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Designing music lessons for the 21st century - Make learning a musical instrument more fun, playful, and modern

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Abstract

Musical education has a positive effect on the development of spatial and cognitive domains of the brain, like language processing mathematics. Children and adults that have had musical training score higher on intelligence tests. These positive effects are caused by cortical reorganization between neurons in the brain. Musical education has not only a positive impact on the spatial and cognitive domains but also on the social skills and self-confidence of students. The teacher has an important role in this because it is the teachers' job to create a safe social environment where this self-development is possible. Self-development is best motivated inside this social environment that fulfils the basic psychological needs. Because music education is in different ways important for peoples' development, but really traditional and always given the same style, this project was created.

The goal of this project was to design an innovative, in the broadest sense of word, music workshop for Kaliber Kunstenschool, such that the Little Big Wonder-band was blown in new life. Therefore, a research question was created, where the project is based on; 'Given that playing together motivates someone to keep playing a musical instrument, how do you develop an innovative workshop that contributes to that? '.

After assessing the entire Creative Technology Design Process, the final project has resulted in a music 'workshop' that gives an extra dimension to- and stimulates practicing at home before a band meeting. The users are communicating via the designed system, by sharing video/audio files of their practice sessions. Stars can be achieved though completing tasks in the system, which are motivational. By practicing with the video/audio files, not only the own notes are practiced, also the collaboration skill is practiced.

The system had to cause more progression during the band meeting which should have resulted in team bonding and less drop out of band members. By seeing other fellow bandmembers uploading that they are busy with practicing, healthy peer pressure was expected to occur, such that other bandmembers want to practice and share as well. Unfortunately, this was not the case. Only one out of the four subjects in the test did like to use the system, and the overall results are showing a downwards number of times practicing a musical piece at home when using the system in comparison without the use of the system. Healthy peer pressure did not occur, whereby the only person that did like to use the system, could not continue using it because it depends on the other users.

Based on the results, suggestions for improvement and further work are proposed.

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Chapter 1 – Introduction

In this chapter, the graduation project will be described and it will introduce the project's topic in a concise manner. It also contains a description of the project's context and problem statement leading to the main research question with additional sub-questions. In the end, a contents description of the full thesis will be presented.

1.1 Musical education

Music has an important role in everyday life. Most of the time people choose to learn a musical instrument just for fun, but several studies have shown that music also has a positive influence on the development of children and adults. Children that have had two years of piano instruction score for example significantly higher on a cognitive ability test than children who did not have any music lesson (Costa-Giomi, 1999). Musical skills have a strong positive impact on language development, literacy, numeracy, measures of intelligence, general attainment, creativity and many more. Music education has also a strong positive impact on the personal and social development of children and adults, but only if music (education) is experienced enjoyable and rewarding. This is the job of the music teacher, how he or she chooses to teach music (Hallam, 2010). Therefore, the music teacher and his/her teaching method play a big role in if music education has a positive impact.

A struggle for music teachers is to keep the lessons interesting and fun so that the students keep motivated and therefore profit from the social and personal development. A study shows that intrinsic or cooperative aspects of musical education, like playing together, work the best to keep students motivated. On the other hand, competitive aspects and strong ratings from the teacher work counterproductive (Schmidt, 2005). A big accomplishment, and therefore a motivation for students to keep going to music lessons, are reaching their own goals. If a teacher sets certain goals and the student experience that they are too big, he or she will not find easy motivation for the music lesson (Schmidt, 2005). To conclude, the music teacher has a big role in the musical education and therefore its positive impact on children and adults. Further background research will be explained in Chapter 2, 'State of the Art'.

1.2 Situation

The product to be developed in this graduation project is an innovative music workshop, together with a didactic set up, and evaluation. The client in this project is Kaliber Kunstenschool. Kaliber Kunstenschool is an art school located in six townships of Overijssel, and the headquarters called Muziekkwartier is located in the centre of Enschede. People of any age can take dancing lessons, take courses in visual arts, theatre, fashion, music instruments,

sing in a choir, play in a band and many more. Kaliber provides workshops at primary and secondary schools and companies can book teambuilding activities which Kaliber then organises.

The amount of people that drop out of musical education at Kaliber is really big between the age of 12 and 18, according to Kaliber's region manager. Therefore, an innovative workshop that sparks the motivation inside these students for music education would be perfect. With motivating them to stay at Kaliber, the teenagers also profit from the positive impact of music education.

The slogan of Kaliber is 'Playing together is more fun than alone', which would be a perfect underlying thought and guideline for the workshop. There are already a lot of 'standard' possibilities to play together, for example in bands, orchestra's and ensembles. Some of those are well filled, but the Little Big Wonder band (LBW-band), a big band for teenagers, has struggle to find new members. It would be great if the workshop would not only be a tool to keep teenagers at Kaliber, but that it also is a promoting tool for the LBW-band.

1.3 Main research question

Taking the project's context into account, the following main research question was created:

'Given that playing together motivates someone to keep playing a musical instrument, how can one develop an innovative workshop that contributes to that? '

1.4 Content description

To find answers to the research question this thesis report is divided into several chapters. In the next chapter, deepening background research will be presented, followed by a State of the Art review. In chapter 3, background information on all the methods and techniques used in this thesis are explained. Chapter 4 elaborates on the ideation phase of the project, which is followed by chapter 5, where the ideation will be more specified. In chapter 6, the prototype will be realized, and this prototype will be evaluated in chapter 7. A discussion of the evaluation can be found in chapter 8, and the conclusion will be drawn in chapter 9. Suggestions on future work is written in chapter 10, where after all the references and appendices can be found.

Chapter 2 – State of the Art

In this chapter, the State of the Art on the GP topic is described. The first part of the chapter reports on background research on the research area and problem analysis. The second part of the chapter describes the state-of-the-art review on the GP's topic, with the main research question as the starting point.

2.1 Literature research

The goal of the background research in literature is to get insight into what impact music education has on the development of children and adults, and how teachers play a role in this. To find answers to this main goal, the chapter is divided into three sections. In the first section, there will be discussed how musical education influences the brain. The second part will discuss the impact of musical education on the personal development of children and adults. The third and therefore last part will investigate how important the role of the teacher is in the musical education, and how the teacher contributes to the development of children and adults.

2.1.1 Musical education influencing the brain

Engaging actively with music through musical training/education has a big influence on the development of the brain. There are several ways how this development could be explained. One way is through cortical reorganization. The brain contains approximately 100 billion neurons, where each neuron has approximately 1000 connections with other neurons (Fields, 2000, as cited in Hallam, 2010). When a certain event is repeated in the brain a lot, during active engagement with music, for example, the connections between neurons get better. This is called cortical reorganization, which causes according to Hallam (2010) and Dittinger et al. (2016) the positive development of the cognitive domains of the brain. Both authors argue that learning is something that occurs without conscious awareness, which for example happens while engaging with music. While listening to music, people process a large number of words and a lot of information. Because music and speech share the same processing networks in the brain, music indirectly contributes to the development of language and different aspects of speech perception.

Another way how the positive impact of music education can be explained is through gamma-band response. The communication inside a network of neurons is a form of oscillatory brain activity, which can be measured with an EEG (electroencephalogram, red.). The measurements of these oscillations are called gamma-band responses. According to Trainor et al. (2009), children and adults that have had musical education showed an induced gamma-band activity in comparison with children and adults that did not have had any musical

education. This is shown in Figure 1 and Figure 2. They argue that this induced gamma-band activity is associated with the positive development of the cognitive domains of the brain, as well as attention, expectation, and memory.

To conclude, there are different ways to explain how music education has an influence on the brain. One way is through cortical reorganization, something that happens when the connections between neurons get better. Another way is through gamma-band response. An induced gamma-band activity stands for the positive development of the cognitive domains of the brain. However, these are only two ways how the positive influence on the brain could be shown. For a more detailed insight, more researches should be consulted.

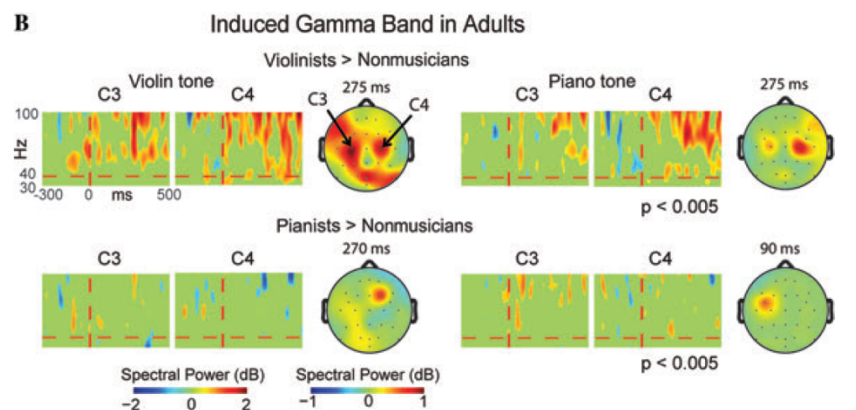


Figure 1, induced gamma-band activity in adults.

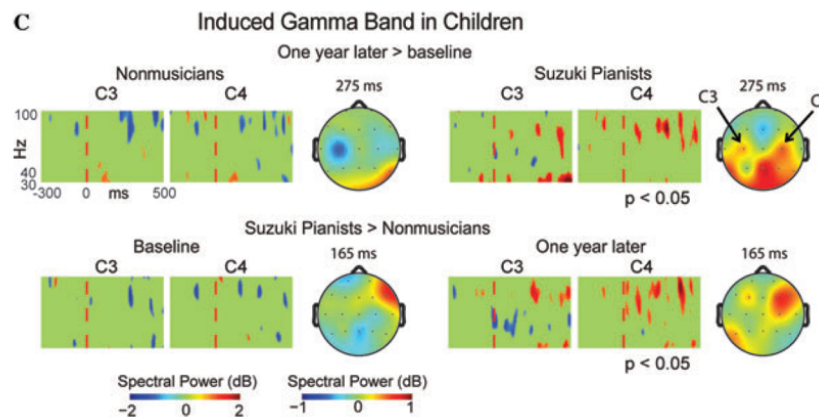


Figure 2, induced gamma-band activity in children

2.1.2 Impact of music on people

There are a lot of different ways how musical education positively attributes to the development of children and adults. Two ways will be discussed in this paragraph, starting with cognitive/spatial development. Costa-Giomi (1999), Trainor et al. (2009), Hallam (2010) and Schellenberg (2005) all argue that musical education enhances learning and performance in many spatial and cognitive domains, such as literacy, mathematics, and language. In Figure 3,

this is illustrated. Children that have had a few years of musical education score higher in intelligence tests in comparison with peers of the same age that did not have that musical education. Language processing and the long-term memory for novel words are proven to be better with adults that have had several months of musical education according to Dittinger et al. (2016) and Hallam (2010). Costa-Giomi (1999) agrees with them but argues that not only the linguistic domain is proven to be better developed after a few years of musical education, also the spatial abilities are significantly better developed. This is shown in a graph in Figure 4. Overall, there are many ways how the positive cognitive/spatial development works out through musical education. Nevertheless, it is not the only way how music education has a positive impact on the development of children and adults.

The second way is the social development of children and adults through musical education. Daykin et al. (2008) and Hallam (2010) believe that musical education enhances social skills and helps with the development of self-confidence. According to Hallam (2010) and Young (2016), musical education also has a positive impact on the creativity, fine motor coordination, teamwork, relaxation and emotional sensitivity of somebody. While learning to play an instrument, concentration is really important. A student has to read the sheet music, process this, convert this to an action, and listen at the same time. Therefore, musical education also has a positive impact on concentration.

To conclude, musical education has a positive impact on the cognitive/spatial development as well as the social development of children and adults. Long-term memory and the linguistic domain are proven to be improved after a few years of music lessons, however only for the period that the student keeps practicing music. In the long-term, the positive impact on cognitive development is not proven yet.

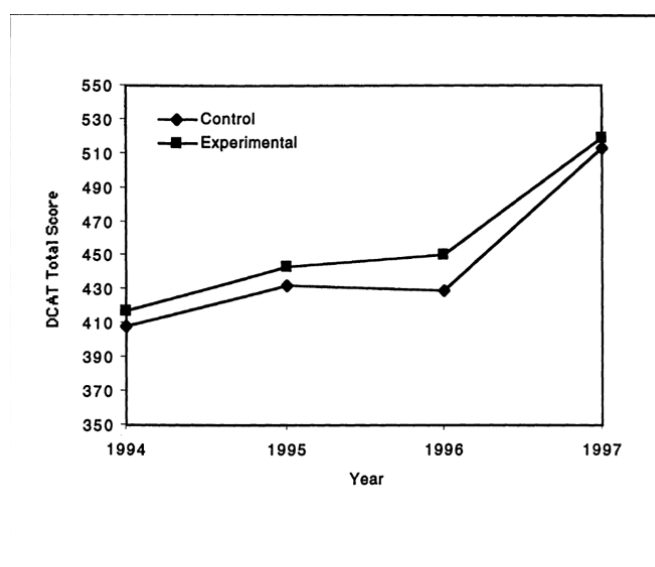


Figure 3, control(non-musicians) and experimental(musicians) group's cognitive abilities scores

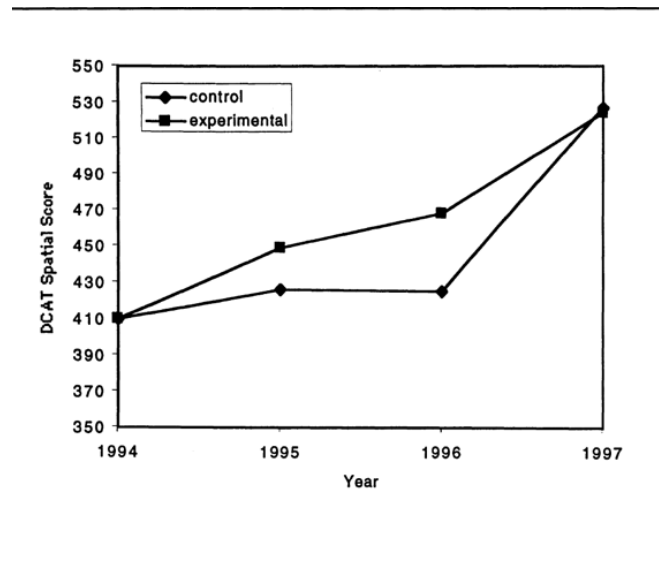


Figure 4, control(non-musicians) and experimental(musicians) groups' spatial abilities scores

2.1.3 Role of the teacher within musical education

The teacher has an important role in musical education, but every teacher is different in his/her educational methods. The different educational methods are thus the most important link to how a student receives the music education. Wright and Kanellopoulos (2010) and Schmidt (2012) all agree that the role of the teacher is key to how somebody receives the music education. Therefore, teaching should be done universal way, such that every student benefit from musical education. On the other hand, Cox (2002), as cited in Schmidt (2012), and Jones and Parkes (2010) argue that it is best for students if teachers are teaching their own style. According to them, teachers are best in influencing students because of their beliefs of how teaching should be done. These beliefs the teachers learned from their cultural background, role model or family. Music is a part of the teachers' identity and he/she wants to surpass a part of this identity onto his/her students. Therefore, teachers teach with conviction, which feels real for the students and thus works motivating for them. Every experience in life is noneducative, miseducative or educative (Dewey, 1933/1998, as cited in Schmidt 2012). Noneducative experiences have small consequences for the student, miseducative some more and educative experiences are experiences that trigger the student to develop beliefs and/or understandings from the teacher. As a music teacher, this is the stadium you want to reach in education. How this is reached, through one universal way of teaching or a teacher's own way does not have to matter.

