are replicated, even though that sometimes results in grammatically incorrect statements.

4.1. Identifying themes and aspects of importance

During the transcription process and after repeatedly reading through the transcripts of the interviews, themes started to become apparent. Some aspects were shared between the interviews, some were left nearly untouched in one interview and discussed more in depth in the other. After reading thoroughly through, the four broad, but recurring factors were established that covered the interviews and their spoken content: (1) *expense*, (2) *accessibility*, (3) *attitude*, and (4) *usage*.

It became clear that many of the topics that the participants discussed, could be rooted to more than one established factor. Some of them appeared to also be dependent on, related to or a consequence of some of the others. An example of this is GarageBand, which is free in itself, but is confined to Apple products, which many schools are not interested in buying as they can be priced a bit higher than other equipment in the same category. It is important to note this because I do not intend to forcefully cram aspects and key points into these categories, but explore how they are at play with each other.

Expense covers statements where the participants talk about the cost of a product, equipment in general and the allocation of resources made by the administrators or municipality and county. Money appear to be the biggest factors, as many of the restrictions that the participants mention, are rooted in some way to money. This does, for example, directly regulate the participants' accessibility to music technology, some of which are presented during this study. This factor is appearing in most cases in the interview as something that is out of the participants' hands, indicating that the factor of expense may not always be directly regulated by them as individuals.

Accessibility covers statements where the participants talk about their access to these products, or any other products they mention during the interview. Based on the interviews, the participants appear to have differentiated access to technology, as they are from three separate schools. This results in a different school administration with different distribution of budgets and financial resources. This appears to be one of the main links between the economic aspect and accessibility, in that a modestly budgeted music section will have access to fewer music

technology products. This can mean that they have to rely on older equipment, or buy cheaper ones, which arguably results in products of lower quality either voluntarily or unwillingly.

Attitude covers those statements where the participants' attitudes towards the products are apparent. Their emphasis on certain details of the products are presented here. Their thoughts on music technology in general are also presented. This theme is arguably less interchangeable with the others than, for instance, expense and accessibility. This is because attitude directly presents the participant's subjective thoughts regarding a product or feature. It can, however, be argued that the participant's subjective thought is affected or rooted in some of the other themes present in this study. However, it would be too vague to explore that aspect, as the participants may not be actively aware of this issue themselves.

Usage refers to statements where the usage of the product(s) itself is in centre, and what the participants emphasise when using the products. The participants' emphasis on the usability of the product is often closely connected to time – what time do the participants have available to learn how to use the product themselves before teaching it to their students? Another point, as mentioned by one of the participants was how quickly the students could get something back from the product, i.e. how “effective” the product was in actual classroom use. This section also serves as a positive contrast to the other three, in that they can be considered as restrictions advocating not using a product, whereas usage focuses on what the participants want from the product and how it can benefit their teaching.

4.2. Expense

When I asked Karl and Hege if they were familiar with Rocksmith, Karl said he had thought about buying it, but found that it would be too expensive if it turned out to be something he'd never use.

Karl: Har jo vurdert å kjøpe det flere ganger, bare for å teste det, egentlig. Men det har vært litt sånn, vært litt mye penger hvis ikke jeg bruker det til noe.

Both Karl and Hege indicated that they think Rocksmith is a rather expensive product. When Hege asks Karl, he says that it is more than double the actual price.

Hege: Jeg tenker at det er ganske få skoler som hadde kjøpt inn sånt. Er det ikke ganske dyrt?

Karl: Det her er, ja, det koster borti en tusenlapp per, ja.

Tor and Ole, on the other hand, seem satisfied with the price when I tell them what I paid for my edition of the product. They are, however, quick to add the need for instruments to the equation.

Intervjuer: ... Så det er snakk om hvert fall under fem hundre kroner.

Ole: Åja.

Intervjuer: Per, liksom, sett, da.

Ole: Så, en mindre utgift, sånt sett, da.

Tor: Ja, så lenge man har gitarer.

Ole: Ja, så lenge man har gitarer.

When discussing how much the price of a product matters, Karl and Hege talked about budgets and how the expense limits their choices. Karl illustrates the situation by saying if you, for instance buy 20-30 Rocksmith licenses and guitars for the school, you might have overspent and used your budget, as well as the other subject's budgets for that year. Budgets are seemingly a key factor in the accessibility of these products, and how obtainable they are, amongst other things. Another factor that Karl and Hege talk about in the same interview segment, is how the municipality charges for installing programs on the school's computers. The schools' computer network is also very strict when it comes to which programs can be installed on school computers, or computers owned by anyone else in the municipality. This is something that will also be discussed more deeply in the "Accessibility" section.

Karl: I tillegg, hvis vi skulle installert Rocksmith på Pc-ene, så måtte vi jo i tillegg betalt, men, lurer på om det er en sju, åtte tusen, eller det er i hvert fall en ganske bra sum til kommunen for at de skal gjøre det tilgjengelig for oss på PC-ene.

Karl and Hege state that the Skoog appears to be a costly product to buy. They also underline the confinement to Apple products as a restricting feature in their case, as they do not have such devices available at their school. They therefore present an alternative to this costly approach, by giving examples of how the money could be alternatively used to buy several other, cheaper instruments that more students could benefit from, instead of spending it all on one single instrument (or device).

Karl: ... den koster jo sikkert en tusenlapp eller to, den saken der og så, skal du ha en iPad til to og et halvt til tre tusen i tillegg, så... kunne du ha kjøpt to elpiano eller to, fem eller sju gitarer for samme prisen. sant? eller to xylophoner og...

Hege: Hundre ukuleler

Hege and Karl mention how the administration at their school recognises the need for creativity and music as a subject. This causes the music teachers to be able to buy a wider selection of equipment, as they are given a bit more funds from the school's budget. Karl states that they see the value of music and that they are very lucky to have such an administration. Both participants do note, however, that other schools are not as lucky.⁵ They give examples of other schools they have been to, where music rooms are grouped together with other subjects – not necessarily to be more efficient and save space, but because the school can't afford to have or does not prioritise a designated room for music education.

Karl: Altså, når vi er kjempeheldige oppe hos oss, for det vi har en ledelse som har

Hege: Er litt glad i praktisk

Karl: Som er glad i musikk

Hege: Ja

Karl: De er glad i musikk, og som ser en verdi i musikken ...

Tor and Ole do not talk about their administration, but Ole says that he has iPads and Microsoft Surfaces available for use at his school. This arguably does directly imply that the school he works at allows music some freedom when it comes to the use of their finances.

Intervjuer: Mhm. Det er jo absolutt en rammefaktor der. Det er jo, har dere noe slikt tilgjengelig hos dere?

Ole: Vi har faktisk en del iPad, jeg tror det er iPad mini som brukes.

Intervjuer: Ja.

Ole: Og så er det en del sånne Microsoft Surface tablets.

All the participants recognise the need for physical instruments or devices in order to be able to use these products presented to them. This crosses between the category of expense and accessibility, as expense appears to heavily influence the participants' accessibility to music technology. When discussing Soundation, I mention the additional branch of Soundation4Education, which is Soundation specifically designed for educational purposes, in collaboration with MusicFirst. None of the participants had heard about it, though Karl thinks he might have gotten a mail about it in the past. After I tell them what the product can do, Karl

⁵ Lucky was considered to be put in quotes, as schools are supposed to have a set percentage of their budget to each subject by law. The intention is not to accuse, but many teachers have indicated that schools tend to alter these numbers slightly, in order to favour other subjects and that the creative subjects tend to be neglected.

states that this sounds like something that costs money, which then drastically lowers its suitability for schools in general.

Karl: Neida, men sannsynligvis ser jeg for meg at det er en tjeneste som de gjerne vil ha littegrann penger per bruker på, sant? Og da blir det, da plutselig så synker jo aktualiteten ganske mye igjen som sånn

Karl says that money is key when it comes to school contexts, which sums up this entire issue quite perfectly.

Karl: Så, det er liksom litt sånn, det at ting ikke koster noe særlig med penger, det er litt sånn alfa omega, i skole, de fleste skolesammenhenger ...

This is also something that both Tor and Ole note.

Tor: Så er det jo gratis, da.

Ole: Det har masse å si.

4.3. Accessibility

This section focuses on the participants' statements regarding what access they have to music technologies. An impeding factor that was discovered during the interviews was how restricted the computers are in Norwegian primary and lower secondary schools. This will be discussed in the next chapter. The municipality exercises complete control over any programs that are installed on their computers and if an additional program is to be installed, it must be applied for by the schools. This lowers relevance for any programs that need installation on devices quite significantly and those who are web-based are desperately sought after as a result.

Karl and Hege started to talk about Skoog and they quickly noticed the fact that it is primarily intended for use with an iPad, which they do not have access to. Therefore they would also have to rely on purchasing compatible devices along with the Skoog, which in itself is not free. Karl then said it would be too much trouble to inquire about purchasing Skoog for their teaching and that the cost would be too high. While they both are sceptical as to how well it would work in a classroom setting, Hege adds that if they were to try to make it work, they would have to go all in. One would have to have an attitude to make it work and integrate it successfully – and not just let it be something you for fun one time and do half-way.

Hege: (...)Det kunne ikke vært noe sånn halvveis "vi prøver å få det til", da må du ha en instilling at du skal få det til og integrere den i...

When I later asked if the fact that a product was free contributed to its usability, Karl answered that it was basically a requirement. He added that if something were to be used in schools setting, you would quickly need 20-25 licenses. If you then were to purchase 25 Rocksmith-licenses, much of the school's annual music budget would be spent. Hege also pointed out that when she was teaching Soundation, she used splitters so that the students could sit two by two and cooperate, in order to let everyone have a computer to work with.

Intervjuer: Har det aspektet at det er gratis, eller ganske gratis i dette tilfellet mye å gjøre med at det blir brukt, tenker dere?

(...)

Karl: Absolutt, det er nesten en forutsetning, (...) for at du skal kunne bruke noe i en musikktime, undervisningssammenheng, så trenger du jo fort tjue, fem og tjue lisenser(...)

During the subject of prices to install Rocksmith and talking about how much it would require to both purchase and install products on their computers, Karl says that there is a sum for the municipality to make the product available to them, and a yearly fee to keep it available to them. This presents itself as a restricting feature when it comes to what products are available to teacher as the municipality have total control over their computers. He adds that if they would want something in addition to the municipality's selection of products, the school would have to pay for it. This, he adds, causes web-based programs, which has become more and more common after web 2.0 to become first-rate for them and their teaching as no local installation is required to use them. Hege adds that sometimes the only requirement is the type of web-browser they use. Ole and Tor also express this view, and Ole says that in the municipality which he works, the IT-department is very eager and efficient – so he has no liberties when it comes to installing programs either.

Karl: Skal du ha noe ekstra, så må skolen betale for det.

(...)

så koster det en viss sum i året for å holde det der. Så det er jo da og en sånn ekstra greie med, hvis du skal ha (...) webbaserte programmer som, etter web 2.0, har blitt vanligere og vanligere og vanligere nå, så er jo det helt glimrende, for de krever ingen lokale installasjon...

Hege: (...) av og til så er det nettleseren det kommer an på.

