A Trojan horse, or just a tool?

Music educators on AI in a Dutch music academy

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Abstract

This research aims to study how music educators perceive the role of AI in a Dutch music academy and what it signifies in terms of their technological perceptions. This is done via a content analysis, with a phenomenological character. Nine interviews have been analyzed via two frameworks: technological streams by Mitcham (1994) and Using Generative AI in Education, by Su & Yang (2023). The research hypothesis was that educators would show resistance against AI because of ethics, and that they see it as a tool, while valuing artistical freedom. Hence, technological skepticism and technophobia was expected. These statements were all confirmed, except for their optimistic look on the future. Remarkably, most educators intend to or already use AI for their lesson preparations. They do limit their use, since they want to remain in control of AI. Furthermore, although resistance is shown in their ethical discussions, counterintuitively, it seems as if they have already accepted the technology and now try to find ways to work with it, instead of resisting it and building a safe system first. Hence, the advice is given to consider more regulation on AI in music education, given the involved risks.

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1. Introduction

This research aims to study how AI is envisioned by music educators in a Dutch music academy. Yu et al. (2023) state that artificial intelligence is shaping today's educational system and the future. Therefore, this has an impact on the feelings and expectations that music educators have about AI. On the one hand, AI's use can create opportunities and spark creativity, but on the other hand it may also cause a lot of anxiety and resistance to change. This happens in workplaces all over the world (Mirbabaie et al, 2021). Nevertheless, the technology is seen as useful in the literature, which show various effective AI-based methods to help students master their material, which we will explore, because despite causing negative emotions, it could be of benefit to the music educational system.

Li & Wang (2023) state that COVID-19 has made online AI-tools more popular in the learning process. During the pandemic, they did research on students, who had to use an AI-App that generated prompts. They found an improvement in the following categories: Piano playing (6,51%), solfeggio & music literature (4%), and singing (0,56%). While not all categories score as high, the exploitation of AI increased the overall performance by 15%. Moreover, Hu's study (2021) compared a classic music education with no implementation of AI with one where AI was used, to give the student a unique teaching strategy based on their results in an online teaching method, which showed an increase in learning capability by 17,5%, which also fits with the previous study. Concluding, AI is proofed to be useful.

Although, while it can be useful, this depends on the circumstances and the AI's capabilities. Vanka et al. (2023) state that when using AI as a tool for mixing, it seems that professional musicians want more adaptability for effective use. Moreover, AI generated music has a negative connotation (Moura & Maw, 2021), but with the rapid improvement of generated AI, this vision might change. Surprisingly though, AI can already be used for grading open answers, but teachers need to be convinced that, just like their colleagues, AI can make mistakes (Nazaretsky et al., 2022). In other words, visions on AI are still skeptical, but this might change with education and its improvement, which can create trust in the technology.

What has not been researched yet though, is how music educators envision AI in a Dutch music academy. The studies above look at the effect of various tools and the perception of AI, which mostly take place in elementary/high schools and regular music education. Furthermore, many studies take Chinese music education as their focus. Hence, what this study wants to add to the knowledge gap is in-depth information about music educators' vision about AI in a music academy with a Dutch, European point of view. This research is not specifically interested in the various tools and their effects, but it wants to find out what technological visions of AI live inside the world of a music academy e.g. technological skepticism, technological positivism, and technophobia. Furthermore, it is interested in how the music educators, from various departments, envision the use of AI in their academy. With this data, a broad picture can be drawn of AI's integration and possible future within the curriculum, just as possible future developments and trends of this technology can be predicted.

Hence, this research is relevant because there is limited in-depth information about music educators' perceptions of AI. Moreover, the connection between AI in practice, ethics, and discussion about the future give a broad, yet in-depth, overview of AI in a music academy, which can be used for predicting the future course and strategy of music education, as well as for predicting what the next generation of professionals can expect.

Taking the above paragraph in consideration, the main research question of this research is the following: "*What do the perceptions of music educators concerning the role of AI in a Dutch music academy signify in terms of their technological perceptions?"*

Sub-questions to be answered are the following:

- In what ways do music educators envision the practical role of AI in their music academy?
- What technological perceptions of AI can be discerned in music educators?