As stated before, there are several ideas how a teacher should teach his/her music education. Therefore, there is not one best way to teach music, but there are some important things to keep in mind as a teacher. Using rewards and punishments or teaching in a controlling and prescriptive way are really ineffective according to Isbell (2008) and Evans et al. (2015).

On the other hand, improvisation and collaboration are great educational strategies for teachers to use, by which creativity and motivation are enhanced. This motivation is key to learn music according to Evans (2015) and Schmidt (2005). Self-determination is what a student needs, to have the motivation to learn and practice music. Personal growth and the fulfilment of basic psychological needs (competence, relatedness, and autonomy) are the most important aspects of self-determination theory. Musical learning is best motivated within a social environment that fulfils the basic psychological needs, and it is the task of the teacher to create this social environment. This social environment is according to Young (2016) and Stanley et al. (2013) really important for students. In this social environment, students dare to open up, express their true self and generate their own interest.

In conclusion, the teacher is an important piece of musical education. Creating a safe social environment where personal growth is supported and motivated should be the main goal of the teacher. What the best way for the teacher is to do so, is still a point of discussion.

2.2 Field research

2.2.1 Interview with Henriette Punte

Henriette Punte is working at Kaliber Kunstschool as a marketing communications advisor. To gain knowledge about the marketing part of the workshop and the approachness of teenagers, she was interviewed. The whole interview is available in Dutch in Appendix I.

Punte points out that teenagers are the most difficult group to target. In reality it seems that playing together works most of the time to keep the teenagers at Kaliber. But at their age, they get other interest outside music education, and do not feel the motivation anymore to proceed with this. Money is besides the lack of motivation a big problem for teenagers. Most of the time parents will pay for the lessons, but extra activities like workshops are for the student's own costs. That is a reason why teenagers are not willing to participate in extra activities. The most important thing that Punte mentions, is that you do not want to force the teenagers. If they don't want to do something, they are not easy to win over.

The marketing of extra activities is mainly done through posters placements and social media posts at Kaliber. Social media works really well, a lot of shares are done through the teenagers itself if they want to be involved. Promoting an event including food has proven to be more successful than events without food. In Almelo, Kaliber uses youth ambassadors. Those ambassadors promote activities themselves and are in the target group. This works really well, and the plan is to set this up in Enschede as well.

2.2.2 Interview with Lotte Sieverink

Lotte Sieverink is working at Kaliber Kunstenschool as project leader education. Where a part of her job is to create lessons and workshops for (high)schools. The complete interview can be found in Dutch, in Appendix II.

Workshops like djembe or hip-hop dancing are really popular at schools. Most of the time the groups are between 15 and 20 people and takes between 1-1,5 hour. The more people, the less attention the workshop leader has per person. If the students are working well depends if the workshop is compulsory or if the students chose themselves to attend. Also, the teacher has to 'click' with the group. Without that click, a workshop could work out the wrong way. The culture of the group is with every group of students different, so there is not really one way how a workshop should be given and that that is the right way. The projects at schools do not necessarily attract more people to take lessons at Kaliber. For that, the lines of communications should be improved according to Sieverink.

2.3 State of the Art review

In this part of the chapter, already existing innovative workshops and other relevant things in the field of research are shortly explained.

2.3.1 Live Looping Workshop – MaX Music

Creating soundbites through recording, layering and looping of ordinary sounds. The workshop leader will come to location. There is no need of previous knowledge in music.

<https://www.maxmusic.nl/nl/workshops/live-looping-workshop-jongeren>

2.3.2 Air drumming Workshop – MaX Music

Playing and editing beats, bass lines and samples on infrared instruments. The workshop leader will come to location. There is no need of previous knowledge in music.

<https://www.maxmusic.nl/nl/workshops/air-drumming-workshop-jongeren>

2.3.3 Music production workshop – MaX Music

Create your own pop/dance numbers, edit them and mix it with music software on iPads. The workshop leader will come to location. There is no need of previous knowledge in music.

<https://www.maxmusic.nl/nl/workshops/muziekproductie-workshop-jongeren>

2.3.4 Producing lessons – Kaliber Kunstenschool

Learn to work with music-sequencers (for example Cubase or FL Studio) and how to create your own song with it. Theory, composing techniques and arranging are part of the lessons as well. Learn this instead of a classical instrument, there is a possibility to have individual or group lessons.

<https://www.kaliberkunstenschool.nl/module/producing>

2.1.5 SoundLAB workshop – Muziekgebouw aan 't IJ

Ever heard of a MODi, Dato, rolltone or hothand? In the workshop SoundLAB, you'll learn to use these brand new instruments. There are around a 100 'new' instruments at the lab. And the most fun part: everyone can make music with them. Go to muziekgebouw aan 't IJ for the workshop. There is no need of previous knowledge in music, and is possible for children as well as adults.

<https://www.muziekgebouw.nl/agenda/Concerten/6947/>



Figure 5, some instruments that are used in the SoundLAB

2.3.6 Instruments make play – Festival

Instruments make play is a festival about self-invented musical instruments in the form of concerts, an exchange, workshops, exhibitions, residencies and much more. The festival is free to visit, but there is no guarantee that you can actually participate in it.

<http://instrumentsmakeplay.nl/festival/>

2.3.7 Dato DUO - Instrument

Sequencer and synthesizer in one. The DUO grows along with your skill. As you expand your studio, you can connect other instruments like Volcas and Pocket Operators or hook it up to

your modular synth. This instrument is available to purchase, and easier to learn without a teacher than a regular instrument.

<https://dato.mu>

2.3.8 Digital art factory – Podium Zuidhaege Assen

Between 10 and 18? Like to be creative AND technical? Please visit the DAF-space. Work with an existing project or start your own. This place is not only focussed on music, but there is a possibility to create a new project that is in the field of music and technology.

<http://daf.ico-kunstencentrum.nl/over-daf/>

2.3.9 Muziek en technologie – HKU

At the muziek en technologie course you will work with Sonic Interaction Design. A random space will be transformed in no time into an interactive installation where music is the most important factor. Pre-knowledge into music and technology is needed, but this study shows that the combination of music and technology is raising.

<https://www.hku.nl/Opleidingen/MuziekEnTechnologie/BasisopleidingMusicAndTechnology.htm>

2.3.10 SpecDrums - Instrument

Rings that turn color into music. Set any sound to any colour via an app and play around! It is an easy way to start exploring making music, with a non-classical instrument.

<https://www.specdrums.com>

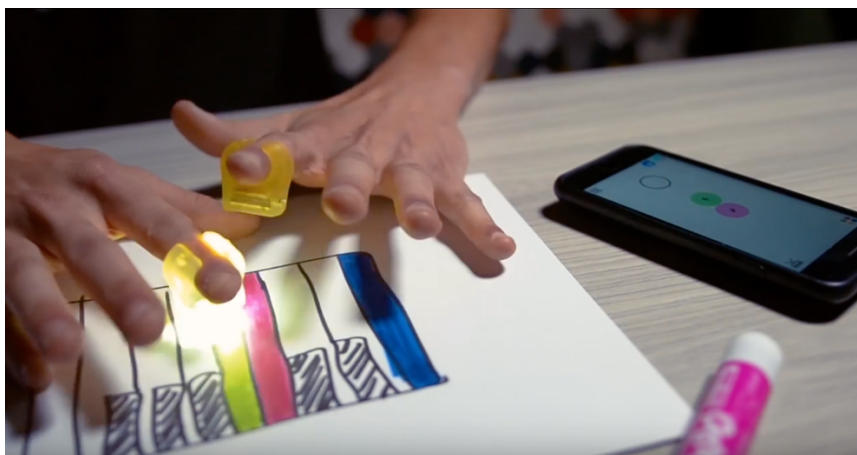


Figure 6, SpecDrums in action

2.3.11 Mogeess – Sensor that turns everything into an instrument

Mogeess is a sensor that connects to an app and can turn anything into an instrument. Choose what sound you want to hear and the sensor recognizes different soundwaves when playing on it.

<https://www.kickstarter.com/projects/mogeessplay/mogeess>

2.3.12 Freedrum – Virtual drums

Play along to your favourite songs, learn new beats, and master fills at any time and any place. Freedrum connects wirelessly to your smartphone and is small enough to take with you anywhere. The drumsticks accompanied with a sensor makes it able to play without the drums itself. Just air is good enough!

<https://www.freedrum.rocks>

2.3.13 Jamstik – Virtual Guitar

A versatile MIDI controller, the Jamstik, connects via Bluetooth 4.0 to your phone, tablet or computer so you can play guitar with any of the 100's of compatible MIDI apps available. The first smart guitar on the market!

<https://jamstik.com>



Figure 7, Jamstik in action

2.3.14 Two sense – Online band

Two sense is an Australian band of three people that have never met in real life. Through online media they practiced and eventually created a song. Even the clip is recorded with the members' own webcams. This is a good example that with technology, a lot more is possible within the music branch.

<http://fasterlouder.junkee.com/meet-band-made-song-without-ever-meeting/871440>

2.4 Conclusion

The goal of the literature research was to get insight into what different kinds of impact musical education have on children and adults, and how the teacher has a role in this. There can be concluded that musical education has a positive effect on the development of spatial and cognitive domains, like language processing mathematics. Children and adults that have had musical training have induced gamma-band activity and score higher on intelligence tests. These positive effects are caused by cortical reorganization between neurons in the brain. Musical education has not only a positive impact on the spatial and cognitive domain but also

on the social skills and self-confidence of students. The teacher has an important role in this because it is the teachers' job to create a safe social environment where this self-development is possible. Self-development is best motivated inside this social environment that fulfils the basic psychological needs.

The goal of the field research was to gain information and get tips from professionals who already work with the target group in the musical domain. After the interviews, it became clear that teenagers are a difficult target group for music education. Promoting an extra activity like a workshop for teenagers at Kaliber works best through posters and social media posts. Student ambassadors would be the best way to promote such an activity, but they are not used yet in Enschede. Money is a factor why people choose not to attend an extra activity, so the workshop should cost as less money as it can be if it should be attractive to teenagers. Not only marketing wise, also in grasping teenagers' attention is hard. Field research complements the literature research in the fact that the teacher, or in this case the workshop leader, is key in how the student experiences a lesson or workshop. Several aspects should be taken into account when giving a workshop, i.e. the culture of the group, group size and the duration of the workshop.

After all, this literature and field research is only a small look at the domain of musical education, which is suitable enough for this graduation project. Therefore, it has its limitations. Firstly, only two ways are described how the positive influence on the brain can be shown. For a more detailed insight, more researches should be consulted. Secondly, there is no proof yet in any research of the long-term impact of musical education. Hence, it is recommended to do further research in the effect of musical education in the long-term. At last, the best way how a music teacher can create a safe social environment is a point of discussion. Therefore, it is recommended to do further research on this, so that the personal development of students is ultimately supported and motivated. After all, that should be the main goal of music education.

With the background research in mind, an overview of the state of the art was created. Innovative is a very broad term, so a lot of different aspects of the word innovative were explored. When searching for existing innovative music workshops, enough came up, but they are all in the same domain. Workshops where technology is central, for example drumming in the air through sensors and recording sounds from daily life and mixing them with an iPad to a song. Technology innovativeness is really focussed on the way how music is made, through sensors, mobile apps and mixing technology. However, most of those workshops are meant to do only once or twice and are mainly focussed on people that cannot play a music instrument (yet).

When looking at the other side of innovative, there is the new media. New media, especially social media, are really important for the music industry. Nowadays there is not yet

Zoë Bosschaart

a music workshop where social media is actively the matter of subject, expect for the marketing purposes. Two Sense is an Australian band with three members, however, none of them have met each other in real life. They met online and make through sharing videos and videocalls their own songs. Because everyone could practice together but didn't have to be available all the time, it made it a lot easier. New media is a really interesting aspect of how an innovative music workshop could be designed, such that the motivation of teenagers in music education is sparked again. An additional success would be that those teenagers find fun in playing together and that the Little Big Wonder band finds some new members.

In Chapter 4, the ideation phase, the workshop ideas will be worked out further. However, with the results of the state of the art presented, there can be concluded that this proposed graduation project is novel.