I asked the participants what their municipality offers them in terms of products for use in their teaching. Karl and Hege have to take a second to think, but eventually respond that they have a couple of free-license programs such as Finale and Audacity available for remote installation by the IT-department should they choose to. Other than that, music programs are scarce in the selection, according to Karl. I also ask if these programs are something that they use in their teaching, but neither of them do. Tor and Ole, when asked the same question, answer in more or less the same way. Ole says they do not have any programs that he knows of, but adds that he usually teaches the youngest part of primary school, so such programs are too advanced for his students. Tor says he might have opportunity to have Audacity remotely installed, but he is not completely sure.

Karl: Ja, det [Audacity & Finale] ligger der. Ellers, så er det vel lite av musikkprogrammer

Hege: Ja

Intervjuer: Er de programmene noe dere bruker i deres timer?

Karl: Nei...

Karl and Hege adds to the availability of products that they have recently gotten a computer with Cubase installed, which they call a multimedia computer. In addition, they purchased a Focusrite audio interface and a couple of studio monitors, and created a small recording studio, with which Karl is very pleased. He does however acknowledge that this is one single computer, and they amount of student work that will be done on it is small. Hege envisions that it will be used for recording of choirs and producing CDs. One example they also use is for projects. If the students compose something, they get to record it on the computer. They both underline the fact that this computer will be heavily controlled by the teacher, as the students do not have the knowledge required to use the interface. Karl and Hege both agree that it would not be very motivating for the students to create products using poor quality recording equipment where, for instance, fan noise is apparent in the background of a recording. They have set themselves a standard that the product a student creates should be something they would want to show to their parents or friends. By using pre-recorded loops and samples in, for instance, Soundation or GarageBand, this is much easier than if they were to create everything themselves.

Karl: Wohoo. Vi har fått en såkalt multimedia PC, med Focusrite lydkort og studio monitorer og, har laget et lite lydstudio. Så det får vi se om vi kan utnytte på et eller annet

vis etter hvert, men det og er litt sånn, okei, det er én PC. Så da er det litt mer sånn at da blir det litt, blir nok ikke så veldig masse sånn, elevarbeid på den.

I asked Karl and Hege what would make the products more relevant for them and their teaching situation. They responded that both GarageBand and Rocksmith would be very handy to have as a web-based option. Since GarageBand is limited to iPads, which they do not have, it is not something easily accessible to either of them. He notes that it is a wonderful product, but the main obstacle is the compatibility. They do not have enough electric guitars for an entire class to be playing Rocksmith at once either, so Karl suggests a small microphone that could be attached to e.g. an ukulele, of which they have plenty, and then corded into a computer. Tor and Ole also note this, but Tor suggests station work in order to make it work with many students, few guitars and computers

Hege: Jeg har tjuetre elever på det meste i musikk.

Karl: Tjuetre elgitarer.

Hege: Skal du ha tjuetre el og bassgitarer, da

Karl: Nærmer seg raskt hundre tusen kroner, det

*(*latter*)*

Hege: Det kan jo bli veldig voldsomt. Det har jeg ikke tenkt på før nå.

During the first part of the interview, Tor says to Ole that he does not have iPads available for use at his school, but he has a computer room with fifteen computers that works fine. Ole says he has iPad Minis and some Microsoft Surfaces. When they explore GarageBand, Ole states that it looks like it could be fun to try something like this with his students. During the second half of the interview, he asks how much GarageBand costs to purchase and is very delighted when told that it is free. He then exclaims that he will definitely be using this for his next music lessons.

4.4. Attitude

I started both interviews by asking the participants what they thought of when I mentioned the term “music technology”. The responses from the participants were similar. Karl said he automatically ventured into the world of computers, with Cubase, plug-ins, recording and music production. Hege said she thought of computers and guitars, like the image on the Soundation homepage, which by accident was left up on the screen. Ole said he pictured speakers, mixing

desks, amplifiers and things “on that level”. Tor however, said that he considered all instruments as a part of technology. He focused on the development throughout, but noted that it is easy to consider it as the newest, latest, and that which is electronic.

During both interviews, the promotional video of Skoog refused to play. Hege and Karl resorted to finding the video on their mobile device, whereas Ole and Tor went on to exploring other products – therefore only Hege and Karl discussed the Skoog. They found it to be a product more suited for music therapy and not really something for their type of teaching. They said it could be a fun thing to have and play with, but not something to spend a lot of money on. They also mentioned that it featured too few buttons to play with, and that as a result their students would quickly get bored of it.

Hege: ... Jeg tror ikke dette hadde vært noe jeg hadde gått veldig inn for at vi skulle fått oss.

Karl: Nei, jeg tror heller ikke det. (...) hatt en for at det hadde vært en litt gøy greie å ha, men ikke sånn ..., dette bør vi satse penger på.

When discussing Rocksmith, all participants mark that they’re discussing a video game. Ole coined the term “gimmification”⁶ when asked to describe Rocksmith as a product. Karl and Hege mentioned that you could learn to play guitar to some extent, but that a teacher or at least a textbook would be required to cover the theoretical aspect or as Hege states: the why or what. Rocksmith then serves as a motivator and a way to practice technique.

Karl: Så kan Rocksmith være en sånn, et spill for å så, motivere og øve teknikk.

Hege: Mengdetrening, kanskje

During their exploration of Rocksmith, Tor and Ole both say that it is an exciting product because it utilises a real instrument. However, they have different attitudes regarding the outcomes of playing Rocksmith, with Ole emphasising its value in terms of motivation, while Tor notes that it seems fun “to do”. Ole also notes that Rocksmith seems to be an easier way to learn guitar compared to the traditional way, where a student would “place themselves in a vacuum” (meaning that they individually practice) in between classes. He also mentions the

⁶ The term “gimmification” is not commonly used in this context– but is phonetically very similar to “gamification” which is a much more used term when discussing activities in game form. It is possible that Ole’s pronunciation was misheard during the transcription, but it is still very probable that he was referring to the latter.

aspect of constant feedback through the game's automatic difficulty adjustment. Ole believes that the learning of an instrument should be done intensively, and is critical to the common practice of rehearsing once a week and expecting something to happen until next rehearsal, and when it doesn't you tend to become stagnant.

Ole: ... Jeg vil jo tro det at det vil tenne ungdom og det virker jo som en lettere måte enn den, i hermetegn, tradisjonelle måten å skulle lære seg gitar - Der du må sitte nærmest i et vakuum, i mellom timene dine, sant. (...) Så får du direkte feedback hele tiden på hvordan det går.

Ole and Tor independently agreed with Karl and Hege's statement about how Rocksmith could serve as an introduction, and provide practice and motivation. Tor further says that they can be introduced to the product at school, and if it is something they find interesting, they can acquire it for themselves. When asked if they find any features missing or weak, neither of them can think of any.

Tor: (...) syntes det virket som en bra, en kjekk introduksjon til gitarspill.

Soundation is a product that all participants have experience with, and use to variable extent in their own teaching. Karl states that it is simply awesome, to which Hege agrees, and adds that it is very fun and motivating. When I ask what made it so motivating, she answers that it is user friendly – it is easy to comprehend, and be productive in. They both mention that it's easy and fast to get a product back. The students easily get a feeling of "Woohoo! I've made music!" to use Karl's words. This aspect is something that will be further discussed in the next section: "Usability".

When asked what would make Soundation even more relevant, or more suited for their teaching, Karl suggests a wider selection of samples, not only electronica, to which Hege agrees. They also said that Soundation did not appear to be as "composer-friendly" when wanting to create a song as they had hoped. Tor and Ole also shared Karl and Hege's view on the samples found in the free libraries included with the software. Tor adds that some are very unattractive, and even that hearing some of the samples again, would drive him insane.

Tor: ... det er enkelte av de samplene som jeg blir helt gal av å høre igjen, da.

Soundation could be used to achieve some of the competence aims in Norway's curriculum for music, and cover subject areas such as composing or making music to some extent, Karl says.

When asked what role music technologies such as Soundation could serve, he answered supporting tools to motivate, to create some sparks and to do something different now and then – which, he adds, seems to have worked as some of their students have created their own user accounts in Soundation at home.

Karl: Vi har hatt elever som kommer og "Jeg har laget meg konto hjemme".

Hege: Ja, og alle skulle ha med seg passordene hjem, for de skulle gjøre dette hjemme (...)

When discussing GarageBand, Karl and Hege both state that it would be great to have at least 10-12 units of it, because like Soundation, their students can quickly create songs and the user interface is easy to navigate. However, its confinement to iPads, which they indicate have not been available at their schools, causes the relevance to drop significantly. Tor states that GarageBand looks really good and appealing, and that the design and look of it makes up for any flaws or weaknesses it may have, such as its interface, which initially was a bit hard to navigate. He also said that the synths and drums in GarageBand sounded better than those found in Soundation – and that the sound in GarageBand was easier to manipulate so that ultimately material produced using it sounded better. Ole agreed with this and said that he had several iPads available for use at his school. He did not know, however, that GarageBand is a free download, and when explained that it usually came pre-installed on new devices, he exclaimed enthusiasm and said he wanted to try GarageBand with his students at his next music lesson.

Tor: (...) det ser tiltalende ut med farger og de der ikonene. Syntes det ser mer tiltalende ut enn for eksempel det der Soundation.

When asked to describe the products, Ole stated that GarageBand could serve as both a toy and a tool, because you could sit and “touch” the strings on the guitar on the screen, and simultaneously create music with it. Soundation served more as a specific tool, and did not give any indication of being a toy. When Tor says that he believes that these products are good tools, Ole agrees and says that while Rocksmith is a specific tool for learning to play the guitar, Soundation and GarageBand is more about understanding how music can be developed (with interwoven sounds) – there are more elements and one can explore them all.

Ole: Men jeg, spesielt den GarageBand, den inspirerte meg litt. Den skal jeg prøve.

Both Hege and Karl express a view on music that emphasises *playing, trying, and doing* music. They say that music theory appears to be of less relevance to the students, and if they really

want to learn about music history, theory, etc., it will not happen during primary school. If a student becomes interested, they can go back and discover who did what, how they did it, etc. Karl says that it is about putting together and connecting sounds and notes into music, and whether you do that on a xylophone or by pressing buttons on a computer, it is basically the same thing – the learning outcome is identical, but through different means.

Karl and Hege also express concern regarding the downscaling of the aesthetic subjects, and mention the widespread challenge of music classrooms which have been combined with other subjects, such as arts and crafts or food and health. Music can become something you have in every room, because there no longer is a dedicated music room in some Norwegian schools. They also mention the school's focus on physical activity, and say that they are encouraged to have five to ten minutes of physical activity per hour. Karl jokingly imitates an administration asking what good guitars will do, and that they have just purchased volleyballs for the sports section, since the sport is still strong.

Karl: ... det blir ... sånn (...) hva skal vi med et klasesett med gitarer(...) Nei, vi skal, vi har nettopp kjøpt inn noen volleyballer til gymmen, så. For idrett, idretten, den, den står sterkt fremdeles.

Karl and Hege state several times how products that require local installation processes, and/or cost money quickly become less relevant as there are heavy restrictions on both their financial freedom and what they are allowed to install on the school's computers. When asked towards the end of the interview, if they had any final thoughts to share, Karl envisions a web-based Rocksmith. Hege adds that the requirement for electric guitars makes the use of Rocksmith difficult. They both conclude that a USB that could be attached to a ukulele, of which they had plenty of at their schools, would increase the relevance of the product for their teaching. They both also show enthusiasm towards GarageBand's functions and design, and when asked how it could be made more relevant for their teaching, Karl suggests a web-based solution, much like Soundation. Hege says that new approaches and new ways of doing things then become crucial in music. They both agree that technology is a good way to revitalise the subject and prevent it from becoming neglected even further in education.