The first sub-question intends to reveal how music educators envision how AI can be used in their music academy. This allows the research to go more in-depth about their own lessons, and it generates different ideas about what needs to be considered when using AI in an educational setting, such as ethics, how much AI is needed, and which functions it needs to fulfill. Different educators often have different styles of teaching, which generates a variety of perceptions, which are analyzed to discuss AI's possible future in music education.
The second sub-question is to decipher what perceptions the music educators have of AI, since it can cause various feelings, whether explicitly or implicitly, which can be sorted in categories like technological positivism, technological skepticism, and technophobia. This helps the research to draw a picture of the general perceptions that live inside the music academy. These perceptions are shown through a general analysis and citations, which include typical examples and metaphors. These add clarity to the meaning of AI for the individual educators and it can be translated to a broader perception for the music academy.

This research will take a phenomenological approach. "Phenomenological research is the study of lived or experiential meaning and attempts to describe and interpret these meanings in the ways that they emerge and are shaped by consciousness, language, our cognitive and noncognitive sensibilities, and by our preunderstandings and presuppositions." (Given, 2008, p. 614). By taking this approach, this research intends to find out what the experiences and perceptions of music educators of AI signify, which draws from this phenomenological principle. It also shows a picture of what it is like to work in the small world of a music academy and what emotions emerge when technology from outside tries to enter their world. Furthermore, the preunderstandings and presuppositions can be expressed spontaneous in semi-structured interviews, because these allow natural and genuine interactions to take place, which a survey would inhibit. This method also uses in-depth questioning, and it provides typical expressions and examples, which a structured interview would restrict.

Nine Dutch interviews have been conducted, which have been summarized, translated, and coded to organize the data. Two frameworks are used to structure the data accordingly. One involves technological perceptions and streams (Mitcham, 1994), while the other one is about how Generative AI is used within education (Su & Yang, 2023). The interviews answer questions about how educators see AI being used in practice and in the future. This enables the research to find out about their perceptions, lifeworld, and experiences within music education. This creates an image about how AI is experienced by various music educators from different departments and how their students, future professionals, will be able to benefit from AI, as well as future strategies for the music academy, because ethics are involved.

In the following chapter an overview of the theory will be given. After that, the methods will be presented, followed by an overview of the data with an analysis, and finally a conclusion is made.

2. Theory

2.1 Introduction

In this chapter the research question will be theorized to gain a broad view of the world in which this research takes place. The general role of AI in regular education will be explained, which reflects on various cases throughout the available literature. This serves as an inspirational source for thinking about how AI could be used in music and what struggles may appear. After this, a framework is given on how AI can be implemented in education, but this is modified to serve as a base for implementing AI in music education. This analysis creates structure for the interviews. When this is clear, we move to literature on AI in the practices of music education, where various cases and outcomes are discussed in which AI is used for various music and educational purposes. These cases, however, do not take place in a music academy of higher-level education, as our case does, but just like for AI in regular education, this shapes our image of how AI manifests itself in music education. Furthermore, because music educators shape how technologies such as AI can be implemented, it is good to reflect on the various technological streams that they can have, because they might be skeptical, like it, or fear it. Eventually, these different viewpoints can be applied to a general vision of the music academy, will help to create a vision of the future, in terms of strategy, implementation, and how AI will be used. Finally, a preliminary answer is given, based on the information that is gathered in the theory section.

2.2 The general role of AI in regular education

Let us begin with analyzing two cases. The first case illustrates an exciting experiment on using AI as a grader for open-ended questions, which changes the perspectives of the educators positively. The second case is about the teachers' attitude towards AI and how including AI in technical solutions has a positive benefit on their vision of AI.