Chapter 3 – Methods and Techniques

In this chapter, the methods and techniques used during the graduation project will be explained.

3.1 Creative Technology Design Process

The chapter structure of the complete thesis is based on the Creative Technology Design Process (Mader & Eggink, 2014). This process can be used as a guideline to see easily what is needed in every step of the design process, from an exercise or project description to end product and evaluation. The process contains three major stages, the ideation phase, the specification phase, and the realisation phase. Starting with a design question and ending with an evaluation, the process is complete. The entire process can be seen in Figure 8.

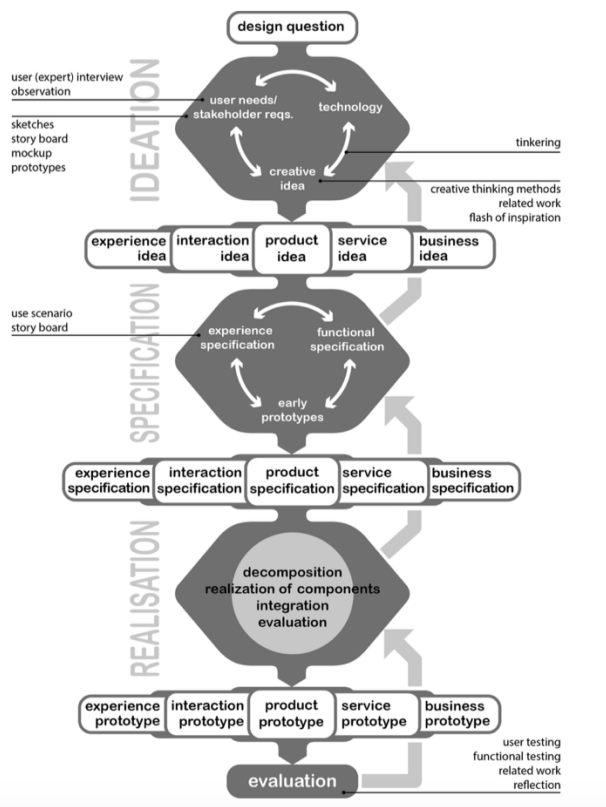


Figure 8, Creative Technology Design Process

3.2 Interviews

There are three main different kinds of interviews, structured, semi-structured and narrative (Stuckey, 2013). In a structured interview, the interviewer follows a specific set of questions, like a specific script is followed. In a semi-structured interview, the interviewers have set an outline in which topics will be discussed, but the interview is adapted to the answers the

interviewee gives. In narrative interviews, the interviewer assume that chronic illnesses are not simply to story of an illness but the story of life which is altered by illness. In this thesis research, the interviews conducted will all be semi-structured.

3.3 User requirements

User requirements are made up to specify what the proposed system needs to fulfil after testing it to conclude it successful. There are five different kinds of user requirements (Shrivathsan, 2012);

- Business requirements; high level goals of the organization
- Market requirements; addition to business goals, outline market needs
- Functional requirements; cover the functionality of the product, does it work?
- Non-functional requirements; cover the goals such as reliability and level of success
- UI requirements; user-interface specifications

The user requirements created in this graduation project are non-functional and can be validated trough user tests.

3.4 Mind mapping

There are several to organize and document a brainstorm, for example the nominal group technique, the group passing technique, the team idea mapping method and individual brainstorming. The last technique is the technique that will be used in this report. During individual brainstorming, the person is free to visualize everything he or she thinks of in a mind map.

A mind map is a visual way to organize information. It is a hierarchical diagram that easy shows what the relationships are among the different parts. There is a lot possible in mind mapping, and the freedom of the user ensures that the brainstorm is creatively stimulated¹.

3.5 User scenarios

User scenarios are used to get a feeling of how a user of a system possibly will interact with the designed interface or product. The scenario is written by the designer of the product and is an explanation of how the designer predicts his product might work. The creation of the user scenarios is an important part of the specification phase because it enables the designer to get into the mindset of the end user.

¹ Retrieved from <http://www.mindmapping.com>

3.6 User test

Conducting a user test is a really important part of the evaluation phase of the design process. The tests are used to evaluate the designed product and gives feedback on how the product is received. There are five different kinds of user test methods ²:

- Hallway testing
- Remote usability testing
- Expert review
- Automated expert review
- A/B testing

In this research, asynchronous remote usability testing will be done. This entails that user logs will be collected of the subjects' interaction with the system, and that the subjects will receive small feedback on their actions.

3.6.1 Script

The same script for every user test is very important, to obtain the same treatment and reduce the difference in explanation of the user test, which could cause different behaviour of the subjects. The script in de user test used in this graduation project is as follows:

1. Introduce myself, who am I and why am I here?
2. Hand out information brochure and consent form
3. Collect consent form
4. Hand out survey that has been done before explanation system
5. Collect survey
6. Explain the system
 - a. Collect stars by completing tasks
 - b. Those tasks are:
 - i. Upload video/audio where you play a piece in WhatsApp
 - ii. Practice music piece
 - iii. Practice music piece with video/audio of somebody else
 - c. Fill in the google forms when you have done a task
7. Explain why it is important to use the system
8. Explain when I will come back for the end evaluation
9. Recap information
10. Ask for questions

² Retrieved from https://en.wikipedia.org/wiki/Usability_testing

Chapter 4 - Ideation

In this chapter, the ideation part of the creative technology design process is described. This part consists of different stages, as can be seen in figure 9. First, stakeholder interviews are conducted, where after the tinkering stage is described. The chapter will conclude with two creative concepts for the envisioned product.

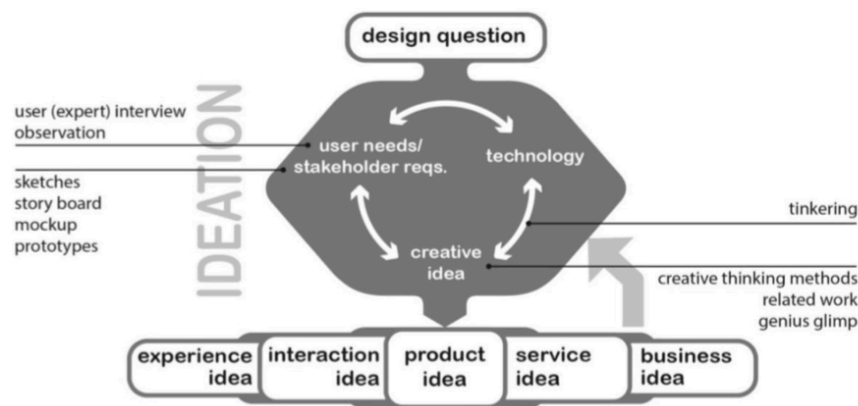


Figure 9, Part 1 of the Creative Technology Design Process

4.1 Stakeholder interview

4.1.1 Bennie Waanders

Bennie Waanders teaches Saxophone at Kaliber Kunstenschool and is conductor of the Little Big Wonder-band (LBW-band). Despite being at an age of 60+, Bennie regularly mentions that he would like to see that social media is used a lot more within Kaliber. He is still discussing with the marketing and communication department how this should look like, but if social media could be implemented in the workshop would this a renewing experience, according to Bennie.

As discussed before, the LBW-band has trouble to keep its members and find new members. When asking what Bennie thinks the reasons are, he mentioned several things. Main reasons according to him are that the students have no time for it anymore, moving house, no motivation to practice and that the quality of performance is not as high as hoped. The lack of motivation to practice and quality of performance is a viscous circle that needs improvement.

3.1.2 Janette Davelaar

Janette Davelaar is region-manager at Kaliber Kunstenschool. Janette is open and enthusiastic about every innovative collaboration between technology and musical education, to give a new

dimension to musical education. She shares the opinion with Bennie that social media could be used more at Kaliber, and not only for marketing and communication purposes. Janette mentioned several times that using the teenagers itself for promoting a band works better than using the M&C department, because teenagers are more efficient influencing peers than adults telling them what to do.

Janette came up with the idea and advise to go in the new media side of technology instead of developing a ‘new, smart instrument’, which is not innovative anymore at Kaliber. They do workshops like that all the time, and a workshop that make use of new media is entirely new. This matches with the findings in chapter two, the State of the Art.

4.2 Tinkering

In the tinkering stage, the generation of new ideas is central. A brainstorm session is a great way to generate a lot of new ideas. They might not all be prizewinning, but it is about getting new insights and combining ideas until there are a few great ones.

4.2.1 Mind map

For the tinkering part of the Ideation phase, a mind map is created. A mind map is an easy way to visualize and organize information and ideas and therefore an ideal tool to use while brainstorming. The mind map in figure 10 shows the different things thought of during the brainstorm and background research. An enlarged version can be found in Appendix VII.

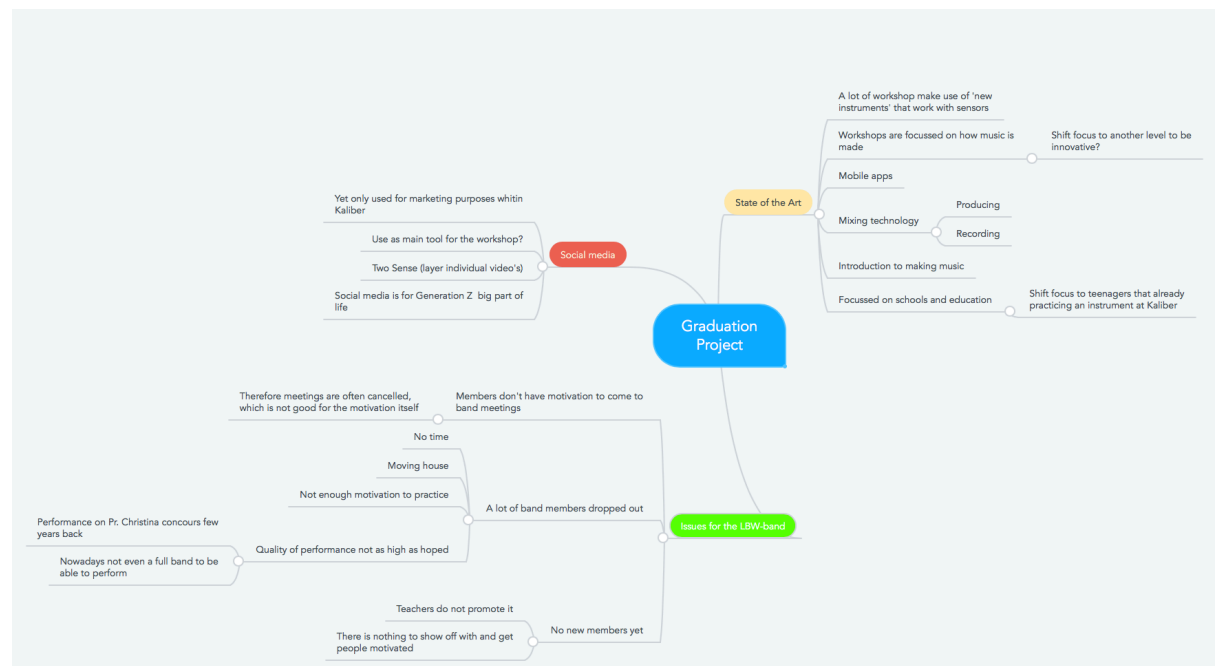


Figure 10, Mind map

4.3 Product ideas

From the brainstorm sessions, visualized in the min map, and stakeholder interviews, two main ideas arose, which are explained briefly below.

4.3.1 Idea 1

The first idea is inspired by the Australian band Two Sense (see chapter 2.3.14). An interface will be designed where each bandmember will have an account. With this account, the user can upload a video where he/she is practicing a musical piece that the band is playing at that time. The uploaded videos of the fellow bandmembers are shown on the interface, where the user can practice with. It is also possible to share the videos on social media and select several videos to layer them together. With practicing with this system at home, quality of the band meetings progress and this has to cause more motivation to go to the meetings. The social sharing could cause extra publicity for the band within the own social circle of the teenagers, and the platform causes more motivation and quality of the band sessions.

4.3.2 Idea 2

The second idea is an interface that involves a small amount of gamification. An interface will be designed where each bandmember will have an account. The homepage is adjustable by the moderator (could be the bandleader or teacher). Through checking a list of 'to-dos', the personal status-meter grows from beginner to pro. The to-dos could entail social-media sharing, which causes publicity, but could also entail motivational to-do's like practice at home three times this week. The interface will show a ranking of the statuses of the bandmembers, which has to work motivational.

Chapter 5 - Specification

In this chapter, part two of the Creative Technology Design Process is worked out. Storyboards and rapid prototypes are described of the three ideas that raised in previous chapter. The evaluation and feedback of the stakeholders are implemented after that which results in a final idea specification and the requirements the final idea should accomplish.

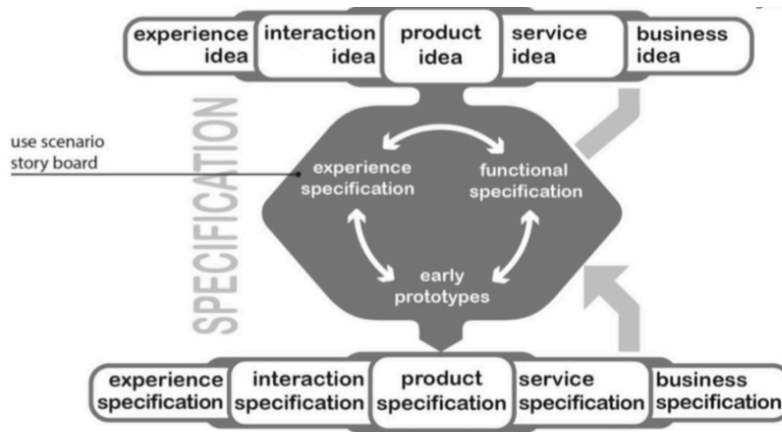


Figure 11, Part 2 of the Creative Technology Design Process

5.1 User scenario product idea

In the user scenario's, fictive members of the Little Big Wonder-band are using the two ideas. The fictive members are not based on any real-life members.