4.5. Usability

Usability may indicate how much time the participants are willing to spend on a product. It also gives an indication of how much they are willing to let their students spend time on it, as well as how intuitive the products are in terms of navigating, *getting the grip of it*, commonly referred to as *user-friendly*.

When discussing Rocksmith, Hege says that it could be used as a motivator for students who find it fun, but still have a learning outcome from the interaction with the product – which Karl also confirms. Ole said that he believed Rocksmith would ignite interest in youth and be an easier way to learn how to play than the traditional way of learning instruments. Also, the constant feedback in the form of ascending or descending difficulty constantly lets the player know how they're doing, in his estimation. Tor added that he liked the fact that they were using real instrument, and mentions Quest for Fame, which he played when he was younger, using a guitar pick connected to the mouse hub to strum. Tor also mentioned that he felt like he played better than the game registered, and noted that that had also been the case when playing Guitar Hero or Singstar as well.

Hege: Jeg ser jo sånn, for eksempel for en elev som trenger motivasjon for noe han syntes er gøy og hadde syntes dette her [Rocksmith] var gøy, så hadde det jo vært ypperlig.

When talking about GarageBand, Karl says that having a set of licenses for a class, 10-12, would be absolutely great. He then says that they could have a lot of fun with it. All participants are strangers to Rocksmith to some extent - no one has tried it, though some have heard of it. During the first part of the interviews, they try their hand at playing songs, and exploring the codes of the game: what different symbols, colours and actions mean – as well as how they are supposed to react to them. Karl, Hege, Tor and Ole all use the first song they try to understand what they are supposed to do. During their playing, they mumble words such as “of course”, and “okay”. Tor say it took a while before he got the hang of it. He also added that this seemed to work well, he was just reading it wrong. During the break, Karl says the reason he did not understand it at first, was that maybe the difficulty was at such a low level, intended for those who are really novice – it was too easy for him to understand it. He also said that maybe he had played too little Playstation to understand the game. Hege adds that they just need to keep trying, to see if they get the hang of it, to which Karl agrees.

Karl: Okei, men vi prøver en av disse greiene her igjen, bare se om vi skjønner det litt bedre.

When I asked Karl and Hege what made Soundation cool, fun and motivating (which they characterised it as), Hege said that it was user friendly and Karl added that you could quickly drag in three blocks of sound, hit play and say “Woohoo! I’ve made music!”. Hege elaborates by saying that the students quickly get a product in return when using Soundation, and so they are able to hear what they have done on the computer. The fact that they see a result quickly is something they find very motivating, she adds. It cannot be a long-term process. Karl and Hege also find that GarageBand has the same features as Soundation, with their selection of loops and blocks of sound ready for use through drag-n-drop.

Karl says they have access to Audacity, which is a free DAW, but Hege and himself does not use it. When asked why, Karl says that you have to put everything manually into it yourself. It is not like Soundation where you have a library of sounds and loops, which can easily be put together to form a backing track for them to sing to, etc. In other words, it is too difficult for them, and they do not have the knowledge required to create a song in Audacity.

Karl: (...) Så det blir litt for avansert for de (...)de har ikke kunnskap til å kunne lage det de trenger for å lage en sang innpå der.

This is also something Ole mentions, as he primarily teaches the youngest students in primary school. He has not used Soundation with students younger than grade five. For him, the use of tablet software with a user-friendly interface will be most relevant. Karl and Hege, when talking about Soundation, says that it works very well in an educational setting, when the students are able to use their computers. Hege adds that not being able to use a product or the computer, is in itself a bigger problem – she talks about one experience she had when the Soundation website seemed to be down for some of her students.

During the first part of the interview, Tor and Ole encountered a sound error with the computer, which was discussed in section 3.3.5.4. They spent a lot of time trying to troubleshoot the problem, but were unsuccessful in doing so. After examining more or less the entire system, they summoned me to aid them. After thorough troubleshooting without success, we had to continue the session with the sound problem still in effect. During the break, Tor and Ole joked about the technical problem being the real objective of the interview. They said this was the

reason they held off calling me until they did. This experience also supports the section above about technology working as intended. When it does not, the problems could be easy to find, or in this case, impossible – or as Hege stated, a server problem, i.e. out of their hands.

Tor: (...) Vi begynte jo å lure på om det var det som var den egentlige oppgaven.

Ole: [Ler] Det som var testen.

[Alle ler]

Intervjuer: Et psykologisk spill

Ole: Kan musikk lærere egentlig?

Karl and Hege both add that when Soundation does work, it is an easy product to use and if you have had to little time to prepare for a lesson, Soundation works as a great relief at the end of a long day, where the students can make music, compose and do some research.

Karl: (...)når vi er ferdig med det, så kan dere gå på Soundation og så kan dere lage littegrann musikk, komponere litt og forske litt.

Tor and Ole discusses using Rocksmith as part of a station setup, where Rocksmith serves as one station. Ole talks about needing to be more than one teacher, to keep an overview, while Tor says he could pull it off by having activities with the rest of the group, while they circle around to other autonomous stations. He adds that if there is someone in the class who are unable to be by themselves, this would be much harder.

When asked about their exploration of Rocksmith, in terms of different features and activities within the product, Tor and Ole say that did not do much of it, and I end up telling them about a lot of the other features. When they talk about features that they wish the product had, they are pleased when I explain that it already exists within the product, they just had not had the time to find it.

Hege and Karl also talk about this during their playing. Hege, like Ole, exclaims confusion when the first song starts playing, and she says she does not know when or what to play.

Hege: Hva, hæ? (pause) Jeg skjønner ikke når jeg skal trykke, spille den.

In this chapter, the process of establishing the four factors has been briefly described, to present the reader with the chronological order of the process. Further, statements from the interviews have been presented to construct a framework of empirical data that will be used in

the next chapter, Discussion. This chapter aimed to present statements as neutrally as possible within the confinements of raw data presentation. It needs to be acknowledged that the data presented in this chapter has been analysed to some extent, as the statements' appointment within the four factors are a result of processing. The raw data would in this case be a pure presentation of the transcripts. That would, however, bring with it a lot of unusable statements, so therefore, a selection of statements from each of the four categories is presented. This is done to present the reader with examples of how the interviews and discussions were executed and to show the state of the data prior to further processing, which is done in the next chapter.

5. Discussion

This chapter is dedicated to discussion of the data, reflection on the findings, and comparison to literature (previous research findings and relevant theories) presented in chapter 2. First, each of the products will be presented and examples of how the factors emerged from participants' discussion of each product will be described. Then each of the four factors that were established through analysis of the transcribed data will be discussed and reflected upon.

5.1 The products

5.1.1 Skoog

The Skoog was discussed much less than anticipated, and because of technological errors with the showing of the promotional video that was prepared for the participants, it was quickly dismissed by Tor and Ole, and they moved on to the other products. Karl and Hege used a backup solution, and found the video on their smartphones and watched it there, which resulted in them being able to discuss the product. In order for the products to be presented and analysed somewhat equally, and having something to compare Karl and Hege's statements towards, a search for reviews of the Skoog unit was conducted in an attempt to find reviews that focused on what users see as both the product's positive and negative aspects. This was done to avoid any form of one-sided argumentation and to minimise my own bias in selecting them. A vital aspect that differs these reviews from that of Karl and Hege is that the reviews feature actual hands-on experience with the physical product, which Karl and Hege did not have the opportunity to experience.

Karl considers Skoog to be a product that is not naturally found within his type of teaching and focus, and Hege agrees and adds that it she thinks it would be most suitable for young children. They both say that it is something their own students would bore with quickly and that development would be difficult. Karl states that the product also does not seem very viable in class settings, though maybe it could be interesting in a small ensemble where the pentatonic scale has been programmed to Skoog's buttons. Several reviews on both Amazon UK and Apple Store mention great success with using the Skoog in their classrooms, and some say it is fun for the whole family, portraying great joy in how easy it was for children to play music. A commenter on the Apple Store said he focused on participation in classroom ensembles and yearly performances and for those in his class with either severe learning or physical challenges, it would not have been possible to achieve that without the Skoog (Apple, 2018a). Another parent shared that her daughter who loved music was now able to play along while her sister played the ukulele (Amazon UK, 2018). An article on www.trustedreviews.com say that "Most of us would love to play a musical instrument, but don't have the time to spend learning how. Skoog is a digital instrument for us." (Svetlik, 2015) indicating that adults benefit from this product as well. The comment on the Apple Store saying that it is fun for the whole family also supports this. Karl and Hege discuss how if they had a Skoog on their class, they would have to spend some time preparing the device, choosing tones, instruments and such, taking up valuable time in their busy schedules as teachers. They also agree that if they were to include the Skoog into their teaching, they could not only have done it half-way, they would have to really go all in on it. This argumentation from Karl and Hege may suggest that their view of this technological product is not overall positive. They do note, however, that it looks like interesting, just not something immediately appealing to their style of teaching or their students. It then becomes natural to code this statement on Skoog as attitude towards the product.

An aspect that was untouched by Karl and Hege, was technological problems with the product itself. Since they did not have the physical product to explore, they could not discover any such problems. However, some online reviews mention problems with the triggering of the Skoog, where triggers were not registered, making it frustrating to use (Geisz, 2016). An online review at Amazon UK reported the app crashing constantly (Amazon UK, 2018), which was also not something Karl and Hege could experience. While untouched by the participants, it indicates and supports the notion of technology not always working as intended.

One of the aspects of the Skoog that was impeding in the eyes of Karl and Hege was the price of the product – more specifically if it was free or not. While neither was told the price of the Skoog, Karl guessed in his statement that it would cost between one and two thousand NOK. At a current listing price of around 2000NOK (\$238)⁷, Skoog is the most expensive product amongst the four included in this study, if one look at the isolated price for the products, excluding any hardware needed to operate them. If one were to include the cost of peripheral equipment and e.g. played Rocksmith on a guitar worth 15 000NOK (\$1783) or used Soundation on a computer worth 12 000NOK (\$1426), the circumstances would be different. Such operational frames would differ too greatly from one school, context and situation from the other to be able to incorporate into the equation ethically. To be able to properly focus on the products in relation to each other, the isolated price is the only price that is incorporated. In Geisz' article on Skoog, he stated that with the problem he had with triggering, he could not justify such a high price for the product (Geisz, 2016). The more you pay for a product, the more you believe you are paying for a product of quality, meaning a product that is working as intended and is durable. Both Karl and Hege gives strong indication throughout their interview that money is a vital part of what causes something to be of interest to them and their teaching. This will also be seen throughout the other products. The coding process directs this statement to expense, which appear to be able to bottleneck many of the statements and will be discussed in section 5.2.

In combination with the price of the Skoog, the compatibility of the product also greatly reduced Karl and Hege's perceived possibility to use the product in their classes. Skoog is intended for use with Apple products and have built-in support for GarageBand, iTunes and other iOS apps, leaving those without Apple products unable to experience all the possibilities that the Skoog offers. Karl and Hege do not have iPads available for use at their school, so if they were to acquire Skoog for use in their teaching, they would also have to buy iPads. They agree that if that was the case and they were to buy both iPads and Skoogs, it would become a costly process. Combined with their doubt on how well it would work in their classes, they say that they could buy electric pianos, several electric guitars, xylophones or a hundred ukuleles for the same amount of money. Karl is bringing up the aspect of accessibility when he says they do not have iPads at his school. As mentioned earlier in chapter four, accessibility is closely connected to expense, as money can dictate how accessible something is to the teachers.