For AI to be implemented, trust is essential. While trust in AI comes up in the studies mentioned before, the study by Nazaretsky et al. (2022) provides insight in how professional development programs improve it. Primary and secondary school teachers were tested about their trust in AI. The study let the teachers have various discussions, ask questions, and let them use an AI-Grader. What had a notable impact on the trust of AI was that in the beginning of the experiment their idea of a perfect AI grading system was that it had to match their grading. To educate them, their grading was compared with four blind grading results, of which two were teachers, one was an expert, and the AI grading software. The agreement difference between their own gradings and all results ranged between 79% and 91%, which on average was 85%. This had a positive impact on their bias, because AI and humans both make mistakes. The research's conclusion for the professional development program mentioned that, other than the accuracy percentages, it is important to inform teachers via accessible concrete tasks where they experience the use of AI, as well as using real participant data, which demonstrates ease of use and practicality, preferably with their own students so they have something at stake. Furthermore, the program should explain the teachers more about how AI works in basic terms, procedures and practices. Hence, this research can be helpful when trying to convince educators of using AI. However, this information could also be shared in lessons with educators and students, because both could benefit from the information, but then again, it seems that experiencing the findings of the experiment makes it useful for developing trust.

Just like the previous study, Cojean et. al (2023) did research on teachers' attitude towards AI, and moreover, on how having AI involved in a technological solution influences their perception of it. When AI was included, teachers saw the benefit of it. They found that technology without AI would give them more workload. The fear of replacement was not significantly high, which means that the teachers understood that it can be used as a tool for them, not against them, and that they can focus on other aspects of teaching. However, they do see more ethical concerns with the use of AI compared to regular technology. Although the teachers see benefits to using AI, they still tend to favor non-AI technologies more. This, compared to the previous study, gives more perspective on what emotions the educators feel and that they do see it as a useful tool, while ethics and trust play a larger role when comparing this to non-AI technologies.

2.3 Framework for AI in Music Education

As seen in the previous section, a successful implementation of AI can be a difficult goal to reach, which is why this section gives a framework which can be used for breaking down various components of generative AI in music education.

When mentioning AI in this research, it refers to *Generative AI*, which "refers to computational techniques that are capable of generating seemingly new, meaningful content such as text, images, or audio from training data." (Feuerriegel et al., 2023, p. 111.). Applying this to music, we see this being used for various topics, e.g. AI generated music, voice modulation/replication, songwriting lyrics or chord progressions, mixing and mastering, apps for practicing skills and transcription software.

The model, presented in *figure 1,* is useful for creating structure, which is why this is used for generating a sub-question, as well as interview questions. This model originates from a recent paper called "Unlocking the Power of ChatGPT: A Framework for Applying Generative AI in Education" (Su & Yang, 2023).

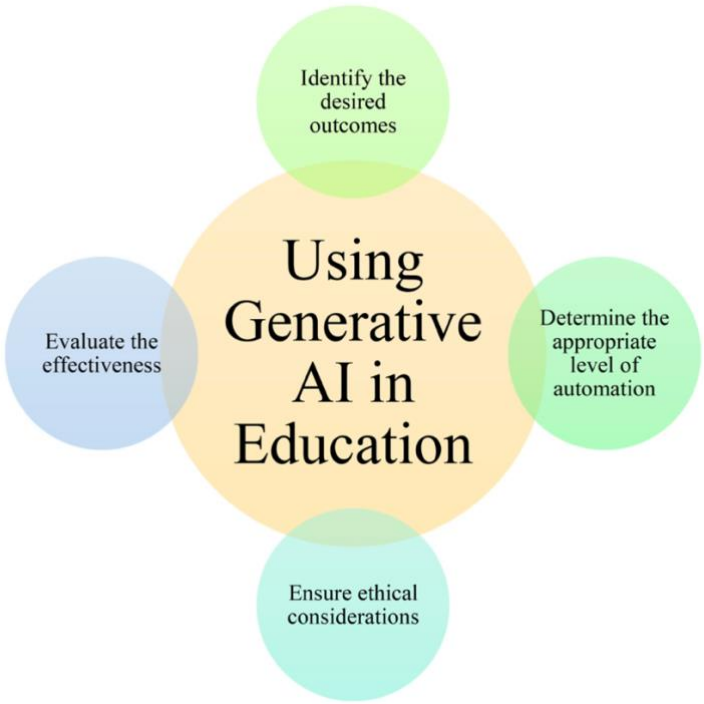

Figure 1: Framework for using AI (ChatGPT) in Education (Su & Yang, 2023, p. 359)