5.1.1 Idea 1

Sophie is fifteen years old and practices saxophone at the LBW-band. Besides playing in the band, she also got music education every week at Kaliber where she has to practice for. She like to make music together, that is why she decided to join the band. Unfortunately, the band meetings are getting cancelled every time, because her fellow bandmembers dropped out or do not feel like showing up. The team spirit is gone... Sophie really wants to go to the Princess Christina Concours again, just like three years ago. That is why she decides to introduce the product to her fellow band members.

First, Sophie instructs everybody to sign up for an account. Then, she explains what is possible with the system. Everybody has to upload a minimum of one video of their practice session every week. Below the videos, there are options to react and interact with fellow bandmembers, to discuss changes. Also, there are options to share the video to their own social media channels. It is possible for everybody to select several videos to layer them and practice

with that. Sophie sets a deadline, by which everyone should have uploaded a video. Through the deadline, everybody is well prepared for the actual band meeting.

After two weeks of using the system, people start showing up again at band practice. The practice itself turns out much more fun and productive! Sophie is really happy and suggest trying to go to the Princess Cristina Concours this year. Everybody is in and eager to find bandmembers that are needed for that!

5.1.2 Idea 2

James is thirteen years old and plays guitar at the LBW-band. Besides playing in the band, he also got music education every week at Kaliber where he has to practice for. He likes to make music together, that is why he decided to join the band. Tough, James really does not like to practice at home for his band meetings. At home he wants to use his spare time for gaming and hanging with friends. First, he could get away with it, but now the quality of his playing is far below some band members.

The band leader, decides to introduce the system to the band, because he finds that the band could use some more members and that the quality of the meetings could be way higher if everyone practices at home. By using a gamification system, he hopes that boys like James find the motivation to get a high ranking and thus do all the to-dos.

James registers for an account and sees that there is a ranking system. Immediately he decides that he wants to be number one, so he makes time to do all the to-do's. He starts practicing at home and shares at his own social media how cool the LBW-band is. With that, he even gets a friend eager to play along at a band meeting. It is the right external motivation that James needed to get new motivation for the band. The band is performing and growing better than ever before!

5.2 Rapid prototypes

5.2.1 Idea 1

For the rapid prototype, there is chosen for a 'Netflix-style' layout, as can be seen in Figure 12. In the upper bar of the interface, there are besides the band name three buttons. The first button is the 'layer' button. When first have selected several videos, trough clicking the 'select'-button, the layer button will layer the selected video's and make one of them. By clicking on the 'account'-button, the personal account is showed, including possibilities to sign out, change preferences, etc.

In the upper video row, the user's own uploaded videos are showed, and there are squares free to upload new video's. In the lower video row, the fellow band-members' videos are showed. Under the video's, there is a menu which fold open when clicking on it. It is

possible to react on the video and share the video on the user's social media accounts. By clicking on the arrows, new video's will come forward, in a carousel kind of way.

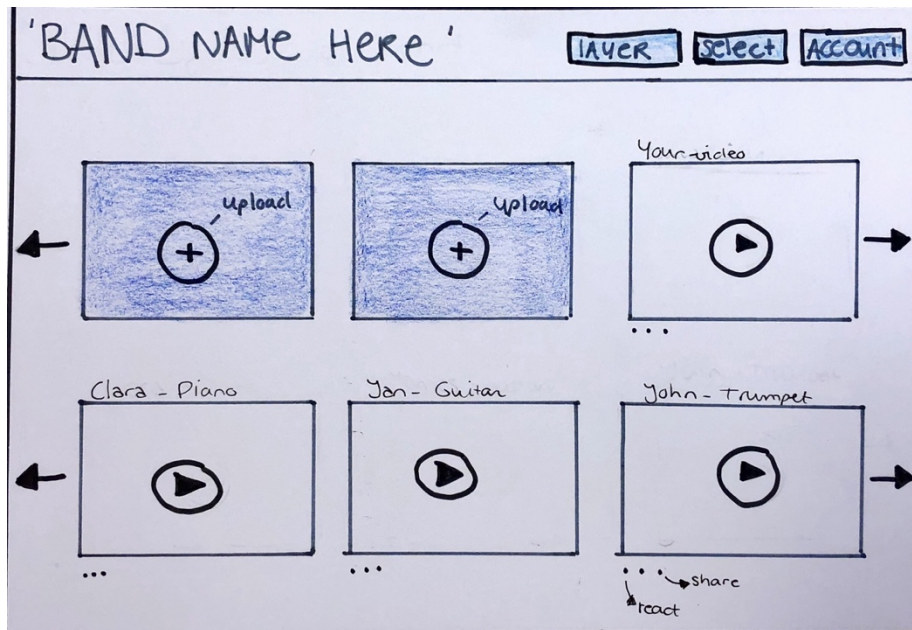


Figure 12, Rapid prototype idea 1

5.2.2 Idea 2

For this rapid prototype an optional layout is drawn, as can be seen in Figure 13. In the upper bar of the interface, there is one 'account'-button besides the name of the band. By clicking on the 'account'-button, the personal account is showed, including possibilities to sign out, change preferences, etc.

At the left side of the interface, the 'to-do list' is showed. The band leader, or the person who function as moderator, can add to-dos to this list. A student can check boxes if they have done the task and can provide proof with it. When checking a to-do task, the 'your-status' meter will colour in one piece, which will update the status from beginner to pro.

The right side of the interface is the ranking, where the top 5 of the band members' statuses are ranked. This adds competition to the system.

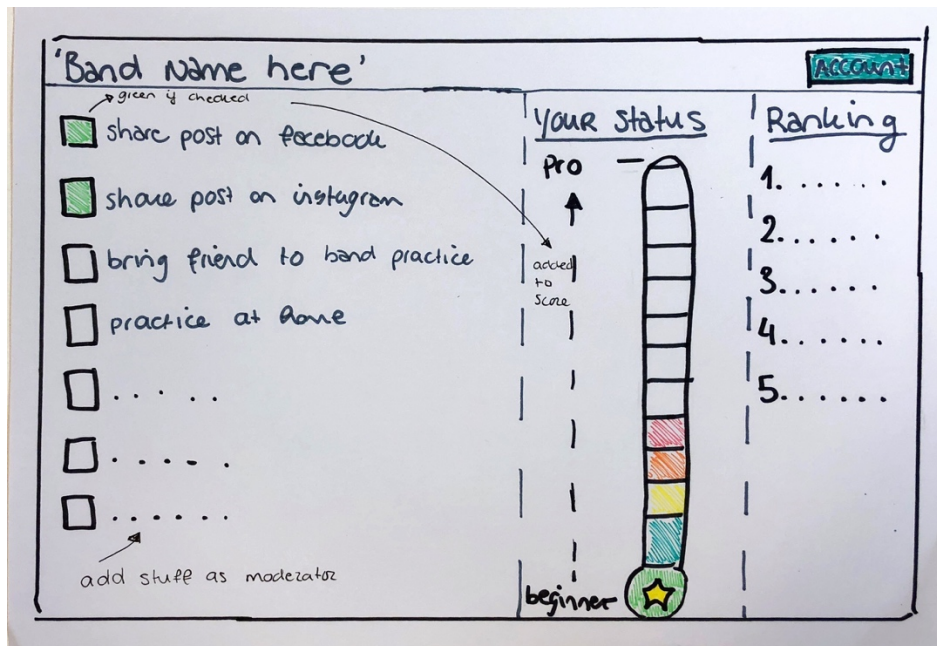


Figure 13, Rapid prototype idea 2

5.3 Evaluation of the ideas

After discussing the previous described two ideas with the stakeholders, reactions were positive. Uploading videos does not only contribute to the motivation to get busy with practicing during the week, but it is also being a great addition to practicing the skill of playing together and listening to another instrument while playing, Bennie Waanders argues.

Though, Bennie also liked the gamification part of the second idea. Bennie argues that teenagers are always busy with gaming and challenges, so implementing a ranking where you eventually can become ‘the best’ at practicing at home, would work motivation for the teenagers. After all, Bennie is the person inside Kaliber that works a lot with teenagers for many years now, so his opinion will certainly be taken into account. Because Bennie liked aspects from both systems, the idea arose to combine the best of the ideas into one final idea.

Janette Davelaar is enthusiastic about both ideas and is interested how the both ideas could be merged into one final system.

After this evaluation, the final idea is created as can be read in chapter 5.4.

5.4 Final idea

5.4.1 Idea specification

The final idea has resulted in a newly designed music ‘workshop’ that gives a new dimension to and motivates practicing at home before a band meeting. This causes more progression during the band meeting which hopefully results in team bonding and less drop out of band members. There will not be one workshop that takes x number of hours, but the workshop is a duration of 3 weeks, beginning with an introduction, then using the intervention and ending with an evaluation.

Taking the ideation and specification phase into mind, the final project idea has arisen. Some aspects of the first idea, and some aspects of the second idea are combined into a final idea. The teenagers will have contact via a newly designed system. Every week, the teenagers can achieve three stars. The first star is achieved through practicing ‘the normal way’ at home. The second star is achieved by sharing a video or audio file of their practice sessions at the homepage of the system. The last star is achieved through practicing with video or audio-files of peers. By using this intervention, the practice at home will be more fun and will give an extra dimension to the at home practicing sessions. By seeing fellow bandmembers uploading that they are busy with practicing, hopefully healthy peer pressure will occur, such that other bandmembers want to practice and share. Also, the gamification part with the star-ranking will contribute to that as well. By practicing with the video/audio, not only the own notes are practiced, also the collaboration skill is practiced.

5.4.2 User Requirements

User requirements are made up to specify what the proposed system needs to fulfil after testing it to conclude it successful. With this project, there are three user requirements that need to be fulfilled.

The first user requirement is that users of the system are practicing more at home after using the system than before. This contributes to the fact that the system should be an external motivation.

The second user requirement is that users of the system have found it more fun to practice at home than before the introduction of the system. The gamification factor of the system has to contribute to that.

The third user requirement is the more specific requirement of requirement two. The user should be driven and motivated enough through the system to achieve the three stars every week.

The last user requirement is that in the end, the user feels more healthy pressure to come prepared to the band meetings and want to blow new life into the band again. The band has to be a fully operating band, but this requirement is not possible to measure after the testing phase. It could be a long-term requirement.

5.4.3 Rapid prototype

After the merging of the two initial ideas to the final idea, a visual prototype is created. This prototype can be seen in Figure 14.

The prototype is an interface, which has an upper bar with two buttons. By clicking on the ‘account’-button, the personal account is showed, including possibilities to sign out, change preferences, etc. By clicking on the ‘upload’-button, a screen will appear where the user can upload a video themselves.

In the video-part of the interface, the uploaded videos of the fellow band members are showed. Below the video-part, the to-do-part is placed. The stars can be coloured yellow by the user by clicking on it, which means that the user have fulfilled the task. The ranking-part will be updated with the star-score of every band member. The moderator can add or remove tasks during the week, to keep the users interested. The moderator can also check if the actions on the platform are still ‘clean’ and can delete content if necessary.

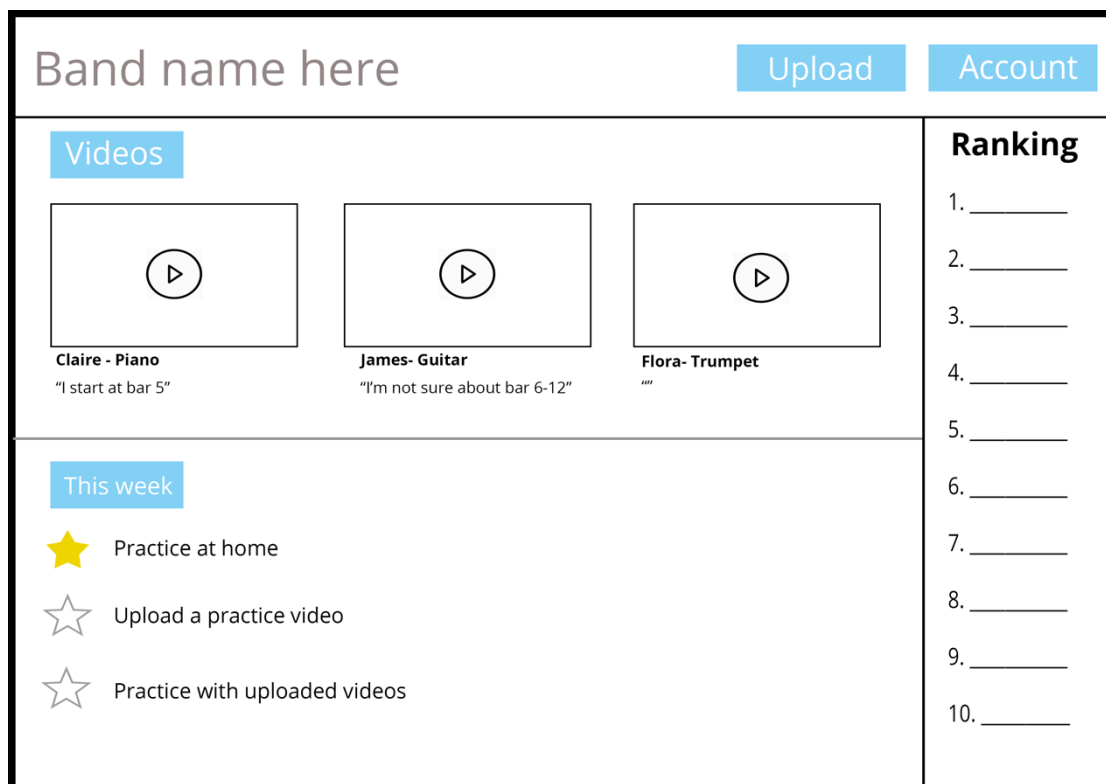


Figure 14, prototype final idea

Chapter 6 – Realisation

In this chapter, the third phase of the Creative Technology Design Process is discussed. System components are discussed, and there will be concluded what the best feasible option is. The method of the user-testing is described and the chapter will end with a description of the full working prototype.