⁷ All conversions of NOK to USD was done during mid-November of 2018, and the currency may have shifted since then. They have further been rounded up to the nearest dollar.

5.1.2 Rocksmith

During the first part of the interview, where the participants were free to explore the products without the interviewer being present, Karl and Hege tried Rocksmith. After trying a song, Hege says she is uncertain how this would be used in a classroom with several students. Karl adds that you would need several units, headphones, etc. They both note that it is expensive, though they are not certain of the price of the product. This conversation was coded as usability and expense, as Hege displays doubt regarding how Rocksmith would be used in a classroom and Karl and her views on economy fit under two of the four codes. It is also supported by Karl statement that it would be a great way to learn, if they had unlimited resources.

Expense is mentioned in several forms regarding Rocksmith, which reinforces the position that this concern has in relation to this product. All participants talk about needing to have enough electric guitars to play. Norwegian school teachers often tend to have a couple of electric guitars at their disposal, but far more acoustic guitars or ukuleles. The price of an acoustic guitar is much lower than electric ones, and ukuleles are by far the cheapest common string instrument. Further on finances, Karl and Hege say that the municipality charges for installing programs on their computers, as well as a yearly fee for it to be kept available to them, while Tor and Ole do not mention the latter restriction when discussing Rocksmith.

Rocksmith is a program that must be installed on a computer to be operational, which is difficult because of the restrictions on school computer systems. Some programs are available to the teachers, but the process of incorporating a new program into their selection, i.e. making an exception is difficult according to Karl and Hege. This is one of the key restrictions when discussing which programs are relevant for the teachers to use. If a program was to be installed on their computers, they would much rather find an online option.

Karl and Hege's attitude towards the product is overall positive and they see the value that it can bring to an educational context, but the other factors (having enough guitars, having it installed on their computers, finances) restrict it from being something they will buy in the foreseeable future. Tor and Ole appear positive towards the product, and Tor says he believes he could make it work using a rotating station set up in his classes if the amount of licenses and guitars were limited.

5.1.3 Soundation

None of the participants explored Soundation, although Tor and Ole briefly touched on it while they were troubleshooting their sound issue. It is understandable, as this is a product with which all participants had some experience with and had used in their own teaching. Exploring it in this study may then not bring anything new to the table in their eyes, since they have prior experience with it. Since they all had experience with it, they could talk a lot about it and share their reflections and experiences, which proved useful.

Karl and Hege both loved Soundation. They characterised it as wicked cool, fun and motivating, because it was easy, quick to use and, motivating. It strongly suggests that they see a positive learning outcome from the product and that its usability is well tested and approved by them. Their attitude towards Soundation is also visibly tainted by its possibilities, not to mention their past experiences with the program.

In terms of finances, Soundation appears very relevant to the participants, which they all note, because it can be free. The free version of the product has a lot of potential, with over 700 loops and effect to choose from. In terms of what the students have potential to learn, even with the free version, there are more than enough possibilities for different end-products, combinations and creations. The aspect of a free program that is not required to be locally installed, appears to check all the boxes for a relevant product for the teachers. The fact that it is online based then seems to nullify the restriction of finances and accessibility, because there are no expenses which does not limit the accessibility, both in terms of paying money for a product. This is supported further since they technically have access to it as long as they have their computers and a working internet connection.

5.1.4 GarageBand

The version of GarageBand that the participants explored was on an iPad. It is also available on Mac and iPhone, with a bit different layout according to screen size, but the main features are shared between the devices. For Karl and Hege, GarageBand is similar to Soundation, in that it is user-friendly, quick and easy to use. Their attitude towards it and the usability is, for them, basically identical to Soundation. For them, the Achilles heel of GarageBand is the fact that it is exclusive to Apple products, understandably. As mentioned before, they do not have Apple products at their school, therefore they do not have access to this product. Further, their access to it is restricted by financial factors – placing GarageBand in the same position as

Skoog. Tor and Ole share a similar opinion on the product as Karl and Hege. They also find it very user-friendly and Tor states several times that it looks really good, especially compared to Soundation, which he believes his students find a bit dull, visually.

One of the most surprising moments during our discussion on GarageBand, was Ole's moment of epiphany. He had said earlier in the interview that he had access to iPads and Microsoft Surface tablets, but he did not know that GarageBand was included in Apple's products. He erupted in joy and said that he would definitely use GarageBand in his next music class. Discovering that you have access to a product which you see so much potential and use in, must be quite a relief for Ole. It is safe to say that both Tor and Ole are very positive towards GarageBand, and their statements are coded accordingly.

5.2 Themes

5.2.1 Expense

According to the statements by the participants, expense appears to be one of the biggest issues of relevance when it comes to impediments to bringing these four music technology products into schools, as a lot of what they say can be rooted in economy. It is seemingly a barrier that will continue to exist, even though equipment and products have become more affordable (Brown, 2007, p. 305). Economy is the foundation of society and in this case what enables the schools to be open and educate the public. This causes a ripple effect, affecting each subject area. The factor of expense can however not easily be altered without a positive attitude, access to it or a projected positive outcome of using a product. In other words, if the teachers were to get more money, they would have a higher accessibility to music technologies, but this would also need a perceived learning outcome in the products by the teachers and an attitude towards technology that suggests that they want to and know how to use it.

Funding of the schools in Norway are primarily sourced from the government, both local and state. Funding for primary schools, lower and upper secondary schools are mainly the responsibility found within municipal or county governments and the state government covers roughly 25% of the total costs, but mostly focused on higher education. Looking at the statistic showing where the funding comes from to education in general, found in Solholm's article (2016), we see that government funding combined equals just above 91% of the total expenditures of education in Norway, whereas local governments cover 2/3 at 66%. The second

biggest funding source is households, at 8%⁸ and in third, businesses contribute less than half a percent (Solholm, 2016).

An aspect that may have been perceived differently by the two pairs of teachers, was the foci of the interview and the study. When presenting the interview to the participants and what the study focused on, the briefing given at both interviews were attempted to be as identical as possible. When reading through the transcripts and analysing the participants' statements, their statements were understandably not divided equally amongst the four categories. This is understandably natural, as none of them will have the same predispositions and biases brought into the study's context and setting, yet, the difference is base for wonder. Karl and Hege talked a lot more regarding expense than Tor and Ole. In reflecting, this may have been influenced by their interpretation of my briefing regarding the interview and study. It could also have been their subjective focus on what they wanted to emphasise when it came to using music technology in their school, meaning what restricted them the most, in their opinion. Karl and Hege could have felt that they have less financial freedom at their school, resulting in them focusing more on finances. They do however note that they have an administration and principal that values music and allows them to buy some extra equipment. The Norwegian term "å tøyе strikken", translates to testing the boundaries that are set. Karl and Hege might also feel that since they are already, in their words, blessed being allocated extra funds, they are not comfortable asking for even more from their administration. They might also unconsciously be trying to promote the fact that they are able to inquire extra equipment as a result of their financial freedom. The difference between the pairs may be explained through their individual perceived usability in the equipment, or what learning outcome they intend for their students after the class is over. This moves the discussion into usability. The subject was also briefly touched upon during the first part of the interviews, when the participants was asked what they considered to be their most important task as a music teacher. Tor and Ole talk very scarcely of finances, but they subtly mention it in their acknowledgments for e.g. enough guitars for Rocksmith. Unlike Karl and Hege, Tor and Ole are from different schools, and also from different parts of the school system, which automatically gives them several differences in terms of teaching, curricular goals, students, and so on. Ole may not be as concerned or occupied with finances, since he has iPads and Surface tablets available for use at his school. Since none of the other three have this possibility, Ole is at an advantage with his possibilities,

⁸ The 8% here is compiled from expenses for books, writing supplies, tuition fees from private schools. It also covers other education such as driving lessons, adult education and folk high schools.

so he might not have as strong perceived restrictions on his options as the others. However, as Ole states, his students are mainly amongst the youngest in primary schools, so the products normally used when referring to music technology are above their capabilities. Therefore, his focus lays mainly in simpler user-interfaces on the tablets that the youngest students can use. This discussion is again moving into the category of usability and will be continued there. Tor does not have the same technological products at his disposal. When asked by Ole, he said had a computer room with about fifteen usable computers. His lack of concern regarding finances must be rooted in something else, as his and Ole's settings are so different. Reasons for that could be rooted in the other categories, but a possibility that includes the factor of expense could be sufficiency. There might not always be a need to strive for the latest or best products to teach the students. In that process, what the teachers already have, may be well sufficient. If the school was to purchase a lot of expensive equipment, teachers could very well feel an obligation to use it, even though they may not be qualified to (Purves, 2012). Tor may feel that what he has available in terms of technological equipment is sufficient in relation to what he wants to achieve with his teaching. This aspect may also be true and applied to the other participants, but Tor's lack of financially grounded statements and the fact that he does not have the same equipment as Ole, may suggest other motivational elements than the other participants. Equipment-wise, he is fairly equal to Karl and Hege in that neither of them have iPads or Microsoft Surfaces, but they voice their financial concern more than he does if that is where it is rooted.

Table 3 - Prices for Rocksmith 2014 (cable included)

| | PC | Xbox One | Xbox 360 | Playstation 4 | Playstation 3 |
|-------------------------|-----------|-------------------------------------|------------|------------------------|-----------------------|
| Highest available price | 499 NOK | 799 NOK | 749 NOK | 848 NOK | 749 NOK |
| Time of peak price | Late 2016 | Early 2016 & Late 2016 - Early 2017 | Early 2016 | Early 2016 – late 2016 | Late 2015 – late 2016 |

While Tor and Ole do not talk much on the subject of expenses, financial concerns or economy in general, Karl and Hege do, at least more directly than Tor and Ole. During their alone time

with the products, Karl and Hege briefly discuss the price of Rocksmith and they both express a viewpoint that it is an expensive product, ranging at about 1000NOK (\$119). Karl did also mention during the briefing that he thought about costs in relation to Rocksmith, and that it would be too expensive if the product was then found to be uninteresting or not living up to the expectations. I purchased my edition of Rocksmith a couple of years ago, but could not remember having paid very much for it, so I searched online for the pricing history. Using www.prisjakt.no, a website that tracks prices from online and physical stores, the change in price for PC, Xbox One and PlayStation 4 since Rocksmith was released in 2013 could be found. According to their statistic, and as seen in table 3 (p.56), the highest price for Rocksmith for PC was listed at 499NOK (\$59). For Xbox One and Xbox 360 the peak price was respectively, 799NOK (\$95) and 749NOK (\$89)⁹. For PlayStation 4 and 3, the peak price was respectively 848NOK (\$101) and 749NOK (\$89). It should be noted that this website shows the lowest available price since launch, meaning that the table shows how expensive the products was at its lowest. Another factor is that some stores simply charge more for a product than others. The latter may have been the case for Karl, in that the store where he acquired Rocksmith sold it for a higher price than the cheapest available at the time. His choice of platform for the game is also a factor, given that the different platforms are priced differently. As seen in table 3, consoles are in general priced higher than PCs, which could have an impact on Karl's statement. If he was referring to the product on a console, his assumption fits the statistics. During the interview, Karl said that maybe he had played too little PlayStation to understand the game's built-in codes and rules. This suggests that he may have been referring to either of the PlayStation prices of Rocksmith, which are relatively expensive, although the type of console he is referring to was not mentioned. In contrast, as he mentioned earlier when asked what he thought of when thinking about music technology, he said he ventured into the world of music production, studio, Cubase, and so on. This suggests that his common tool for working with music is PC, but he could have a console for leisure activities such as watching movies and playing games.