This model is originally meant for educational applications, but since the concepts mentioned can be applied to music education as well, this framework will be the core of this research. When we take a closer look at this model, they mention various steps for using generative AI in education, for which we will change the meaning for it to be applicable to our music education orientation:

1. *"Identify the Desired Outcomes"*: when using generative AI, there are various ways of perceiving objectives that one can have with the use of a prompt and the AI application itself. If the text matches the desired outcome, the chances of the output being useful for the desired outcome are greater. This is why having a clearly defined objective is key in generated AI.
2. *"Determine the Appropriate Level of Automation"*: When the Desired Outcomes are given, there are various Levels of Automation that can be envisioned, since there might be a small part of the task that needs to be automated e.g. giving feedback to the teacher while the students perform a certain solfege exercise, or perhaps a full automation is desirable, for instance with the use of an App for self-study.
3. *"Ensure Ethical Considerations"*: Generative AI has various ethical dimensions that educators can envision, since these can influence the actions of student and educators. AI comes with biases and misinformation, which require a critical mind to discern, especially concerning copyright within music as a subject that should be treaded cautiously.
4. *"Evaluate the Effectiveness"*: Music educators may have different ways of perceiving the effectiveness of the use of AI within a music academy curriculum. One can discern how good the AI-method works within a class and evaluate what might need improvement, while also considering whether AI has the appropriate level of automation and whether it is an improvement within the curriculum.

Concluding, this model is essential for this research, because it contains valuable categories that provide structure to generate interesting interview questions, as well as a coding scheme. Furthermore, it is very practical-oriented, compared to Mitcham's technological streams framework (1994), which we will discuss later in the theory. It does have a limitation for this particular research, because it is quite broad, which means that this research gives its own interpretation on how this might be applicable to the music academy case.

2.4 AI in the practices of music education

Now that we have discussed AI in regular education and have gotten a framework for analyzing the implementation of AI in music education, more information is needed on how AI manifests itself in the practices of music education itself. This gives more context to what this research is about. It is good to consider that our case is a Dutch HBO-level music academy, which is comparable to a university of applied sciences. This means that AI needs a high level of functioning to meet the demands and expectations of these professionals, whereas amateurs could be satisfied easier with basic functions.

While quite new to the public, with its rapid improvements, according to Yu et al. (2023) artificial intelligence is starting to shape today's educational system and that of the future. There are many studies that are in favor of AI because of its efficiency and impact it can have on educational systems, so let us explore some of these to gain a better understanding of what areas AI can improve and what areas AI needs to progress in further.

In various literature there is evidence of AI-based methods to help students master their material. COVID-19 has accelerated this adaption process, and it has made online AI-tools more popular in the learning process (Li & Wang, 2023), where one for example could use an app to learn skills like sight reading and solfege. Because of distance learning, this was a helpful tool during the pandemic. Li & Wang's research made students use an app that generated prompts for students for various categories. They found an improvement in the following categories: Piano playing (6,51%), solfeggio & music literature (4%), and singing (0,56%). While not all categories score as high, the exploitation of AI increased the overall performance by 15%. If we follow this research's logic, it seems that for sight reading (e.g. piano playing), solfege, and music literature this app improves the students' learning process the most. We also need to look at the difference between using AI in education or not, for which Hu (2021) has an interesting study. For this, a classic music education with no implementation of AI was compared with one where AI was used to give the student a unique teaching strategy based on their results in an online teaching method. This showed an increase in learning capability by 17,5%. Remarkably, the percentages of these two research cases are quite similar and hence positive about the use of AI in education, but nuances need to be made, because professionals and amateurs have different ideas of whether AI is a beneficial tool or not. It would also be interesting to research why these improvements happen and how this could improve the practice of live lessons, which this study hence asks in its interviews.