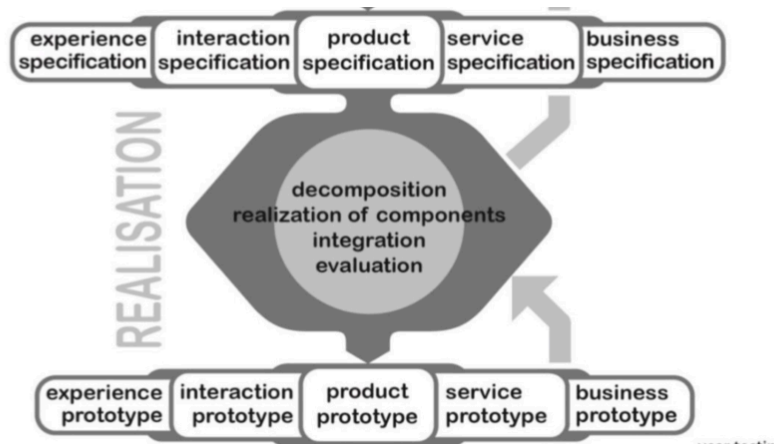


Figure 15, Part 3 of the Creative Technology Design Process

6.1 System components

The proposed system is an entirely new designed and programmed platform, as can be seen in Figure 13. This is not feasible to make for the functional testing; therefore, already existing platforms are explored in this chapter that are possible to use for the working prototype.

6.1.1 Component 1 – Website

The first option to use is a simple WordPress template website. WordPress templates are known for its easy-to-use websites, especially if the host is not skilled in programming at all. A disadvantage for using a WordPress website is that everything is opensource and nothing can be made easily private for a group.

5.1.2 Component 2 – WhatsApp group

The second option is a WhatsApp group. WhatsApp groups are known for easy and quick communication between two to 256 people. It is an easy platform to share video's on, but a disadvantage is that every text will be placed under each other. For seeing all the media uploaded in the group, a few menus have to be clicked through. Also, a to-do list and ranking have to be 'faked' through the moderator and won't be generated itself.

6.1.3 Component 3 – Facebook group

The third option is a private Facebook group. A private Facebook group has a clearer and easier interface to use as to the other component possibilities. In the group, videos can be published easily, and the ‘poll’-function that already exist in Facebook could be used as the ‘to-do’-list. Just like the WhatsApp group, the moderator still has to generate the ranking themselves. Another disadvantage is that not every teenager nowadays has a Facebook account.

6.1.4 Component 4 – YouTube

YouTube is known as a video-sharing platform. Unfortunately, there is not a possibility to create a group-specific page. Every user should sign up for a YouTube account, and post videos to their own account. If they have to be findable for others, they are open for every person in the world, which might not be the best option. Another disadvantage is that the gamification part of the system (to-do’s and ranking) cannot be implemented at all.

6.1.5 Component 5 – Google Forms

The fifth option is using a Google Forms page. With google forms, a custom made online survey and quizzes can be made. A variety of possible answer-forms can be given, such as typed answers, multiple choice, and even the upload of an attachment is possible. A disadvantage is that only the creator of the Forms can see all the answers, so other users cannot see the uploaded attachments. Also, the ranking cannot be generated automatically, but it seems that no existing platform is able to do that.

6.1.6 Component 6 – Wunderlist

The last option is a Wunderlist group. Wunderlist is a mobile and computer application, where several lists of tasks can be made. These tasks can be assigned to a due date, a person and ranked on preference order. This platform would be a good option for the gamification part of the system, although the ranking can be changed by all the members. A major disadvantage is that it is not possible to implement the video-sharing part in this platform.

6.1.7 Most feasible solution

At first, the Facebook group seemed as the best option to use, taking all the pro’s and con’s into account from all the component options. When proposing this idea to Bennie Waanders (conductor of de LBW-band red.), he mentioned that not everybody of the band has Facebook anymore, and that they are not willing to sign up for an account. Bennie mentioned that he already has a WhatsApp-group with the bandmembers, so that that would be the best option.

Taking his advice into account, there was decided to use a WhatsApp-group in combination with a Google Forms page. The gamification part would be done through the Google Forms page with help from the moderator, which will post the ranking in the WhatsApp group. The

users can upload their videos in the WhatsApp group and can easily comment and communicate about that.

6.2 Functional Testing

During the functional testing, the fully working prototype will be tested on the functional requirements, that are explained in chapter 5.4.2. Participants of the research will sign a consent form after reading the information brochure. The research is submitted to the ethical committee and concluded positive. The research can be referenced by file number RP-2018-36.

The research is a standard Formal Methods and Tools research group (HMI) research. The research consists of two parts. In the first part, which takes place at may 25th, the subject will be interviewed on its behaviour and motivation towards practicing a musical instrument at home before a band practice. The subjects will be introduced to the fully working prototype, which they will use for three weeks. The second and last part of the research takes place at June 15th. The subjects will be interviewed on how its behaviour and motivation is now towards practicing at home after using the prototype for three weeks.

The results of the before and after interview will be compared and evaluated in chapter 7.

6.3 Fully working prototype

6.3.1 Description

The fully working prototype is realized with the slight use of the Wizard of Oz method. The Wizard of Oz method is a method where users of the system think they are interacting with a computer, but in fact there is a person behind that controls the system. Instead of using an automated newly coded interface, the prototype is a combination between a WhatsApp group, Google Forms and the workshop leader, which is discussed in chapter 6.1.7.

During the prototype testing period, the teenagers will have contact via the WhatsApp group. Every week, the teenagers can achieve three stars. The first star is achieved through practicing ‘the normal way’ at home. The second star is achieved by sharing a video or audio file of their practice sessions in the WhatsApp group. The last star is achieved through practicing with video or audio-files of peer-band members. Through filling out a google-form, the score is kept up through the workshop leader/moderator. The moderator will publish the ranking in the WhatsApp group.

Using this intervention, the practice at home will be more fun and will give an extra dimension to the at home practicing sessions. By seeing fellow bandmembers uploading that they are busy with practicing, hopefully healthy peer pressure will occur, such that other

bandmembers want to practice and share. Also, the gamification part with the star-ranking will contribute to that as well. By practicing with the video/audio, not only the own notes are practiced, also the collaboration skill is practiced.

6.3.2 Visualisation the working prototype

6.3.2.1 WhatsApp-group

A screenshot from the start of the WhatsApp-group part of the prototype can be seen in Figure 16. The person in green is the moderator and will manage the test. First the moderator starts off with an explanatory reminder of what is the idea, where after the Google Forms page is introduced. The explanation and test is conducted in Dutch, because the subjects are all native Dutch speakers.

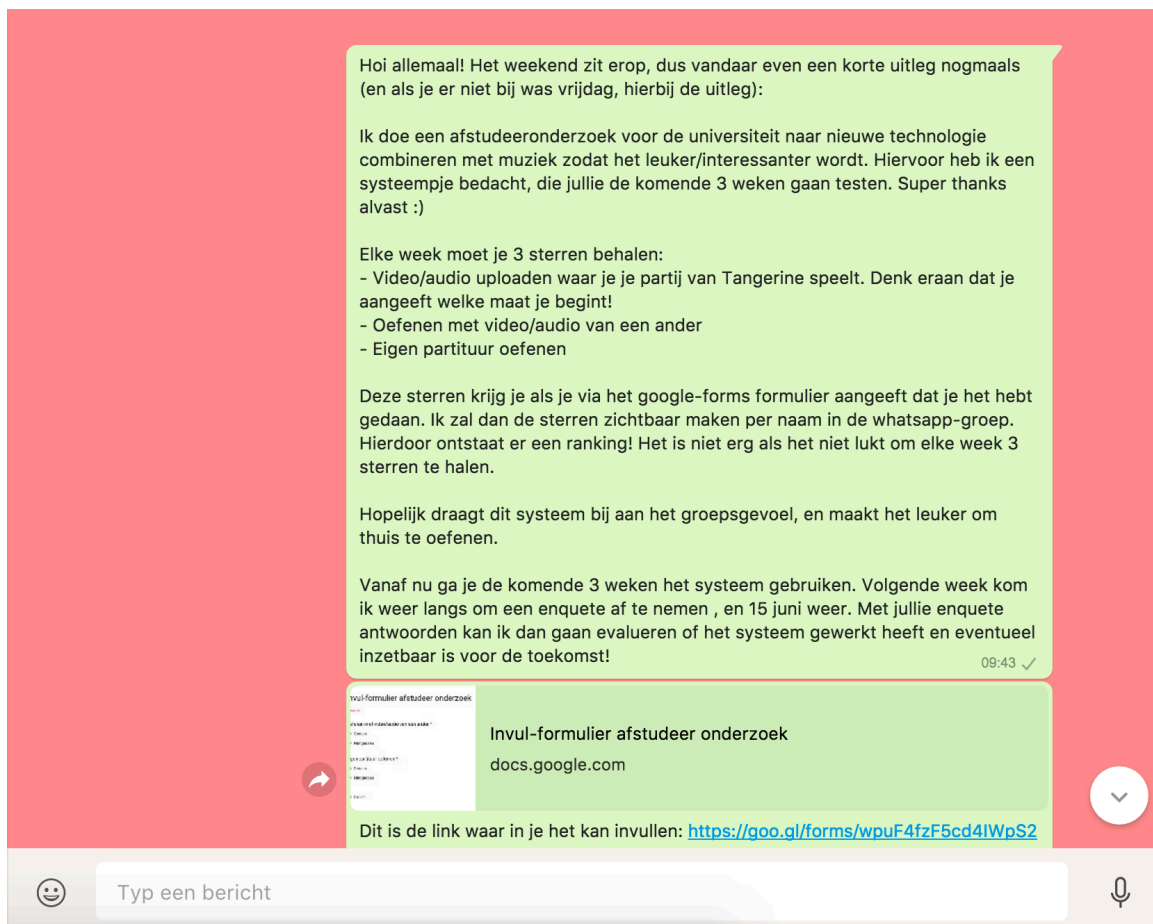
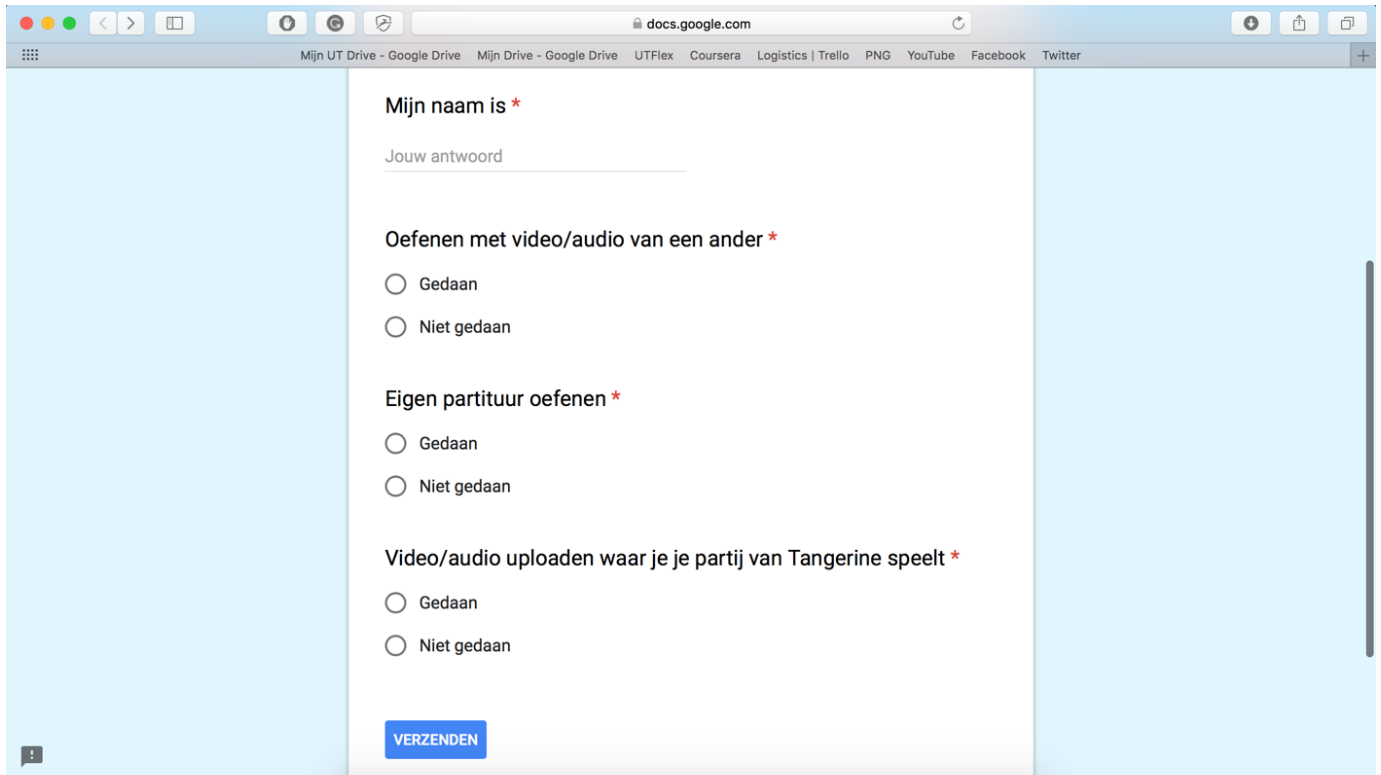


Figure 16, WhatsApp group of the prototype

6.3.2.2 Google Forms page

A screenshot from the used Google Forms page can be seen in Figure 17. The subject need to fill in their name, such that the moderator can match the stars and ranking to the names. The form is adjustable every day of the week, such that not every task needs to be fulfilled in once. The page is in Dutch for the reason explained before.