As described above, Rocksmith and Skoog are rather expensive products, which entails that if schools were to buy these products, they would have to set aside funds for it in their budget. During their interview, Karl and Hege talk about how money could be spent on purchasing

⁹ Rocksmith 2014 for Xbox 360 had a peak price of 928NOK (\$117) that lasted for two days in September 2013 before the price was nearly cut by fifty percent. The price shown in the table 3 reflects the prices that lasted for longer periods of time.

products for their teaching. When talking about Skoog, they include the purchase of the compatible unit, iPad in addition to a Skoog, counting towards about 4000NOK (\$475). That amount could have purchased several guitars, a couple of pianos or a hundred ukuleles, according to Karl. Later when asked how important the fact that something is free is to them acquiring a product, Karl says it is “alpha omega”. He then says if they were to buy a class set of about 25 licenses of Rocksmith, they would thereby have spent the music budget for that entire year, and even taken a bite of the budget for the arts and crafts section. Both statements may indicate an essential feature of attitudes towards the product from the teachers: focusing on quantity as well as quality, being able to supply every student with a “basic” instrument, instead of buying a few costly products that appear to be “cool”. Rather than buying the newest, the types of products they already have, may be enough, which can be supported by Purves (2012).

5.2.2 Accessibility

When Ole discovered that GarageBand was free for all iPads, his obvious enthusiasm indicated that this was completely new information for him. I did not ask him for how long he has had these devices available to him, which could be a possible reason for this event. As Ole said, he mostly teaches the youngest children and has never used Soundation with students lower than fifth grade (age 9-10), and therefore he focused more on setups with easy user interface so that the students could use them. His lack of familiarity with the products available on the iPad may then have been understandable, if he had not had the time to familiarise himself with the unit. Another aspect to it may have been that the units were not purchased exclusively for the music classes. If they were purchased to cover several subjects such as Norwegian, math, natural science and so on, having the teachers share the units may have resulted in Ole not having the opportunity to explore the device as much as if the units were exclusive to the subject of music. Arguably, if the iPad were to be bought to cover several subjects, and not only music, the threshold for purchasing them may also be lower as it would not be an expense isolated to the subject of music. There is a wide array of ways that the iPad can be used as a learning tool in other subjects that is not presented in this study, as it would digress its focus. On that basis, it may be easier to justify, both for the educators and administration, to purchase products that are characterised as expensive by for instance Karl and Hege. Ole’s radiant joy about the product when he learned that he had access to GarageBand, also shows his attitude towards the product, as well as his perceived usability of it. This experience was unique among participants

in the study because none of the other teachers had iPads or any similar type of units available for use at their school.

The participants were asked about whether they had products that the school could offer them, i.e. products that can be remotely installed by the municipality's software-department. Ole said no, but the reason is understandable given the age of his students. Tor said he might have the option to have Audacity remotely installed, but he was not completely sure. He says he did a Google-search, looking for web-based programs. He then found Soundation, which he said was reported as the best or biggest at the time, so he chose that without going into depth on any of the other alternatives he found. Karl and Hege also talked about Audacity and how they could have it installed if they wanted to, but their experience with it was similar to that of Cubase, which they recently have acquired on a single multimedia-computer at their school. Such a program is too advanced for their students, and they do not have the knowledge to use it as intended, nor the equipment as they would have to create any sounds or loops themselves. Karl and Hege stated that without proper equipment, samples and loops with background noise such as ventilation fans, the sound of other students doing the same, and so on, would ruin such an experience for their students. This has caused all the participants to rely on Soundation when working with music production and creation. It clearly triumphs Audacity in that it has built-in loops, making it easy for students to drag and drop loops and samples into any creation they desire as they are unable to record their own audio, both rooted in limited equipment and their abilities and knowledge regarding such procedures.

During the interviews, I briefly asked about Lyderia. It is free, found online and developed specifically for educational purposes. This product came up naturally, as the participants were already discussing web-based music learning, and therefore it is also described in section 1.2. Tor and Ole had heard a bit about it, but neither of them had tried it. Karl and Hege had some brief experience in using it and both say they had started on it but never quite were able to get it rolling. Karl noted that he really liked the concept, and that it had great potential. This leads me to ask the question of why other web-based solutions are not more common with these teachers?

The participants in this study, despite being acquired on random basis, appear to have very similar experiences and opinions on using these types of products. Whether that is to be considered luck or misfortune is in the eye of the beholder. Two participants said they have

used Lyderia for a bit before moving on, and acknowledged that it has great concepts and potential for education. According to Lyderia's own website, the game is used by more than 30,000 students and teachers (The Cultural Rucksack, n.d.), which signifies that it has become more than a gimmick that will fade into the past. One of the groups that I am a member of on social media is specifically for music teachers, intended to share concepts and ideas for music education, and several times people ask for easy to use, free, online music creation platforms. Every time at least a handful of options are provided by the other members, such as Incredibox, Soundtrap, Soundation, JamStudio and Lyderia. If one does a Google-search for online music games or programs for educational purposes, a lot more suggestions of these types of products show up. This naturally raises the question of what the teachers are looking for in a product, guiding us towards the aspect of usability. Theoretically and practically, all participants have access to all of these products, as they are meeting the filter set by the teachers themselves: free, online and easy to use for students.

The price of an iPad can vary, but will in most cases be at a minimum of around 3000 – 3500NOK (\$363 - 424), making it an investment that will be noticed in a school budget as they rarely tend to buy a single unit of anything. During their interview, while on the subject of GarageBand, Karl and Hege talked about how the municipality had spent quite a lot of money on Chromebooks (lap-top computers that use a Google based Android system, are fast and cheap in purchase). They are part of more and more municipalities' new focus on a digital teaching environment, as students in both primary and lower secondary schools are to be given Google-accounts. Chromebooks are cheap to buy, effective in use as they store things online and fast in performance, making them viable tools for educating students in e.g. online classrooms. Karl says that he is hoping that this focus might lead to more music apps that the students can use, for instance something like Soundation. He further says that it is looking very good with the introduction of these Chromebooks and that it will also help to increase the density of computers in the school, allowing more students to be online at the same time. It will also enable them to use web-based products such as Soundation without any problems, as the Chromebook is equipped to handle the demands set to run it. The focus on Chromebooks in schools in Norway is however not something that has happened without impediments, and both parents and researchers worry about cybersecurity, and how their children's profiles are feeding Google's advertisement targeting profile algorithm, making a profit on its user's behavioural data (Jansen, 2018a, 2018b; Rettberg, 2018). This concern and problem is not confined to Norwegian institutions, as many cases are revealed elsewhere in the world. Examples such as

the recent Facebook scandal in which the data of up to 87 million users was improperly shared with Cambridge Analytica (a political consultancy), or the unauthorised spying on adolescents in private settings through the webcam of free, school provided laptops mentioned by Boghosian (2013, p. 131), presented in Hebert (2016, p. 144).

5.2.3 Attitude

One of the main impediments that the participants focused on when discussing the products, was the issue of installing anything locally on a computer. The municipality's computer division enforces strict control over each computer, so anything external, for instance a program that is meant to be installed on a computer, must go through them first, resulting in a protracted process, as well as being expensive. This impediment may seem to cast the participants into a black and white filter. Anything that needs to be locally installed, is immediately deemed inaccessible, as the participants know that if they were to make it work, they would have to go through the process of having the product approved, and everything that follows. It also colours the interviews – every time we discuss a program that needs to be locally installed, the fact that the process must be executed, which is dreary, is immediately brought up. In the case of this study, the only program that needs local installation, is Rocksmith, as the others are either web-based, or featured on or compatible with an iPad. Such a limiting factor may be influencing the other factors, as the attitude of the teacher towards a product, will shine through in a theoretical process of inquiry. If the teacher displays a negative attitude towards a product, the individual may not feel inclined to discuss a possible inquiry with colleagues, much less the administration. They may then not feel a motivation to make a push for the product, which has a price, resulting in no access to the product. Prior to this, the usability of the product must also be taken into consideration, as it either supports or opposes the entire process – why bother inquiring something that has no perceived use or potential?

Another aspect that is relevant when discussing attitude towards technology, is the fear of the new, resulting in technophobia. Ross Purves write about teachers feeling pressured to use new technology, because the school has invested in it, but regardless of the teachers know how to, or are capable of using it. This results in, or is a result of, fear of technology, and several teachers reported that they fear using the newest technology because they feel inept to educate students who they believe are far more experienced than themselves, resulting in lack of respect from their students (Purves, 2012). The perception of the teacher as the “less technological” can also affect the teacher's self-esteem, resulting in less future utilisation of technologies that the

students bring into the school (Ruthmann & Dillon, 2018, p. 317). A technology-rich environment will encourage "...the teacher to act as a helper to the students..." (Brown, 2007, p. 299). It does not appear that any of the participants in this study show any such trait. They are however younger than the average teacher in Norway, which is 43, (Bjermeland, 2003), so if the study was to be conducted with older teachers, such traits may have surfaced more. It may also serve as a factor for the limited acquisition of participants, as discussed in chapter 3. Research also shows that during music teacher education, the amount of technology instruction is insufficient (Haning, 2015). If several teachers show fear or uncertainty in using technology for instruction, because of for instance lack of instruction during their teacher education program, further education may improve that aspect. Workshops can help improve both the comfort and frequency of use of technology. The knowledge obtained from such workshops, are still present months later, though the drop is significantly apparent, so follow up on these skills is required (Bauer, Reese, & McAllister, 2003). This seem to not be the case ten years later, as many teachers report receiving little to no technical support at their work (NOU 2013:2, 2013).

While talking about discovering the joy of music, allowing students to find out that music can be fun and cool, Karl mentions how easy it was for him to discover this because of his father. He shares that when he was young, his father played in a band and on several occasions, he was brought along to band practice with earmuffs. Seeing all those instruments and how they could be used created the base of inspiration for Karl. He emphasises that not many get to experience such a thing growing up. In most cases, students will then have their first meeting with music in an educational setting, which is completely new to them. They will in that case have little or no relation to the music scene prior to said meeting. None of the other participants mentioned any details concerning their introduction to music. They did say during the introduction a bit about their background and why they wanted to become music teachers, where the general response was that music had always been in their life. The exception to that is Ole, who mentioned his reduced number of credits instead. The instance with Karl directs the focus towards an aspect of cultural impact. In his upbringing, he was introduced to music by his father at a very young age and this may have shaped his attitude and experience with music, resulting in an attitude towards music unique to him. The question can also be raised that if this is the case, how has it affected his attitude and relationship to music? It can also be widened to include computer technology, which may very well be the reason for the researcher's bias in this study. This path spirals further down towards the aspect of identity. How has our life, experiences and

opinions shaped who we are today? The scope could be investigated through sociology, focusing on socialisation and sociocultural learning theories in order to further that direction.