Good to consider when implementing AI in a music academy is how many parameters the technology has and how much can be adapted. In the study by Vanka et al. (2023) on using AI as a tool for mixing, it seems like the professional musician feels that more adaptability is needed. In this study, amateurs and professionals were questioned about the use of AI in their mixing. While this is a beneficial tool, it was found that it depends on the type of user if it is a beneficial tool, since it can be sufficient for an amateur, while professionals seek for more adaptation possibilities and more parameters, to have more control over the final outcome. However, a music academy also includes professions that work with amateurs, such as music teachers. Hence, this may be helpful to teach in the curriculum, so that they can help starter musicians on their journey.

Moura & Maw (2021) did a study about how AI generated music is seen by music listeners and music professionals, which also can be connected to the advancement of AI and the parameters that are needed, as seen before. Interesting about this study is that the literature they used had different expected outcomes than the study itself, which might be the result of a rapid improvement of AI. This is something that this study tries to reflect on throughout. Since this AI revolution is an on-going process, which in the last few years has risen rapidly in its functions and applications, the results of this study might change too. In the study of Moura & Maw (2021), it was found that music listeners, compared to professional musicians, were more neutral in their answer about the use of AI for compositions. Professional musicians answered remarkably more negative, which is partly due to its effects on their jobs and the value of music. Music listeners, counterintuitively, were found to be less tolerant than professional musicians to the use of AI in high involvement contexts, such as by bands and singer-songwriters. This study highlights that because of this difference, it is good that discussions will take place between the audience and the musicians, to bring clarity on this topic. In low involvement contexts, however, like in marketing, commercials, stores, and medical uses, professional musicians and music listeners showed no remarkable difference. This area can actually be seen as an opportunity, according to Moura & Maw (2021), because it is low cost, which hence creates the expectation of small and medium-sized companies to take over the marketing area with the use of AI.

2.5 Technological streams in music education

Now that we have a framework on how AI is used in practice, which enables thorough analysis of music educators' ideas on AI, these also contain various statements and ideas, which are influenced by their technological perceptions. These lie at the heart of their opinions, because emotions on a topic influence how they perceive AI and if someone has a different feeling about AI, this can show up in their answer, which is why it is relevant to distinguish between these categories, which will now be further explained.

As introduced, the attitudes from the music educators can differ from each other. Therefore, it is good to use a framework to categorize this into different *technological streams*. This enables generalization of the ideas that live inside the world of the music academy. For providing these categories, the framework of Carl Mitcham is used. He proposed 3 terms, which we will alter to our technological perception: "Ancient Skepticism", "Enlightenment Optimism", and "Romantic Uneasiness" (Mitcham, 1994). His theory looks closely at history and its relation to technology, but for our case, the characteristics are more relevant. For Ancient skepticism we will use the term *technological skepticism*. Ancient Skepticism is (1) cautious and (2) asks many questions about the use of technology and the consequences, reliability, ethics and (3) eventually whether we can trust that new technology, hence suspicion. This technological skepticism is something that is usually seen when implementing new technologies and will probably be seen the most in the interviews. For Enlightenment Optimism, *technological positivism* is used. Enlightenment Optimism is (1) generally very positive about technology, (2) finds it very promising for improving society, and (3) it can solve everything. Therefore, it is the opposite of technological skepticism. There are always people who are positive about new inventions, which they try to use it a lot, while they forget that there might be aspects such as ethics that they need to consider. For Romantic Uneasiness, we will use *technophobia*. Other than Ancient Skepticism, which puts more emphasis on the reliability and truth finding, Romantic Uneasiness puts the emphasis on (1) the impact on society, culture and the individual. This is something that technology can disrupt. Think of (2) alienation, (3) the weakening of societal bonds, imagination and vision versus the technology. So, here you see more fear against what the technology will do to society, and for this case, the impact on creativity and culture seems important. Now that we know the various terms of this framework and shaped it for our research, for which *Figure 2* serves as an overview, we can structure the ideas and main perceptions of music educators, which will follow in the analysis.