The screenshot shows a Google Forms page in Dutch. The browser's address bar is 'docs.google.com'. The page title is 'Mijn UT Drive - Google Drive'. The form contains the following questions and options:

- Mijn naam is ***
Jouw antwoord
- Oefenen met video/audio van een ander ***
 - Gedaan
 - Niet gedaan
- Eigen partituur oefenen ***
 - Gedaan
 - Niet gedaan
- Video/audio uploaden waar je je partij van Tangerine speelt ***
 - Gedaan
 - Niet gedaan

A blue button labeled 'VERZENDEN' is located at the bottom of the form.

Figure 17, Google Forms page of the prototype

6.3.2.3 Prototype in working

In figure 18, the prototype in working is showed. A participant uploaded a video saying which bars she played and which she is unsure about. The moderator gives positive feedback and publishes the first ranking.



Figure 18, Prototype in working

Chapter 7 - Evaluation

In this chapter, the last phase of the design process is addressed. First, there will be evaluated to what extent the requirements which were specified in chapter 5 are completed. Next, interviews with the stakeholders were conducted and checked if their expectations were matched. The user scenarios described in chapter 5 are held next to what really happened during user testing. There will be concluded with the final level satisfaction of the stakeholder.

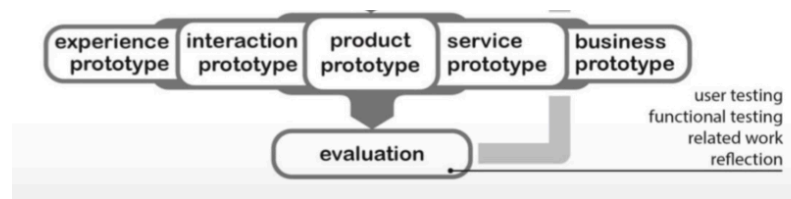


Figure 19, Part 4 of the Creative Technology Design Process

7.1 Way of evaluation

The user test will be evaluated through comparing two surveys. One survey will be held before the subjects are introduced to the prototype, and will be conducted as described in chapter three, methods and techniques. The second survey will be held after the subjects have used the prototype for three weeks. With asking a few of the same questions, a good comparison and therefore conclusion can be withdrawn. The second survey will be also conducted as described in chapter three, methods and techniques. For the test, there are four people available.

7.1.1 Survey before introduction prototype

The answers on the first survey will be the zero measurement of the user test. The subjects will be asked about the amount of at home practicing and their motivations to do so. Also, demographic data will be collected, to eventually use that to draw conclusions that are linked with demographic data. The complete survey is in Dutch, and can be found in appendix V.

7.1.2 Survey after introduction prototype

The answers on the second survey are used to compare with the zero measurement. With asking several questions the same as in the first survey, there is a possibility to check if the use of the prototype is experienced positively or negatively. The complete survey is in Dutch and can be found in appendix VI.

7.1.3 Survey results

7.1.3.1 Survey before introduction prototype

Answers on how many hours and times per week the subjects practice at home for the Little Big Wonder-band can be found in the pie charts in table one, as well as answers on the question if the subject practice their music pieces for regular lessons more, less or equal than their music pieces for the LBW-band.

On the question why the subjects are in the LBW-band, all the answers are more or less the same, they are in the band because it is fun and entertaining to play together than alone. 75 percent of the subjects' answer that they need extra external motivation to practice at home more. This suggests that the prototype is actually needed and could work out positively. Answers on why the subjects would practice their music pieces at home are all more or less the same, answers are 'because they are hard and so that I know what to play during band meeting'. Answers on why they are not practicing at home are also quit the same, it is because the pieces are too easy or already known, but the major is because the band meetings keep being cancelled and therefore there is no point of practicing.

7.1.3.2 Survey after introduction prototype

The results on the second survey are quite remarkable. 75 percent of the subjects did answer that they did not gain enough external motivation from the prototype to practice their music pieces at home (more). Explanatory comments to that are that they still do not have the motivation because the LBW-band will quit eventually, and that therefore practicing is useless. One person answered that she already knew it, so therefore practicing would be useless. Answers on the question what would help them to use the prototype, are quite different. One answer is more bandmembers, another person does not know, and the other person would use it if everybody was using it and shared videos.

Positive remarks on the prototype were the increase of group feeling and that you can help each other from home with practicing. Listening to other people helps increasing the skill of knowing how you should do it. These answers show that the intentions of the prototype were conveyed well. Negative remarks on the prototype were that one subject is dependent of the others and the pressure of having to do something. An important remark was the fact that it maybe would work better on younger children. The older teenagers tend to relativize the gamification system a lot quicker and therefore the main motivational part of the prototype is not working anymore.

25 percent of the subjects did use the prototype, with the explanatory comment that she wanted to achieve the stars and was practicing because she did not know her music piece well enough. She liked the fact that she was rewarded with practicing and was extra motivated through that as well.

7.1.3.3 Comparison surveys

As can be seen in table 1, the use of the prototype did not work out as expected or hoped. On the first two questions, nothing changed between the two survey moments. On the first question, this is not that big of a deal, because there could be a change from zero to one hour practicing per week. This is not clear in the pie chart, but in the second question there can be concluded that indeed, nothing changed. Before the use of the prototype 75 percent did not practice at all at home, and after the use of the prototype, the same number came out of the survey. Remarkable is the outcome of the third question. Before the use of the prototype, 25 percent of the subjects practiced their music pieces more for the LBW-band than for regular lessons. 50 percent did this less, and 25 did practice equal times for lesson and band. After the use of the prototype, the 25 percent that practiced more for band, disappeared and changed into 'I do not know'. This is an outcome that was highly unexpected and wanted, because in most positive case the chart should not have showed any percent 'less practice'.

With the comparison of the two surveys, there can be concluded that this outcome was not expected at all. Possible explanations will be discussed in chapter 8, and a final conclusion will be withdrawn in chapter 9.

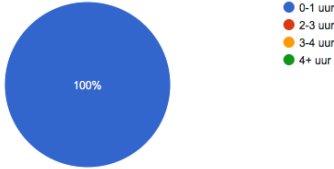
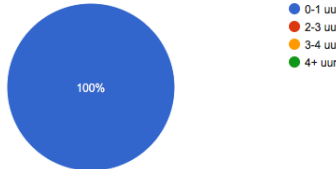
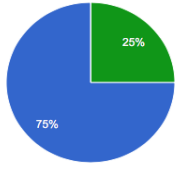
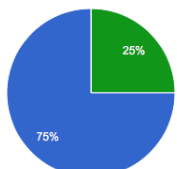
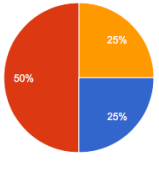
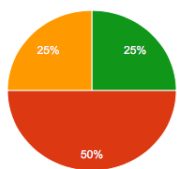
Before use of prototype	After use of prototype
<p>Hoeveel uur per week oefen je gemiddeld thuis je partijen voor de LBW-band? 4 reacties</p>  <p>Legend: 0-1 uur (blue), 2-3 uur (red), 3-4 uur (orange), 4+ uur (green)</p>	<p>Hoeveel uur per week oefen je gemiddeld thuis je partijen voor de LBW-band? 4 reacties</p>  <p>Legend: 0-1 uur (blue), 2-3 uur (red), 3-4 uur (orange), 4+ uur (green)</p>
<p>Hoeveel verschillende momenten per week oefen je gemiddeld thuis je partijen voor de LBW-band? 4 reacties</p>  <p>Legend: 0 (blue), 1 (red), 3 (orange), 4+ (green)</p>	<p>Hoeveel verschillende momenten per week oefen je gemiddeld thuis je partijen voor de LBW-band? 4 reacties</p>  <p>Legend: 0 (blue), 1 (red), 3 (orange), 4+ (green)</p>
<p>Kruis aan wat van toepassing is. "Ik oefen thuis gemiddeld per week mijn partijen voor de Little Big Wonderband, dan mijn partijen voor les." 4 reacties</p>  <p>Legend: meer (blue), minder (red), gelijk (orange), weet ik niet (green)</p>	<p>Kruis aan wat van toepassing is. "Ik oefen thuis gemiddeld per week mijn partijen voor de Little Big Wonder Band, dan mijn partijen voor les." 4 reacties</p>  <p>Legend: meer (blue), minder (red), gelijk (orange), weet ik niet (green)</p>

Table 1, comparison of surveys

7.2 User scenarios versus reality

In chapter 5.1, two user scenarios are described based on the two initial ideas. Based on those user scenarios, the final idea arose, which is tested in the above explained user test. Two surveys were part of that user test, where remarkable things came out. There can be stated that the described user scenarios did not go at all like that in reality.

The first thing where the user scenarios are totally different from reality is that the prototype is nothing like the proposed system. The users did not have to sign up for an account, and the layout of the system in real life was something they were already using. One major aspect that went totally different is that the person that did use the system, did not get the rest to participate as well.

Another thing that did not similar as in the user scenarios is the set deadline. The band members were not prepared for the meeting at all. The practice did turn out more fun for the person that used it, but the overall result is disappointing. The hope that the bandmembers got more motivation through the gamification aspect of the system did not work out as hoped as well. Only one out of the four band members used the system and got motivated through it. The band is not growing in number of bandmembers as written in the user scenarios, but in a timestamp of three weeks, this was not a reasonable goal.

Overall, there can be concluded that the user scenarios and reality did not match at all. There were some points where the scenarios and reality matched a little bit, but at such a small level that it almost is negligible.

7.3 Interview Stakeholders

7.3.1 Janette Davelaar & Management Team of Kaliber

After a small talk trough the results of the user testing, a small evaluation took place. The main point that came forward is that unfortunately the results did not show the results that were predicted and hoped. Though, these results show interesting discussion points and chances to elaborate study on in future work, where Kaliber is really interested in.

Through this research, there is created an interesting opening to possible combinations of technology like gamification, and classical musical education. Even though the results did not show an increase in motivation and did not make the at home practicing more fun for everybody in this user test-group, the workshop leader did enough in external motivation and commenting on their actions. After all, the disappointing results could not have been the fault of the workshop leader, maybe a lager user test-group would have helped.

Chapter 8 – Discussion

In this chapter, results of the project will be discussed, as well as the completion of user requirements, which are set in chapter 5.4.2. There are many discussion points that arose after testing and evaluating the project, in several domains.

8.1 User requirements

Starting with the most important discussion point, the not expected, not so positive, outcome of the testing phase. The hypothesis is not matched at all with the outcome and the user requirements cannot be fulfilled. The first user requirement was that users of the system are practicing more at home after the use than before. As can be seen in Table 1 and is discussed in chapter 7, there was a negative change in the amount of practicing at home.

The second user requirement was that users of the system find it more fun to practice at home than before the introduction of the system. This user requirement is not fulfilled, as three out of the four subjects did not use the system at all. The same goes for the third user requirement, which was that the user should be driven and motivated enough through the system to achieve the three stars every week. Only one out of the four testers was indeed more motivated through the system, but that is not enough to conclude if the system works or not. The last user requirement is that in the end, the user feels more healthy pressure to come prepared to the band meetings and want to blow new life into the band again. This requirement is not fully completed as well. Although it is a long-term requirement, the wished healthy peer pressure did not happen enough, such that everybody used the system.

8.2 Improvement areas

The particular outcome of the requirements could be depending on different factors. The first factor is the small number of testers. The test of the designed system was conducted on only four people. At first, eight people told they would help testing, but unfortunately, they dropped out and only the half of the group went testing. With this small number of subjects, the integrity of the results and conclusion cannot be guaranteed. Also, the particular four people that tested the system, could be an unlucky choose of teenagers in the user group, which represent a distorted view of the user group. Maybe, with four other teenagers, with the same age, the results of the test could be really different, positive maybe, with all the user requirements checked. With more testers, the chance of this happening becomes smaller.

A way to have had more testers is to test it on a bigger band with the same age and motivational problems. Another ways to have had more testers is to have done the test on

multiple bands and/or ensembles at the same time. Differences between bands and/or ensembles could be detected through this as well, which could cause interesting insights to improve the system.

An interesting insight that is gained through the way the testing has been done is that the person that used and liked the system, was the youngest of the group. This particular subject is 12 years old, and the other three were 16, 17 and 18 years old. This is quite a big age gap, where the interests of the subjects are different. Age could be an explanation why the system did not work as well as predicted. Probably are the older teenagers not susceptible for the reward system, which are 'only' digital stars. These subjects did not see the need to achieve a first place in the ranking. Apart from extra motivation through the moderator, which resulted in messages like 'if we don't use it, it is also a result', maybe extra motivation apart could be implemented. A real prize, like a gift card or a bar of chocolate maybe would have helped.

Chapter 9 – Conclusion

The goal of this graduation project was to get an answer to the research question that is created in chapter 1. The research question that have been kept in mind during this project is: ‘Given that playing together motivates someone to keep playing a musical instrument, how can one develop an innovative workshop that contributes to that? ‘.

After literature research a of the State of the Art was created, where after was chosen for a new media perspective of the workshop. In the ideation phase, ideas evolved to more of a system instead of a workshop. These ideas are worked out further in the specification phase, including user scenarios, quick prototypes and interviews with the stakeholders. One final idea arose, consisting of a system that gives a new dimension to and stimulates practicing at home before a band meeting. The teenagers will have contact via the system by sharing video/audio files of their practice sessions. Also, a to do list has to be worked off, which results into a ranking system with stars as a reward.

The final idea was presented with a prototype sketch and discussed with the stakeholders. Several components for the test-prototype were considered, where after the final prototype was created. A WhatsApp group, in combination with a google forms, where a moderator keeps track of the ranking. The evaluation phase is the most important phase of this graduation project. Before and after testing the system with the members of the Little Big Wonder-band, surveys were held. Comparing those surveys, there can be concluded that the system, with the goal to increase motivation for practicing at home and gain group feeling, did not work as proposed.

Only one out of the four subjects in the test did like to use the system, and the overall results are showing a downwards number of times practicing a musical piece at home when using the system in comparison without the use of the system. Healthy peer pressure did not occur, whereby the only person that did like to use the system, could not continue using it because it depends on the other users.