Ole stated during the interviews that Rocksmith was a gamification, taking something without play rules and applying game elements such as rewards, quests, progress, and so on to it. It was further noted by all participants that it was a game when asked to describe the product. It could arguably also be described as a tool for improving technical skills on the guitar or bass. The article by Tobias discusses the relevance of virtual worlds to learning of music. He states that discourse around the subject of such games is often concentrated on transition from virtual to *real* performance (Tobias, 2012, p. 536). Whether such a contrast is present in this study remains uncertain, but the benefits from using such products are documented by both Tobias and Pepler nonetheless. The participants' choice of words may be subject to further analysis in order to explore their attitudes deeper in future studies.

An aspect that may differ greatly between the participants, is how the products were presented or marketed to them, meaning how the school, companies, colleagues, friends or others promoted the products to them. How we perceive objects or things in general is heavily reliant on how they were presented to us in the first place. In some cases, that is the only reference we have towards an object or subject and will automatically colour our attitude towards it, resulting in biases and prejudices that are to be challenged upon actual interaction with an object or subject. It may not be something that we are acutely aware of, but it is how the human mind works. Ideally, one should have an open mind towards everything, but most people can agree that this is not always the case in this world. Also, it would benefit one greatly to be educated on a subject before discussing it. That will minimise any factual errors from occurring. Will Durant (1885-1981) is credited with the quote: "Education is a progressive discovery of our own ignorance." It may be understood in a similar way as the phrase "think before you speak". The take-away from this notion is that an attitude towards something may have already been biased in design before being presented to us, leaving us with a preconception of something that is not neutral. It would be wise to, in the least, attempt to counter any such biased information by becoming more educated about the topic in question. Also relevant is how the products were marketed to the individuals who presented them to the participants. To avoid further spiralling into other subjects and disciplines, that subject will be discussed in in the next chapter in a section regarding future research in this area.

During the second interview, Tor talked about his experience on using Soundation with his students, which he had not been teaching for very long. He admits that since it was the first time he had been trying the product with the students, there were certainly some aspects to his presentation of the product that can be improved upon. How the teacher expresses his or her attitude towards something will surely impact the student experience. If a teacher constantly complains about the faults of something, for instance, the overall impression of something would naturally not be very positive, and vice versa. Especially in the case of teachers, who are responsible for educating the students, the teacher's attitude towards basically everything is constantly monitored by the students.

There has been established a call for a change from teaching about technology to thinking with technology (Chrysostomou, 2017), and that we should acquire a holistic approach to technology (Parti, 2017). Further, the acknowledgment that youth is using technology as a platform to experience, share and create music is established. While school curriculum sometimes can centre too much around classical European music, technology allows youth to experience and connect on their personal level. They can apply their own identity in music and feel more connected to it, while it also opens for more than the traditional classical repertoire (Ruthmann & Hebert, 2012). This emphasises the need for adaptive capability in the teachers (Savage, 2012), so that they can be a leader in this shift. While technology allows youth to engage with and express their own culture through the latest music technology with just the press of a button, it is argued that this may pose a risk of them not appreciating the cultural heritage left for them. Having little to no experience in musical performance and the challenges that come with executing a show in front of a tentative crowd, may cause youth to disregard said heritage, alienating it because it does not look familiar to them (Hebert, 2016, p. 143). As a result, they will find their music education elsewhere (Savage, 2007, p. 75). However, there could be too much focus on the technology, endangering us from shifting the focus from music to technology. The evaluation of students and their ability to be able to use technology can be removing the focus from the music that they are creating using these tools. A question to ask is then if the purpose is an *engineering* subject or an *aesthetic* subject (Vinge, 2010, p. 274).

5.2.4 Usability

The main goal of Karl, Hege and Ole can be generalised to create a spark in their students for music, making them attain an interest and experience how interesting and cool it can be and making them feel joy in the encounter with music. Karl and Hege both state that music is “to

play”, and Hege points out that many students may see music as a rather free subject, more to the likes of a break from the pressure of studying and always be learning. In Norway, the subject of music is often seen as low status (Bergroth-Plur, 2013), and the amount of teaching hours it is dedicated in the national curriculum (Kalsnes, 2005), does not help it’s cause, either. A crucial question that surfaces when exploring how much a product costs and what it does in terms of learning outcomes, etc., is how much money should be spent on these types of technology? There may be a fine line between being innovative and exploring new alternatives in the form of technologies meant to aid in teaching, and using technology for the sake of using technology. Developing technology just to prove our ability, without giving any thought to whom it may benefit, may result in an indifference to new technology in the future, or its stagnation. Pignato’s framework based on Aristotle’s principle of *that for the sake of which* (Pignato, 2017), would further benefit such examination. It also may not be beneficial to overuse and over implement technology, just because it exists, resulting in overkill. Statistically speaking, we know that not every single student in any class will become an agent in the same field of work. Thirty students in a class will not all become lawyers, doctors, social workers or musicians. A basic comprehensive knowledge of a subject should still be required (Ruthmann & Hebert, 2012, p. 568). In educational programs in higher education such as teacher education programs or medical students, the likelihood of this is understandably higher as they choose a specific path. For reference, less than four percent of first-time applicants to higher education in Norway applied for law, which is the most popular field (Solberg, 2018). By using that statistic, it is therefore natural to conclude that such an outcome will not take place. The question then becomes about justification. Is it justifiable to spend such amounts of money on high-technology equipment when statistically, only a fraction of the students will find themselves in the respective field of work once they are finished with their schooling? A viable example of such a justification would be if the students was to become a teacher who taught themselves when they became adults. During higher education, the argumentation becomes something completely different, as e.g. medical students need to practice on the same equipment as they are going to be using in their professional life. You would certainly not feel as safe knowing the person who was going to operate on you only had textbook experience. The same goes for a mechanic responsible for making sure your brakes are functioning as intended. Not all students will share the same passion and interest for a subject and that is fine according to Karl and Hege. They both emphasise that they intend to simply show the students what music is about and give them the opportunity to learn that they may want to pursue music. They also say that the learning outcome is the same whether it is done through a computer or

not. With such a goal in mind, a justification for spending a large chunk of the funds on the newest technology may understandably then be harder.

On the same note, Karl and Hege state that they think the subject of music is too focused on theory. Especially during primary school, they are unsure of how expedient it is to teach the students about classical music history, as well as other theoretical aspects such as music reading. If a student attains an interest on the subject, Karl and Hege state that they are more than happy to help navigate for more education on the subject, but their emphasis is to have the students try music. Both see the potential for Rocksmith to serve as a motivator, which could encourage students to continue playing the guitar, for instance. Research shows that playing games like Guitar Hero or Rock Band can aid in establishing an interest for actual instrument performance and training (Peppler, 2017), and such games are reported to have a positive impact on several aspects that are vital to playing a traditional instrument, such as dexterity and rhythm, as well as being better at sight-reading notation (Peppler, 2017; Tobias, 2012).

An essential aspect that is presented in previous literature is that of the adapting teacher. A teacher who is willing to educate themselves further, and adapt to changes are more suitable for further employment, as shown in surveys of the principals' preference of job questions (Juchniewicz, 2015). It is further noted by, for instance, Savage, that teachers need to adapt to technologies in order not to fall behind. He further states that a wrong way to approach the issue would be "coercing music teachers towards certain predetermined positions for the use of music technology" (Savage, 2012, p. 498). The adaptation towards new technologies may also be focused on during the music teacher education, which could prevent the *methodocentrisism* that music educators tend to suffer from. This means that they fail to recognise the value of research methods that differ from their own personal preferences. This further results in a distanced relationship between the taught and the reality (Hebert, 2009, p. 52). Savage's call for adaptation has been picked up by the Norwegian Government, and is manifested in their reports, calling for more education to workers in general (NOU 2018:2, 2018), indicating a need for this trait not only in music teachers. The factor of usability may then be seen as a result of this issue, while also affecting attitude. This may be indicating that teachers who are more educated, who can adapt to technological change, and use the technology that is being introduced, while also seeing the potential in it are a result that is highly sought after. The data in this study, may show that the participants are able to adapt and see potential in the array of technological products

available to them. However, their limited time, which is pointed out by the participants, hinders them from exploring all the options, simply settling for what is sufficient.

Karl and Hege say they have Audacity available to them if they want it, Tor is unsure and Ole say he does not have any product available, though that may be because he teaches the youngest students, so it will not be as relevant for him. The main impediment in using Audacity, is according to Karl and Hege that it is too advanced for their students. While both GarageBand and Soundation has the wide selection of loops and samples for the students to mix however they wish, Audacity does not have that. You are required to make everything from scratch, as nothing is pre-recorded, resulting in a difficulty level above the students' grasp says Karl. Both Hege and himself teach at a primary school, but Tor teaches at lower secondary. He does not say anything about the subject directly, but he still uses Soundation with his students and is unsure of what other tools he has available. While the students' ability level is left uncommented upon by Tor, it is not likely that his students are recording and creating their own samples from scratch, as he said earlier in the interview that he only had a room with 15 OK computers at his disposal. Recording in that environment would be difficult, to say the least. The recordings would be filled with background noises, as commented by Karl and Hege. Based on what the participants are reporting on Audacity, it may seem that the municipality has missed its target group when making a music program accessible to its users. Sure, many of the features of Audacity are found in Soundation, and vice versa, but the base is different. On Soundation there is, if nothing else, loops and samples to be arranged, whereas Audacity is more of a blank canvas. It may appear that the municipality has Audacity in their repertoire for sake of having a musical program in their repertoire, without devoting careful consideration to its capabilities or possible use by music students.

Based on the data collected in the interviews, the discussion chapter has reflected upon the different factors and how they can affect the participants' attitudes towards music technologies in different ways. The findings are on several occasions relatable to findings of previous research, which enforces the validity of the finding, in that it indicates that it is not an isolated case with the participants of this study. In the next chapter, the overall findings of the study, and reflection upon its applications, implications and limitations will be discussed, as well as how study on this subject, should be done.

6. Conclusion

This chapter concludes the thesis and presents a summary of the findings, as well as a reflection on them. Examples of possible applications are discussed, and the meaning of the findings is reflected upon before discussing possible subjects for further research.

6.1 Summary of findings

This study aimed to explore incorporation of music technology through the eyes of music teachers in Norwegian primary and lower secondary schools. Four teachers were interviewed and questioned about their opinions and thoughts, based on exploration of four music technological products: *Skoog*, *Rocksmith 2014*, *GarageBand* and *Soundation*. Their statements were analysed in order to discover types of impediments relevant to the use of each product in school music programs. Based on the empirical data in the form of transcripts from the interviews, there are four main factors that arise as impediments to incorporating music technology into schools: *expense*, *accessibility*, *attitude* and *usability*. They are described both indirectly and directly by the participants.

The participants' statements were ultimately coded into four different categories. They are however not rigid, with influence and interplay between them. None of the four can be viewed as superior or dictatorial, as they appear to be equally parts of a path towards incorporation of music technology in schools, as seen by the participants. If we look at one of the categories, it is possible to see how the others align in order to support that aspect. The following is a presentation of different ways that the identified themes can be arranged in relation to each other. To aid the reader in recognising the main points from the study, figures have been created to show the different situations of power and regulation.