Technological skepticism	Cautious
	Asks many questions about the use of technology and the consequences, reliability, ethics
	Trust technology? / Suspicion
Technological positivism	Positive about technology
	Promising for improving society
	It can solve everything
Technophobia	Emphasizes impact on society, culture and individual
	Alienation
	Weakening of societal bonds, imagination and vision versus the technology

Figure 2: Carl Mitcham's (1994) edited technological streams characteristics

2.6 Conclusion and preliminary answer to research question

To give a preliminary answer to the research question, many educators and studies find AI useful, but the technology is not perfect to them. They would probably need a more advanced AI tools for tasks such as mixing, grading, and analyzing music. Areas such as ethics could create doubt among teachers, especially since music is largely dependent on human creativity and skill. For this research, that would imply that the most prevalent technological stream for music educators would be technological skepticism. The educators would probably see AI as a tool, which can lower their workload, while the preservation of artistic values of the musician could be an important topic for them. Furthermore, depending on their knowledge and experience of AI, the educators would give different answers about their expectations, because more knowledge about the technology is crucial for the adaptation, because it creates clarity and the realistic expectations about AI's capabilities. However, there could also be resistance, e.g. technophobia, because AI could make certain jobs irrelevant, so there might be educators that do not want to use AI, because of the possibility of it taking over many jobs/tasks in the music academy.

3. Methods

3.1 Introduction

The aim of this chapter is to introduce what methods have been used for the analysis of this research, so the study can be replicated in the future or altered to suit a different purpose. It also serves as a solid base to bring structure to the research, which lets it achieve maximum results in the given time. Essentially, the goal is to be as transparent and understandable as possible about the various methods that are used in this research.

To realize this aim, an overview will be given of the case study, which will describe the research object in detail. Then, the method of data collection will be explained, in which more is told about the selection of the participants and the interviews. This is followed by a description of the data analysis, which also presents a coding scheme and a reflection on how this method fits with the research question and its sub-questions. The chapter ends with a conclusion.

3.2 Case description

Like the research question mentioned, this research is interested in the visions and technological perceptions of music educators from one music academy. The research wants to find metaphors, symbols, meanings and the connected perceptions. Therefore, having respondents from different departments is important to gain insights from various viewpoints. To find these, this study focuses on a Dutch HBO-level music academy, which in English countries is usually described as a university of applied sciences. Since most of the literature focuses on Chinese music education, this research investigates a Dutch, European perspective, emphasizing their perceptions, because this phenomenon can be seen all over the world.

The music academy this research studies offers various programs for music education, such as music performer, music educator, music therapy, and producer/composer. These 4 examples form the basis for the selection of participants, which will be explained later. The programs offer various courses that gives the students the tools they need for the work field, which they usually enter after studying for 4 years. Since this case is studied anonymously, there cannot be elaborated much further, to respect the privacy of the institution and the respondents.

To be able to trace the visions and perceptions that live in this music academy, as well as the meaning they give to these perceptions, the minds of various music educators need to be explored in a way that there is room for expression of their different perceptions, imagination, experiences, perceived threat, anxieties, and struggles when it comes to AI in music education. To reach this goal, semi-structured interviews are done, which will be expanded on later.

Ultimately, the outcomes of this case should be useable as an illustrative example of how music educators perceive the role of AI in a Dutch music academy setting. What makes this case unique is the possibility to interview educators from different departments and professions, which helps to get a variety of perspectives of the topic. Furthermore, because of the higher study level and its location in the Netherlands, it adds to the perceptions and emotions that are felt by music educators all over the world. It also adds to the understanding of AI in Europe and how the politics of AI are seen in the small world of a music academy.

There are of course also limitations that come with this research and case. These are that 9 educators have been interviewed, which could have been larger to be more representable. Furthermore, the research itself could also benefit of researching multiple music academies instead of one, but because of time constraints, it was chosen to focus on one, because this would enable the research to be more thorough. This is why in-depth qualitative research is chosen. Furthermore, the experience of the researcher is limited, since this is a bachelor thesis. However, the effect of the latter is reduced by having guidance of a thesis supervisor.