Though, the stakeholders did like the interesting, new media approach of combining social networks and gamification with traditional music education. Therefore, this research is valuable and could be used in further research in combining new media with traditional music education.

Chapter 10 – Future Work

After researching, user testing and evaluating, options for future work arose.

The first option is to do more research into combining gamification with classical musical education. As concluded in this thesis, the motivation of a 12-year-old was triggered through the gamification, but this could be a coincidental result. With further research in this area, there could be concluded if the result in this thesis is coincidental, and if gamification is the right technique to spark the motivation of a teenager in this day and age. Also, in this field of research, there could be researched further why the gamification does not work on teenagers older than 16 years of age. Does it help to assign an actual prize to it, instead of a digital star?

Another option for further research is to test this product, or a variation of it with another implementation of gamification, on more than four people. The user test-group of this thesis is very small, and with testing on different kinds of bands, orchestra's and ensembles, interesting insights could come out.

During this thesis research a simplified prototype is used for the user tests, in the form of a WhatsApp group combined with a google forms. Using two different existing platforms, could make the task more difficult for the subjects and therefore could create an undesirable outcome of the results. When programming the interface as designed at first, a system with all the desired options is created. The subjects only have to go to one interface for the user test and this makes it easier. A different kind of results could come out of that user testing, which is something to consider in future work.

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Appendix I – Interview Henriette Punte, M&C

Welke strategieën worden er al gebruikt om reclame te maken voor band/orkest?

Jongeren zijn de moeilijkste groep, leg er niet te veel nadruk op. Als je niet wil, dan wil je ook niet. Almelo, studio next, in combinatie met welzijn organisatie scope. Sportchool model. Coahc een uurtje werkte niet. Kudde gedrag. Urban enzo leer je op straat, dat werkt dus niet. Industrie terrein, miss niet goede locatie.

Talent programmas, werkt wel, maar alleen als je al de motivatie hebt. maar ze willen niet perse het podium op.

Een keer goedkoop proberen heel veel aanmelding, daarna haken ze af als het regulier en duurder wordt.

Posters (zoals handletteren) werkt goed qua aanmeldingen, inclusief eten dat werkt ook wel. En dan hebben ze het er wel over om te betalen.

Welke hebben in het verleden laten zien dat ze totaal niet werken? En welke wel?

Korte cursus singer songwritern; niets op afgekomen. Maar jongeren lijkt het leuk om te doen, maar in de groep, wat vinden anderen van mij (schaamte) werkt dan toch niet.

Projecten binnen het voortgezet onderwijs → dat werkt goed als motivatie. Workshop docenten zijn heel andere types dan docenten op muziekschool. Verwachting komt niet overeen.

Social media helpt heel erg → instagram, veel delen.

Ambassadeurs (Studio 15), die doen de prootie, en vertellen het verhaal. Leeftijdsgenoten werken goed. Nog in enschede niet gebeurd.

Sommige docenten promoten zelf voor ensembles / bands.

Als je cursus volgt, kan je gratis bij bigband/ensemble. En als je groepsles doet kan je met 40% korting.

Muzieklessen ouders, korte cursussen zelf betalen meestal. En dan haken ze af. Jeugd cultuur fonds voor jongeren die geen geld hebben. (minder inkomen voor ouders). Wordt wel redelijk vaak gebruikt, voor kinderen.

Studenten 30 procent korting regeling.

Hoe ervaar jij de benaderbaarheid van jongeren?

Meest duistere groep, op een gegeven moment vallen ze na 13 jaar heel erg af. Andere interesses krijgen ze, of oefenen thuis hebben ze geen zin meer in. In een groepje, ga je langer door. Maar individueel haken ze sneller af. Dus samen spel helpt met langer vasthouden van jongeren.

Appendix II – Interview Lotte Sieverink, Projectleader education

Voor basis + middelbare school contactpersoon & meedenkt over aanbod daar wat ze willen en zorgen dat het wordt uitgevoerd.

Basisschool om visievorming helder te krijgen.

Middelbare school heeft muziekonderwijs: maar hoe wordt dit gegeven. Wordt naar gekeken. Zij vragen ernaar om een projectdag/workshop te geven. → hiphop dans, djembe, thema samen uitgewerkt tot een project. (identiteit).

Raw project → respect aandacht wilskracht; 1^e week van school. Eind van de dag met ouders presentatie. Was om te toetsen of er dan meer inschrijvingen komen. Niet echt naar voren gekomen. Maar of dat voor 1 keer of les is niet duidelijk (studio 15 heeft goed gewerkt).

Toch moeilijk om (eerlijke) respons te krijgen. Workshops zijn dingen niet niet echt in het reguliere aanbod zitten.

Nu bezig met onderzoek in almelo basis → voortgezet

Lln die niet spelen maar dan in een band komen door school educatie → te weinig contact met kaliber en school. Lijntjes korter dan zou je daar meer uit kunnen halen. Verbinding ontbreekt. Stap is dan te groot. Onderzoek loopt nu. Cultuur coordinator is tussenpersoon en dat werkt niet altijd.

Anouk Snellink (zangdocente samenwerking kottenpark(modules om docent kaliber in te zetten) heeft veel zicht en ervaring daar mee. en kaliber)

Voor jongeren moet er wel een goede docent staan die die klik heeft. Als iets te lang duurt dan werkt dat averechts, te kort is dan beter 'jammer dat we moeten stoppen'. De ene groep is de andere groep niet. ligt aan het onderwerp van de workshop. Jembe gaat makkelijker beter dan soundwriting. Per. Definitie kan niet iets succesvol of niet succesvol zijn.

Janieke → balie (je kan merken van welke school ze zijn) , de cultuur van een school is erg bepalend. Wijk of cultuur niet te zeggen.

Lyceum zuid / kottenpark/ bonhoeffer. Hoe leerlIn zich gedragen. Ligt buiten je eigen macht en kan je niks aan doen.

Wat voor moderne middelen (techniek, mixen, etc) worden er al ingezet in muzieklessen/workshops/samenspel etc.

Theater, djembe

Zoë Bosschaart

Welke groepsgrootte en workshopduur werkt het beste?

RAW project is groepsgrootte 15-20 max. dat werkt voor docenten erg prettig. Hele klas tegelijk 30-32 kan ook gebeuren. Leerlingen zelf kiezen -> of verplicht
Meteen aan de slag. Ligt er aan hoe lang het duurt (kennismaking duurt meestal 1 uur)
, meer verdieping vanaf 1,5u . Dan kan je ook wat meer achtergrond vertellen.

Appendix III – Consent form

‘I hereby declare that I have been informed in a manner which is clear to me about the nature and method of the research as described in the aforementioned information brochure. My questions have been answered to my satisfaction. I agree of my own free will to participate in this research. I reserve the right to withdraw this consent without the need to give any reason and I am aware that I may withdraw from the experiment at any time. If my research results are to be used in scientific publications or made public in any other manner, then they will be made completely anonymous. My personal data will not be disclosed to third parties without my express permission. If I request further information about the research, now or in the future, I may contact Zoë Bosschaart, De Hems 16-81, 7522 NL Enschede; telephone: 0610628735; email: z.m.bosschaart@student.utwente.nl

As a participant in this study, I agree to being followed on the social platform for the purpose of tracking the actions on the platform as well as a means of verifying results from other data collected. I am aware that I may withdraw this consent at any time without penalty, at which point, the data will be erased. The data will only be used for research purposes, the materials posted on the social platform will not be published in any way.

All gathered data will only be used for this project and will be treated completely anonymous.

I will not get any remuneration for participating in this research.

If you have any complaints about this research, please direct them to the secretary of the Ethics Committee of the Faculty of Electrical Engineering, Mathematics and Computer Science at the University of Twente, drs. J. van Loon, PO Box 217, 7500 AE Enschede (NL), telephone: +31534893748; email: j.vanloon@utwente.nl

Signed in duplicate:

Name subject

.....

Signature

.....

I have provided explanatory notes about the research. I declare myself willing to answer to the best of my ability any questions which may still arise about the research.’

Name researcher

.....

Signature

.....

Appendix IV – Information Brochure

Research leader

Zoë Bosschaart
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7522 NL Enschede
0610628735
z.m.bosschaart@student.utwente.nl

The experiment will take place on Friday May 25th, Friday June 1st and Friday June 15th at the Kaliber Kunstenschool in Enschede.

If you have any complaints about this research, please direct them to the secretary of the Ethics Committee of the Faculty of Electrical Engineering, Mathematics and Computer Science at the University of Twente, drs. J. van Loon, PO Box 217, 7500 AE Enschede (NL), telephone: +31534893748; email: j.vanloon@utwente.nl

This research is a standard Formal Methods and Tools research group research. The research consists of three parts. In the first part, at may 25th, the subject will be interviewed on its behavior and motivation towards practicing a musical instrument at home before a band practice. The subjects will be introduced to a system they will use for three weeks, and their predictions will be interviewed. In the second part, which takes place at the 1st of June, the subject will be interviewed on how its behavior and motivation is towards practicing at home for a band meeting, after using the system for a week. The last part, which takes place at June 15th, a final evaluation interview will be conducted.

There are no known risks for the subjects' safety/discomfort.

The subject will not get any remuneration for participating in this research.

All participants in this research should be in the Little Big Wonder band, a youth big band initiated by Kaliber Kunstenschool.

The purpose of this research is to investigate the effectiveness of a proposed system on the motivation and effectiveness of practicing at home before a band-meeting. The gathered data will be treated anonymously and will not be disclosed to third parties without the permission of the subject.

Participation in this research is completely voluntary and the subject may withdraw at any time without any consequences. In this case, all gathered data will be destroyed. Participants may also refuse within 24 hours after the research has taken place to allow their data to be used for the research.

Appendix V – Survey before introduction intervention

1. Hoeveel uur per week oefen je gemiddeld thuis je partijen voor de Little Big Wonder Band? Kruis aan wat van toepassing is.
 - 0-1 uur
 - 2-3 uur
 - 3-4 uur
 - 4+ uur

2. Hoeveel verschillende momenten per week oefen je gemiddeld thuis je partijen voor de Little Big Wonder Band? Kruis aan wat van toepassing is.
 - 0
 - 1
 - 2
 - 3
 - 4+

3. Heb je naast bandrepetities ook les bij Kaliber? Kruis aan wat van toepassing is.
 - Ja
 - Nee (ga door naar vraag)

4. Kruis aan wat van toepassing is. “Ik oefen thuis gemiddeld per week mijn partijen voor de Little Big Wonder Band, dan mijn partijen voor les.”
 - Meer
 - Minder
 - Gelijk
 - Weet ik niet

5. Waarom zit je in de Little Big Wonder Band?

6. Ik heb externe motivatie nodig om thuis (meer) te gaan oefenen
 - Eens
 - Oneens

7. Waarom oefen je thuis je partijen?

8. Waarom oefen je thuis je partijen niet?

9. Welk instrument bespeel je?

10. Hoe oud ben je?

Appendix VI – Survey after introduction intervention

1. Hoeveel uur per week oefen je gemiddeld thuis je partijen voor de Little Big Wonder Band? Kruis aan wat van toepassing is.
 - 0-1 uur
 - 2-3 uur
 - 3-4 uur
 - 4+ uur

2. Hoeveel verschillende momenten per week oefen je gemiddeld thuis je partijen voor de Little Big Wonder Band? Kruis aan wat van toepassing is.
 - 0
 - 1
 - 2
 - 3
 - 4+

3. Heb je naast bandrepetities ook les bij Kaliber? Kruis aan wat van toepassing is.
 - Ja
 - Nee (ga door naar vraag 5)

4. Kruis aan wat van toepassing is. “Ik oefen thuis gemiddeld per week mijn partijen voor de Little Big Wonder Band, dan mijn partijen voor les.”
 - Meer
 - Minder
 - Gelijk
 - Weet ik niet

5. Ik heb gebruik gemaakt van de interventie
 - Ja
 - Nee (ga door naar vraag 10)

6. Ik heb door de interventie genoeg externe motivatie gehad om mijn partijen voor de band thuis (meer) te gaan oefenen.
 - Eens
 - Oneens