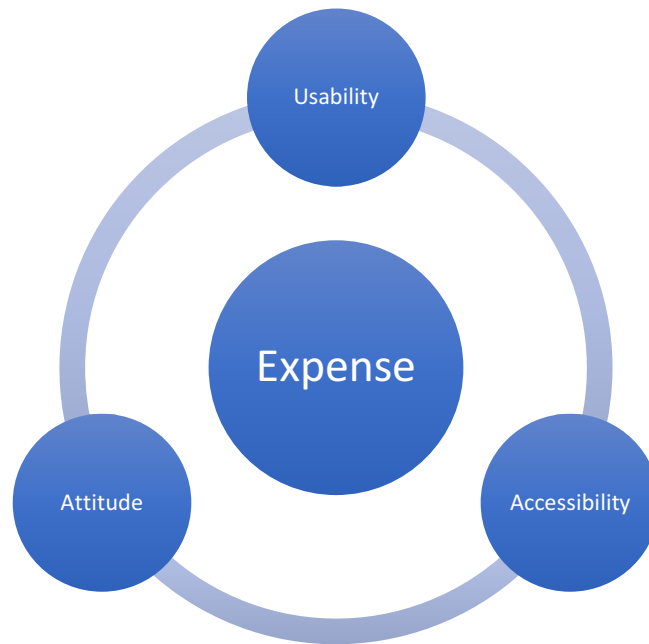


Figure 1 - Relationship between the themes

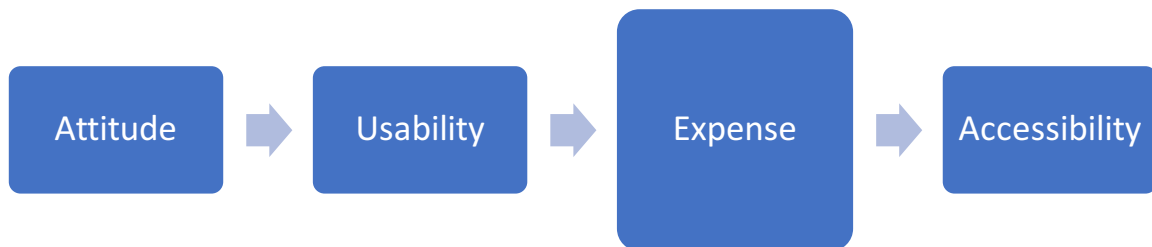


Figure 2 - Example of path for teacher where expense inhibits the part as facilitator or inhibitor

It will help to consider an example. If we were to start using a product in an educational setting, the line of action may look like this. First, the teacher's attitude towards music technology in general, or more specifically that product, company, or type of technology needs to be assessed. Given that they have a positive attitude towards this genre of music technology, they would then need to examine the usability of the product. Will it educate the students, or aid in that

effort? Is it easy to use? In this scenario, the category of expense would either increase or decrease the accessibility of the product. This is simply explained, and there are several agents that expense plays on, in, crisscross of the path above. The accessibility is further dependent on other devices, such as computers or tablets. The attitude and usability through the eyes of the school's administration is also a damning aspect to this process.

Expense can for instance also influence attitude. If there is an attitude indicating that every new technology product is expensive, it becomes a factor in the process as well. An example of this is Karl and Hege's statements on the price of Rocksmith, as well as Karl's statement about Soundation4Education.

While in the figure above, expense appears as the decisive element, any of the other themes can be enough of an impediment alone to stop any implementation of music technology. If the teacher's attitude towards music technology is negative, if it for instance causes the teacher to avoid using new technology, the process ends there. Attitude can also be out of the teacher's control, based on their introduction to music technology, or music in general which was the case for Karl, who was introduced by his father. Another way that it can be out of the teacher's control is how the product was presented to them, i.e. marketing and promotion. A poor first impression can leave a negative attitude toward anything. If the teacher sees no possible use for the product, the process ends there, even if their attitude towards the technology in general is positive and encouraging. They would most likely not force themselves to find use in something just because they like the product. The other end is if the teacher is unable to use the product, simply lacking the knowledge to operate the product. This may further have an impact on their attitude. Expense can also stop the process alone. This can be done either through the administration's refusal to provide funds for the acquisition of the product, or as the participants clearly expressed: the fact that it is not free, is alone enough to render a product unattainable. This is further based on the other factors, indicating that they know the procedure at hand with for instance the acquisition of products needing local installation. Accessibility may also be a stopping factor in this process. In the case of the Skoog or Rocksmith, they are both dependant on external units to work properly, an iPad and a guitar, respectively. The other products also require a unit to be operational, Soundation still needs a computer, and GarageBand needs an iPad. So buying only the product Rocksmith, for instance, is in itself not sufficient.

Each of the themes can be compared to the act of purchasing a television, for instance. Most consumer goods will do. Upon first hearing or seeing an advertisement of a new TV in a newspaper, your attitude towards the type of product is triggered. “I don’t need a TV!” or “A TV might be nice.” would be the contrasting reactions in this example. The usability of the product is then examined, either in the description of the product or online reviews, to see if it can be of any use. “Does it fulfil my needs?”, “Can I use that complicated remote?” Then, the aspect of expense is relevant, by either purchasing the TV at the register for a high or low price, or not. Alternatively, a free one from Finn.no (Norwegian version of Craigslist) will do. Finally, you have access to a TV, but do you have power connected to your house?

Based on the data collected for this study, it may appear that an ideal product can be designed based on the participants’ statements regarding the four specific products presented to them in the interviews. Given the impediments perceived by the participants, a product that is free, web-based, easy to use, and looks and works would sum up the participants’ focal points in the interviews. Tor and Ole say they believe that products like the ones they were shown are good tools, and will help motivate the students by letting them experiment, trying other things than traditional instruments. When asked what would make Rocksmith more suitable for them, Karl and Hege suggested a web-based version with a connection to any classical guitar, without having to purchase several electric guitars for their students. This response emphasises the impediments established, indicating that the participants would rather not have to interact with the processes and bureaucracy from the municipality.

6.2 Implications, application and limitations of the study

The study focused on a small area within music technology in educational settings. One of the motivations for the project was to enlighten an area that had in previous research been little examined. The findings of the study can in many cases relate to research done on adjacent subjects, or be supported using them. An example of this is both attitude and expense. Attitudes towards music technology can be rooted in a fear of technology, digital natives or immigrants, or presentation of products such as marketing. Expense is also manifested in attitude, since the aspect of expenses connected to a product is an important part of the attitude towards almost anything. Findings from the present study help to map out a number of relevant subjects of further investigation regarding the implementation of music technology in Norwegian primary and lower secondary schools, which will be discussed in the next section.

The low number of participants makes it more difficult to generalise the results in the study, which serves as a limitation of the study and will be reflected upon shortly. It does, however, give a good indication to possible impediments in the Norwegian school system, on primary and lower secondary level perceived by its teachers. It serves as a “...single example of a broader class of things” (Denscombe, 2010, p. 60). Despite the participants being chosen without predetermined parameters (simply using those that were available, also known as a convenience sample), the participants are rather similar in their responses, viewpoints and opinions expressed in the interviews. One example of this is the participants’ responses to what they perceived as connoted to the term *music technology*. Statistically, 75% responded variations of the same answer.

As mentioned above, there were difficulties during the course of this study in acquiring participants for the interviews, which may have been caused by any number of reasons. It does limit the study, and certain disadvantages emerge consequently. A larger number of participants would have yielded more interviews, and given a more generalised pillar of support for any statements, ideas or thoughts presented by the participants in the interviews. A low number of participants also suggests that their statements are more likely to be unique, and not show any form of coherence between them. If the study had more participants, the themes may have been enforced even further and more themes might have appeared in their statements.

The aspect of sufficiency, as presented by Purves (2012) appears to be present in the interviews, especially with Karl and Hege. They state that they would rather spend money to supply all their students with classical instruments than spending it all on a couple of high-tech products. This is also supported by Karl’s statement that the purchase of Chromebooks will help to increase the computer density, allowing more students to be online simultaneously.

In the interviews, the participants were presented with four technological products, and given 30 minutes to explore, though they could ask for an additional 15 minutes if they wanted to. In retrospect, four products may have been too many to explore in only 30-45 minutes. Some of the participants had no prior experience with some of the products, so their first time trying them may have taken significantly longer, as they had to understand the functions, user-interface, the codes in general. The predetermined length of the interview could not be stretched any further, as both interviews lasted 2 hours, which was the maximum length set

beforehand. Had the interview focused on fewer products, the participants may have been able to explore them deeper. The limited time may have contributed to subjective pressure to cover everything, both for the participants and the interviewer.

All the participants are relatively young, and they are also younger than the average teacher in Norway. If the study had acquired music teachers above the age of 50 or even 60, the statements and themes found in the interviews, may have been more contrasting. The young age of the participants may not necessarily be a negative aspect. They do consist of the teachers of the future, and are arguably more responsible for incorporating the technology into the educational system. In a not so distant future, the term digital immigrant will no longer be as relevant as it is today, as fewer and fewer people grow up without interaction with digital technology.

None of the participants indicated that they were familiar with the array of accessible, free, web-based products that are available to them, such as Incredibox, Soundtrap, JamStudio and Lyderia. While Karl and Hege said they had brief experience in using Lyderia, the participants' lack of familiarity with such options was left unexplored in this study. As a result, only reflection can be done as to why they have not explored their options more, since these products are within their filter of requirements: free, web-based and easy to use. The reasons for it could however be rooted in any number of factors. When Tor stated that he searched for web-based programs and landed on Soundation, dismissing other options, the logic indicated that this was based on sufficiency. If what he was going to teach his students was narrow, a music game such as Lyderia that includes various topics may have been too broad, making students work on several other topics than the one he wanted to focus on. Further, the lack of using other products may very well indicate that the participants know they can master Soundation, and is uncertain about introducing new products, as that would require them to train themselves in that product as well. They may be comfortable with what products they have available, in terms of what they want to teach the students. As Tor and Ole said in their interview, the students will not become professionals at the school. The school serves as an arena for introduction, and the students can then, if they wish, acquire for instance Rocksmith at home to practice further. Karl and Hege focus on introducing their students to music, not necessarily educating them, which also follows the same train of thought as Tor and Ole. The aspect of time is also relevant to the equation, as the teacher only has so many hours available to them in a day. This understandably causes them to be unable to research every product available, let alone set the time to learn how to use them.

Interestingly, none of the participants use the music technology products that are offered to them by their schools, and Karl and Hege provided specific reasons for their choice. As discussed earlier, there is certainly not a lack of products intended for educational purposes that are both free and available online, voiding any local installation. The question is then naturally raised, why the teachers do not utilise these products: Do they not see any usability in the products? Karl and Hege stated that they liked the concept and ideas of Lyderia, but that they were never able to get it rolling. Like Hege said about using Skoog in her teaching, it could not be something that was done half-way. What was, in that case, holding them back? It may appear that since the products are web-based, they do not fall under the promotion of the municipality, and are therefore left to the attention of those teachers that want to use them in their teaching, leaving the responsibility in the hands of the educators. If this study had included more participants that said they also did not use the products offered by their schools, or future studies indicated that its participants found little to no use in the products offered to them, an evaluation of this subject is required. This has implications for several agents within the educational setting. Music teachers who find no use in the tools they have available, will consequently not use them, resulting in a decreased use of music technology with their students. This further counters the aim and call of both numerous researchers, and public organs such as the educational ministry. School principals may, as a result of their teachers not using products available to them, experience it as a disinterest in the use of technology. It may further discourage the principals from attempting to promote the acquisition of music technologies to their school, because of the teachers' lack of product usage, which again would counter the direction that is envisioned for technology by educational policy makers. On a political level, the same discouragement may be experienced by those responsible for creating policies for the schools. If they remain adamant to the implementation of music technologies in schools, this can further result in a pressure on the teachers to use the products, which according to Purves (2012), may not result in a positive outcome in the usage of such products. That again, may result in teachers resigning or being let go as they can or will not use technology that they cannot use in a meaningful way in their opinion. Lastly, the companies that create music technology intended for educational purposes will experience a decreasing market as a result of the ripple effect that theoretically may happen, as described above. They may also feel discouraged to create products for that market, and they may also find it impossible to continue focusing on that market because of economic factors.