3.3 Method of data collection

This data collection hopes to retrace how the respondents make sense of AI and how they envision it, therefore the data for this in-depth case study is collected via 9 semi-structured interviews. These interviews were aimed to take 45-60 minutes, which included an introduction and sometimes a conversation afterwards. The actual interviews took +/- 30 – 50 minutes, which depended on the amount of information the interviewees knew about the topic.

Given the research question, doing semi-structured interviews is seen as the most effective way to explore the minds of the subjects about how they perceive AI (Given, 2008). By taking this approach, more flexibility is provided for the researcher, which helps to find out what meaning they give to AI, while also exploring their expressions, metaphors, and perceptions of AI that spark the interest of the researcher or the interviewee. Moreover, a content analysis yields the qualitative results needed to do an analysis with fruitful results. This type of analysis is a way of structuring information in clusters and categories, for example by textual analysis (Given, 2008). Doing this helps to gain insight in various patterns and relationships between the chosen categories, which is exactly what this research is interested in. Moreover, a phenomenological approach is key here, since the research question has an explorative character and is interested in various spontaneous expressions that come up in the interviews, which provide meaning.

Now, let us elaborate on the data collection itself. To find respondents, the research looked at what music academy was easy to contact and if it had multiple departments. When the case was selected, the study found an overview of the educators of each program and send them e-mails, introducing the thesis and inviting them for an interview. Thirteen music educators have been asked to participate, of which nine educators have responded, which is a response rate of 69%. After the dates and time had been planned for the interviews, a consent form was sent to them, which they could sign digitally or physically. This form explained what the research is about, and it gathered consent about the recording and processing of the interview. The interviewees could indicate their preferences of the data collection within a timeframe of 3 weeks, which would then be planned either physically or online via Microsoft Teams. Furthermore, apart from the consent form, the respondents did not get information about the topic from the interviewer beforehand, which fostered the spontaneous character of the interviews, to provide accurate descriptions of their feelings, without influencing them with this information.

Nine music educators have been interviewed, which were composed of 4 (44%) females and 5 (56%) males. This was done to get fair representation of both sexes. Next to that, the various educators had to be from different departments. From each of the four departments (music performer, music educator, music therapy, and producer/composer) at least two educators had to be interviewed to give the research a broad view from various backgrounds. This helps the research by gathering in-depth information about the educators' experiences, visions, perceptions, meanings, expressions, examples and contra-examples, struggles, and problems for the development of AI in the music academy. The interviews were conducted in Dutch, so

the original questions are added to *Appendix A*, while the translated version is presented in *Appendix B.*

The interviews were held at the music academy in an educators' room or one of their available (practice) rooms, which had a table, speakers, midi controllers for recording and producing music, as well as a piano for regular practise, at which the interviewer was seated. The interviewees sat at the table. The atmosphere was friendly, relaxed and the respondents were happy to share what was going on in their mind. Although some indicated that they did not know a lot about the topic, they were reassured that that did not matter, because it provides a wide range of views for the research. As a researcher, there was a job to keep an eye on the flow of the conversation and to explain questions if necessary. By giving examples, the minds of the respondents were triggered, which led to interesting conversations about topics that lie at the heart of the respondents' feelings. All in all, the interviews gave a variety of insights into the minds of a music educator. The interview questions that were asked can be found in Appendix A and B. For constructing these questions, the discussed frameworks from the theory sections were used to provide structure.

These interviews were recorded with the consent of the interviewees, transcribed and summarized. Everything that is used in the research is done with their consent. Furthermore, the subjects are interviewed anonymously to ensure their protection within and outside of the organization. The data is put on the University of Twente OneDrive, where it is secured to protect the participants and institution.

3.4 Method of data analysis

This research will perform a content analysis, which is "a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use." (Krippendorff, 2023, p. 13). To make these inferences, or in our case, to retrace the values, symbolisms, perceptions, and the meaning music educators give to AI, the interview transcriptions need to be read carefully. Furthermore, categories from the theory section are needed to order the information and to see connections between the data. This is why a coding scheme is made, which will be explained later.