7. Waarom heb je gebruik gemaakt van de interventie?

8. Wat vond je positief / leuk aan de interventie?

9. Wat vond je negatief/stom aan de interventie?

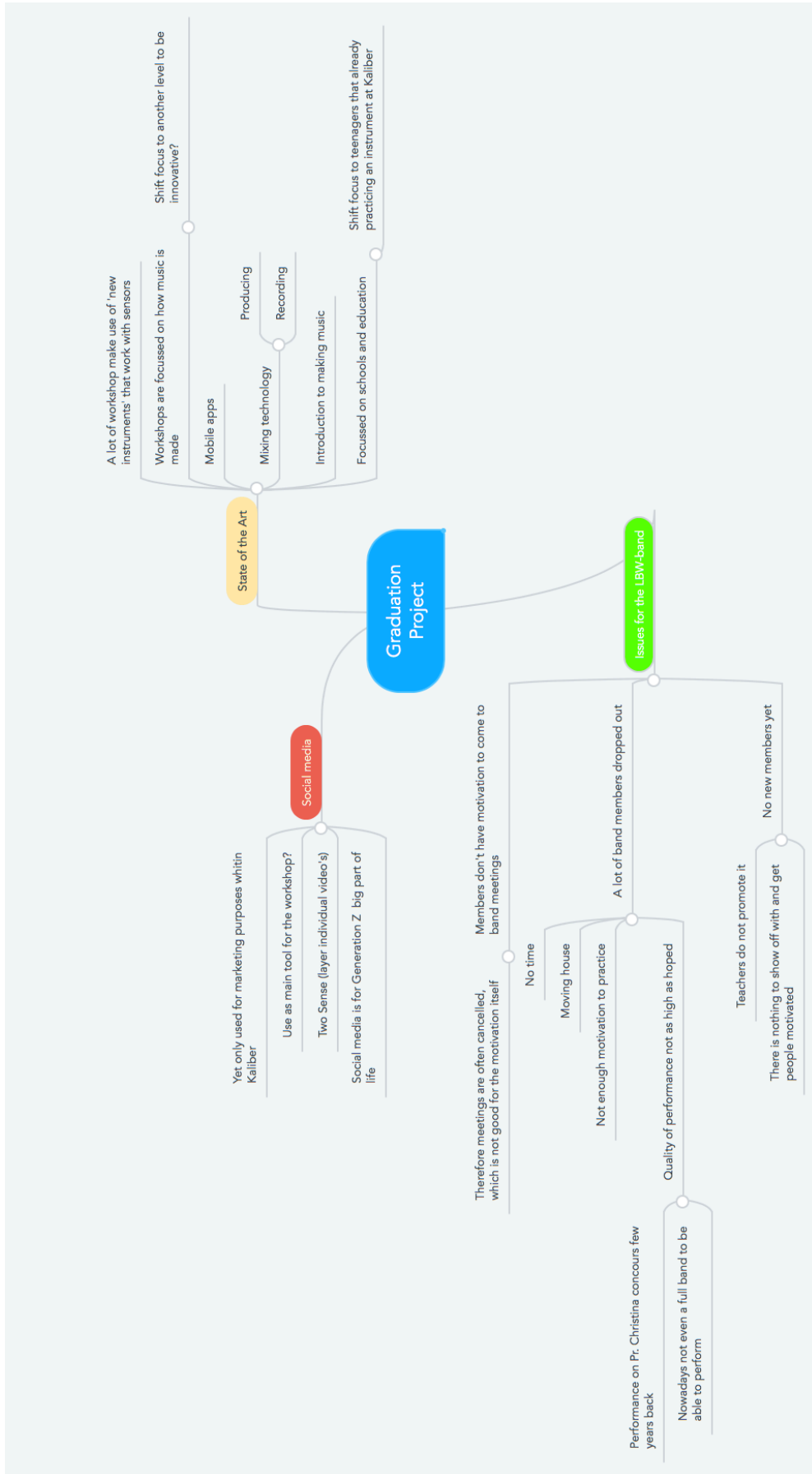
10. Waarom heb je geen gebruik gemaakt van de interventie?

11. Wat zou je helpen om de interventie wel te gaan gebruiken?

12. Welk instrument bespeel je?

13. Hoe oud ben je?

Appendix VII – Tinkering mind map



Appendix VII – Reflection report

Introduction of the graduation project

The product to be developed in this graduation project is an innovative music workshop, together with a didactic set up, and evaluation. The client in this project is Kaliber Kunstenschool. Kaliber Kunstenschool is an art school located in six townships of Overijssel, and the headquarters called Muziekkwartier is located in the centre of Enschede. People of any age can take dancing lessons, take courses in visual arts, theatre, fashion, music instruments, sing in a choir, play in a band and many more. Kaliber provides workshops at primary and secondary schools and companies can book teambuilding activities which Kaliber then organises.

Kaliber Kunstenschool wants to keep innovating its music lessons and workshops, and therefore I got the assignment to design an innovative music workshop. Innovative is a really broad term, so I wanted to find out what the possibilities were at Kaliber and what their needs and wishes are. One problem the school is facing is that a teenage big band from Kaliber, The Little Big Wonder band, has trouble to find teenagers that wants to play in the band and keep them in the band. The slogan of Kaliber is ‘Playing together is more fun than alone’, which fits perfectly with the idea behind the workshop.

After some research, results showed that lack of motivation for playing in the band is coming from lack of motivation for practicing at home. Because there is no motivation for practicing at home, band sessions are experienced less productive, and people will drop out. Also, research showed that 75% of the teenagers need external motivation to practice at home. Therefore, the aim is to design a ‘workshop’ that stimulates practicing at home before a band meeting. This causes more progression during the band meeting which hopefully results in team bonding and less drop out of band members. Therefore, there will not be one workshop that takes x number of hours, but is the workshop be a duration of 3 weeks, beginning with an introduction, then using the intervention and ending with an evaluation.

The workshop will hold the following. The teenagers will have contact via a social platform, in this case a WhatsApp group. Every week, the teenagers can achieve three stars. The first star is achieved through practicing ‘the normal way’ at home. The second star is achieved by sharing a video or audio file of their practice sessions in de WhatsApp group. The last star is achieved through practicing with video or audio-files of peer-band members. Through filling out a google-form file, the score is kept up through the workshop leader. The leader will publish the ranking in the WhatsApp group. By using this intervention, the practice at home will be more fun and gives an extra dimension to at home practicing. By seeing fellow bandmembers uploading that they are busy with practicing, hopefully healthy peer pressure will occur, such that other bandmembers want to practice and share as well. Also, the gamification part with the

star-ranking will contribute to that as well. By practicing with the video/audio, not only the own notes are practiced, also the collaboration skill is practiced.

The type of technology that the project belongs to

Because this graduation project makes use of a social platform, the project belongs in the domain of new media. New media is an umbrella term, encompassing services like websites, mobile apps, computer games and human-computer interfaces. According to the Cambridge English dictionary, new media is defined as follows: “Products and services that provide information or entertainment using computers or the internet, and not by traditional methods such as television and newspapers.”

There can be stated that new media is not ‘new’ anymore. In the early nineties, almost 30 years ago, W. Russel Neuman already spoke of the term ‘new media’ when he was talking about the evolution of audio, video and electronic text communication platforms. The rise of computing technology changed the media landscape in various ways. First of all, it introduced new media, media that is created in digital form instead of the classic ways. Second, the Internet created a global platform where media content could be created, distributed and consumed (Croteau & Hoynes, 2014).

Already in 2000, ten years after the introduction of the internet, studies showed that the use of internet was increasing and that broadcasting was decreasing. Also, internet news was already replacing some printed newspaper usage. Explanation for that is the no censorship, fast and low costs, as well as global reach and interactivity of the internet (Dimmick, Chen et al., 2004). Early 21st century, new media got rapidly bigger every second, especially with the rise of social networks. After the introduction of the first social networking site in 1997, SixDegrees.com, rapidly similar sites popped up. SixDegrees.com is the early forerunner of the (former) popular sites MySpace (2003) and Facebook (2004) (Boyd & Ellison, 2007). In 2005, YouTube is founded, and in 2007 Netflix is adding online streaming to its offerings. In 2004, Google starts to digitize millions of books, and in 2008 it adds newspaper archives to that databank. In 2009, social networking sites like Facebook and Twitter reach a peak of popularity (Croteau & Hoynes, 2014).

As shown in Figure 1, within a decade, social networks grew almost exponentially to a massive part of human life. Since then, the popularity keeps on growing every day. In April 2018, Facebook has over 2.234 billion users and Youtube has over 1.5 billion users worldwide (Statista.com, 2018). While new media was first an addition to people’s life, it now has become an important part of our life. New media has made quite a development itself over the years, but it also changed the way people look at and interact with technology.

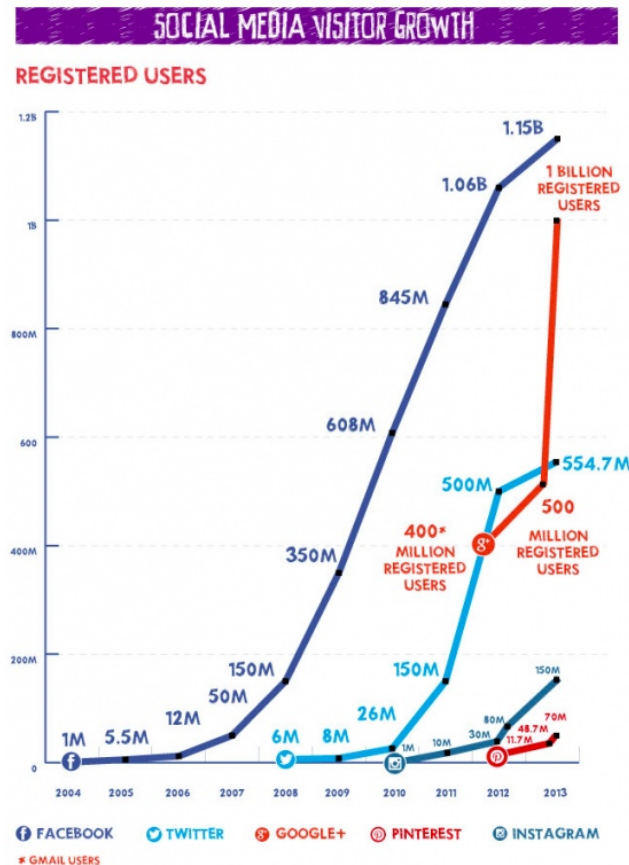


Figure 20, source: Search engine journal

Ethical aspects of the graduation project

The last few years, social networks have become a critical point of discussion. People stating that social networks having a negative impact and making people less social. A study showed that 87% of 150.000 people admitted that they have missed out on a conversation because they were distracted by social networks (Saiidi, 2015). But there are also people that find that social media has positive impact and helped them to remain social with past and current friends and family or deal with problems (Chaudhri, 2017 & Walsh, 2018). Though, these points of discussion are not really ethically related to the graduation project.

Therefore, the main points of discussion in this paper will be personal data selling to external parties, and the appropriateness of social network use for underage children.

Appropriateness of social network use for teenagers

The first ethical issue around social networks is the age from when the use of social networks should be allowed for underage people. 13 years is the legal minimum age for account signup at most social networks, set by Congress in the Children's Online Privacy Protection Act. But at the age of 13, a lot of teenagers are still not grown enough to see risks in using social networks. Cyberbullying and online harassment are two of those big risks. Cyberbullying and harassment are most of the time anonymous and can give the bullied teenager several psychosocial issues like depression, anxiety and isolation (O'Keeffe, Clarke-Pearson et al., 2011).

On the world wide web, everything can be found at any time. Almost every social network make money from the advertisements they show on the site. There are two different kind of advertisements, behaviour advertisements and demographic-based advertisements. Behaviour advertisements are determined on the internet behaviour of the user, and demographic-based advertisements are based on location, education, etcetera (Council On, C., & Media, 2013). Because these advertisements are determined for the user, the user can stumble across inappropriate advertisements for its age. Especially teenagers, are really influenceable. These advertisements do not only influence the buying habits of the viewer, but also the view on what is normal. When inappropriate advertisements are regularly shown, this can be really harmful for teenagers (Council On, C., & Media, 2013).

Even though there are a lot of negative effects of the use of social networks, there are enough benefits for teenagers that use social media. Social networks help with socialization and communication, for example easy targeting a big group for raising charity money and find people with the same interests. Also, learning opportunities are enhanced. Students at high schools use social media to connect with classmates, to discuss homework and group projects (Keeffe, Clarke-Pearson et al., 2011).

Personal data and digital footprint

The second ethical issue that arise around social networks are privacy concerns and the digital footprint. The digital footprint is the collective, ongoing record of one's web activity data (O'Keeffe, Clarke-Pearson et al., 2011). Among adults, is generally known that social networks sell this digital footprint of the user to several companies, for example advertising companies. What goes online, stays online. But do teenagers think about this when they post something online? Future jobs or university acceptance boards might be influenced trough something you posted online in your teens. It is up to the parents and schools to discuss the importance of cyber security and all the downsides of the use of social networks, especially with teenagers (O'Keeffe, Clarke-Pearson et al., 2011).

Social networks sell users' personal data to external companies for targeted advertising, which when signing up for an account the user give permission to. But is it appropriate that a teenager give permission to this, without knowing what it exactly entails?

In the graduation project, which is related to a music educational institute, social media platforms are used where the teenagers can upload their video's. But is it appropriate that an educational institute is making use of a commercial party, which can be harmful for teenagers and where their privacy is in danger? And what if the teenagers do not want to use or have their own social media channels? Do parents have to give their permission to the educational institution that footage of their children may be stored on the world wide web forever? These are all questions that arise within the project, which will be taken into account in the re-design part of this paper.

Trade-offs between potential upsides and downsides

The main trade-off in this project is the user privacy versus the efficiency of the product. As discussed above, all the data of the user will be stored online and could be sold to external parties. Unfortunately, the product would not work without the use of any social network. Though, there is since 25 may 2018 a new European Union wide regulation, General Data Personal Regulation (GDPR), with clear rules about export of persona data. Every company has to obey this regulation, so also the social networks. This means that the user clearly knows what data is public for the company and will cause less ambiguity.

Ways to re-design the product so that negative consequences will be prevented or migrated

A product without the use of social networks would prevent all the negative consequences discussed in this papier. Though, this is not possible, because the product is all about the use of social networks.

Because of the GDPR, it is safer for educational institutes to use a commercial social network. Still, the used social network can sell personal data of the students to external parties. With using a specially build private social network for the project, this could be prevented. The user data would be private to the educational institute. Unfortunately, this would cost a lot of money. Public social networks are free to use, and a private network need programmers that first build the platform, and then keep the platform running.

With the use of private network, the users do not have to use their own social media accounts any more. Also, if they did not had one because of privacy reasons, they do not have to register especially for it. When using a commercial social platform as well

as a private social platform, a briefing before introduction of the product could be given. The digital footprint could be explained, and what the rules are when using the product. There could be suggested that the recorded and shared video can also be just audio files, and videos could be recorded without showing faces.

Because the product will be used by an educational institute, parents of users under the age of 18 has to sign that they agree to the fact that their children are using the platform with their data. Moderators could be the teachers to check if there is no online harassment going on and that everyone is using the platform correctly.

Conclusion

In this report, the ethical aspects of the graduation project are discussed. First some history about the technology domain is given, where after the two main ethical aspects are introduced. Supported with some literature, the appropriateness of social network use for underaged children and the digital footprint are discussed. Trade-offs between potential upsides and downsides are explained, where after re-design options are given as answers on some ethical questions that raised during the report.

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