While this study focused on a small selection of young participants, a lot can be learned about their perceived impediments to including music technologies in schools. As case studies, the findings are not statistically generalizable, but this study does, however, meaningfully indicate some of the impediments perceived by teachers in Norwegian primary and lower secondary schools. Through the interviews, and analysis of them, the study further opened for more questions and subjects that appear to be relevant to the bigger picture of music technology and education, to which this study contributes.

6.3. Further research on this area

During the first interview with the two colleagues from primary school, they both talked about how the county and municipality strictly enforces control over computers in schools. This is seemingly especially present in primary and lower secondary schools in Norway. They appear to have absolute power over which programs are installed and maintained on their computers, and adding another program to their repertoire of programs, is both a time-consuming process, and a costly one, as a regular fee is required to have access to said program according to the teachers. This caused both primary school teachers to favour programs found online, as they did not require any installation and application of installation to the county or municipality. Examples of this are Soundation (which is found online at www.soundation.com), and Lyderia (at www.lyderia.no). An aspect to investigate would be how the county or municipality exerts their power over the computer system. What is regarded as a school-friendly program, and not least who in the county or municipality exerts this power? Is it a single person or a committee? If it is a committee, what people is it comprised of? Is it people with authority and relevant experience to make such decisions or is such a decision spread out to have a general selection of representatives decide?

This research project focused on the spoken word of the participants. While the emphasis was on the socio-constructional aspect of language, a lot of language was expressed through my participant's bodies. Their posture, gestures, non-verbal reactions and so forth, were very easy to see during the interviews. Systematic analysis of this aspect of communication would however open a whole new dimension to research, which this project did not have the capacity or time to investigate. Given that the project focused on verbal discourse, research permission for video recording of the interviews was not sought, as this was not deemed necessary. If future projects were to focus on the body language of the participants as well, video recordings of the

interviews would be crucial as the interviewer would not be able to keep up with the field notes while at the same time conducting the interview. Alternatively, an additional person would be required for registering these actions and reactions. The participants might also feel a bit more uncomfortable as well during an interview with video recording, as their every move could be monitored and later analysed. This may however provide a stronger Hawthorne-effect.

Since the flaws, missing traits and lack of functionality of the products are mentioned by the participants, it would be interesting to study the companies' reaction to this feedback. Are the details mentioned by the participants something that the companies deliberately excluded from the product, or were they not considered at all? It would also be beneficial for the companies to get feedback on how intuitive the participants consider their products to be.

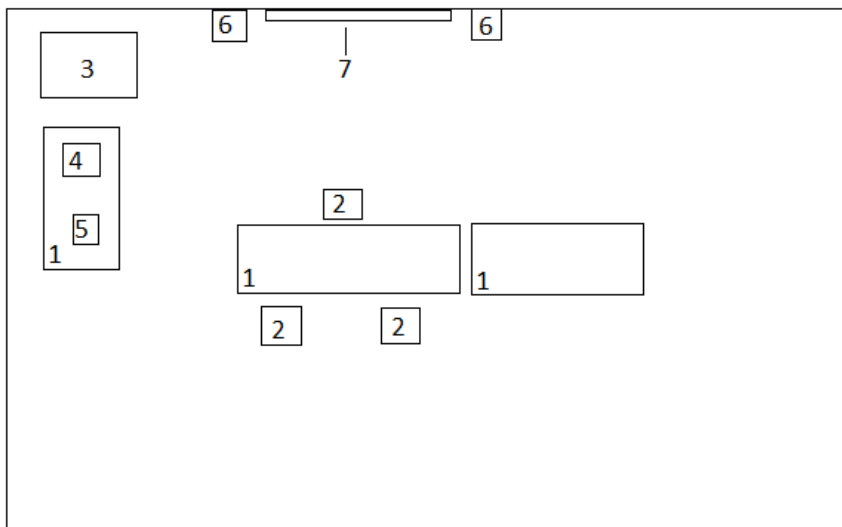
The marketing strategies of these products is a subject needing research, based on the data and discussion of this study. How are the different products presented to possible customers in order to meet a demand (that we know exists)? As discussed earlier, many factors may be at play when looking at such a perspective. The local politics for each of the participants' schools as well as other adjacent schools should at some points also be examined in order to lay further groundwork for this area. The schools' socioeconomic situations are affected by where they are situated, in what neighbourhood they are found, what the people in the area do for a living, and so on. The workplaces of the participants were not something that was included in this study for privacy reasons and to prevent identification of participants.

This study has attempted to enlighten an area previously shadowed within the field of music education technology. Norwegian students are supposed to be educated in the use of ICT, in accordance with the curricular goals of the national plans. Their upbringing alongside technologies in various forms, earning them the term "digital natives", aids them a fair bit on the way. Arguably, the most important element in this educational plan, is the person responsible for teaching the students about and how to use technology. If they are unable to use the technology, for whatever reason, to the extent it is required, a problem arises when looking at the learning outcome that is demanded by governmental standards. The specified foci of this study has been to explore the teachers' perceived problems with implementation and use of music technological products. Based on the data collected in this study, it is evident to say that no single perpetrator can be found, as several factors interject upon each other. Several studies and reports call for an enhancement of the digital literacy of educators, as well as their concrete

use of technologies with their students in the classroom. This has been the case with both internationally acclaimed researchers, as well as governmental organs, which contributes to an increased focus on this issue. This study aims to contribute to that issue, and to encourage further investigation towards the subjects that has emerged in this study. It is, however, not only important to focus carelessly at how one can implement music technology without consideration to how and why it is done. A critical reflection upon how and why technology is evolved, created and used is just as important, through aspects such as *that for the sake of which*. Another, which was presented by the participants in this study, is how far along the way of introduction to these products is the school system meant to assist? The participants indicated that the schools should take on the role as an introducer, to show the students the opportunities by allowing them to peek through the crack in the door, rather than to illuminate the entire path for them.

Appendix

Appendix 1 – An illustration of the interview room and how it was set up



Definition:

1: Table

2: Chair

3: Loudspeaker system

4: Laptop computer

5: iPad

6: Loudspeakers

7: Projector screen

Appendix 2 – Interview guide with loose guidelines

Intervjuguide

1. Innledning

Velkommen, informer om prosjektet, spesifiser at ønsket er at samtalen skal ta plass mellom dem

Bakgrunnsspørsmål

- Introduksjon av seg selv, bakgrunn, erfaring i skolen, evt. musikalsk bakgrunn og preferanse (Introdusere seg uten navn, alias??)
- Hvorfor bli musikk lærer
- Trivsel
- Hva ser de på som sin viktige oppgave i sin stilling

2. Generelt om musikkteknologi

- Tanker, usikkerheter, fordommer?

3. Rocksmith

- Forklar kort om produktet
- Kjenner deltakerne til produktet fra før?
- La dem prøve en sang sammen
- Hva tenker de om produktet/muligheter/hindringer/mangler? Diskuter
- Kunne det blitt brukt i undervisningen din? Hvorfor/hvorfor ikke? Diskuter

4. Garageband

- Forklar kort om produktet
- Kjenner deltakerne til produktet fra før?
- La dem prøve seg frem, prøve å skape noe/spille noe
- Hva tenker de om produktet/muligheter/hindringer/mangler? Diskuter
- Kunne det blitt brukt i undervisningen din? Hvorfor/hvorfor ikke? Diskuter

5. Soundation

- Forklar kort om produktet
- Kjenner deltakerne til produktet fra før?
- La dem prøve seg frem, prøve å skape noe/spille noe
- Hva tenker de om produktet/muligheter/hindringer/mangler? Diskuter
- Kunne det blitt brukt i undervisningen din? Hvorfor/hvorfor ikke? Diskuter

6. Skoog 2.0

- Forklar kort om produktet
- Kjenner deltakerne til produktet fra før?
- Vis dem videoen
- Hva tenker de om produktet/muligheter/hindringer/mangler? Diskuter
- Kunne det blitt brukt i undervisningen din? Hvorfor/hvorfor ikke? Diskuter

Beskriv produktene, hva karakteriserer dem?

7. Avslutning

- Takk for deltakelse
- Noen tanker de vil dele?

Appendix 3 – Information letter to participants upon arrival to interview

Forespørsel om deltakelse i forskningsprosjektet ved Høgskulen på Vestlandet

”Diskursanalyse av musikk læreres mulighetsrom og holdninger til og i musikkteknologi”

Bakgrunn og formål

Teknologi har blitt implementert i stor grad i den Norske skole, men blir benyttet i ulik grad i musikkfaget. Formålet med denne studien er å utforske og kartlegge hvordan musikk lærere *kan* oppleve denne teknologien og hvordan de ser muligheter ved hjelp av den i en klasseromssituasjon.

Utvalget skal brukes som eksempler på musikk lærere i Norsk ungdomsskole.

Hva innebærer deltakelse i studien?

I denne studien vil det bli gjort datainnsamling. Måten dette blir gjort på er gruppeintervju, med forskeren i en først passiv rolle, deretter assisterende. Med dette menes at forskeren skal komme med begreper og eksempler på musikkteknologiske produkter som skal diskuteres av informantene. Samtalen er etter fremvisning ment til å gå mellom informantene, med forsker som observatør.

Alle intervju vil bli gjort opptak av for transkribering. Etter fullført transkribering vil opptak bli slettet og deltakere får tilbud om gjennomsyn av intervju.

Spørsmål vil omhandle muligheter av bruk av musikkteknologi, samt fremvisning av produkter med musikkteknologisk bruksområde.

Hva skjer med informasjonen om deg?

Alle personopplysninger vil bli behandlet konfidensielt. Personalia vil bli anonymisert allerede i intervjuets notater ved hjelp av pseudonymer. Det kommer med andre ord ikke til å bli muligheter for gjenkjenning etter anonymisering. Kun yrke, landsdel(Vestlandet), omtrentlig alder og erfaring med musikkteknologi vil bli presentert.

Datamateriale, personopplysninger osv. er det kun jeg og veileder som har tilgang til. Data lagres på bedriftens server og passordbeskyttet datamaskin

Prosjektet avsluttes Høsten 2018 og alle opptak blir slettet.

Frivillig deltakelse

Det er frivillig å delta i studien, og du kan når som helst trekke ditt samtykke uten å oppgi noen grunn. Dersom du trekker deg, vil alle opplysninger om deg bli anonymisert.

Dersom du ønsker å delta eller har spørsmål til studien, ta kontakt med

Forsker
Sondre Brudvik
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Veileder
David Gabriel Hebert
Tlf: 45 03 08 92
Mail: dgh@hvl.no

Studien er meldt til Personvernombudet for forskning, NSD - Norsk senter for forskningsdata AS.

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