In this content analysis, the research takes a phenomenological approach. "Phenomenological research is the study of lived or experiential meaning and attempts to describe and interpret these meanings in the ways that they emerge and are shaped by consciousness, language, our cognitive and noncognitive sensibilities, and by our preunderstandings and presuppositions." (Given, 2008, p. 614). Hence, for the content analysis, with a phenomenological approach, this research wants to analyze the different perceptions of the music educators by creating various categories, mainly between how they envision AI in their music academy and their lessons and what technological streams they show to belong to during the interview, as well as the various meanings they give to AI. This enables the research to eventually make conclusions about what this information signifies for the technological streams and perceptions, such as what the leading technological stream is, what practical uses are envisioned the most, and eventually how this translates itself to the future of the music academy and how it progresses with the rise of AI.

To perform this analysis, several steps were taken. The first step was to listen back to the interviews, together with an automated, but sometimes inaccurate, transcription from Amberscript, a transcription service for which the University of Twente has a license. An

Excel sheet was made which contained an overview of the respondents and the interview questions. Since the interviews were performed in Dutch, to save time with transcribing, for all respondents, each answer to the question was summarized and put down in English. When there were remarkable quotes, these were written down in a separate Excel sheet, which is organized by the interview questions as well. About 10 quotes per respondents were written down, so there are +/- 90 quotes written down in Dutch, of which the highlighted quotes (about 2 per respondent) are used in the analysis. To successfully translate the Dutch sentences to English, sentences that are formulated in a confusing or incomplete way are altered while preserving their meaning. Doing this simplified the translating process and allows for a better understanding for the reader and the research itself. These quotes can be seen in *Appendix C.*

For the analysis of the various answers, a coding scheme was made by taking a deductive approach and using the theory mentioned before. The codes are categorized in different categories and hence sub-categories. These can be seen in the *figure 3* below.

Code nr.	Code	Sub-code
1	Technological positivist	Positive about AI
		Improve society
2	Technological skepticism	Weighing out pro's and con's
		Reliability/truth finding
3	Technophobia	Creativity at stake
		Stresses impact on society, individual, culture
4	Desired outcomes	Goals
		How AI helps to reach goals
5	Desired automation	Fully
		Partly
		None
6	Evaluation of effectiveness	Categories to evaluate
		What difficult to evaluate
7	Ethical considerations	Plagiarism
		Copyright and ownership
		Fairness and bias
		Safety and security
		Misinformation

Figure 3: Coding scheme

These codes follow the logic of the theory and hence contain characteristics in the sub-codes, which were all used to structure the data and to create clarity. This helps distinguishing patterns which can be used for answering the research question. Codes 1-3 refer to the technological streams and codes 4-7 to AI in practice. The codes are used to be able to filter the data to see similarities and differences in the data, so it is used as a tool, since data from 9 respondents is not too much to oversee manually. The analysis itself is divided in various sections to allow the research to combine questions that are related to each other. After the analysis, conclusions are made for the sub-questions, which allows for the main question to be answered.

3.5 Conclusion

To conclude, this research does a content analysis with a phenomenological approach and studies a Dutch HBO-level music academy with various departments. Nine anonymous semi-structured interviews were performed, which took 45-60 minutes. The questions were based on the theory frameworks from Mitcham (1994) and Su & Yang, (2023). These are used as well for the coding sheet, which is used to code the outcomes of the interviews in Excel sheets. These Excel sheets contain the summarized (English) answers, which are coded, as well as interesting quotes, of which 20 are used. By manually gaining insight in the information and using filters, insights are gained about the minds of the music educators about their technological perceptions and how they see AI in practice.

4. Analysis

4.1 Introduction

In the following section, an analysis is made of the interviews, done with 9 respondents. This is to get an answer to our main question about what perceptions music educators have concerning the role of AI and what this signifies in terms of their technological perceptions. First, we will go over sections of the interviews which have common themes. This will be used to draw a conclusion which answers the 2 sub-questions about the practical role of AI and their technological perceptions. Doing this will provide a structured way to perform an analysis of the various respondents. It also provides a clear overview of what has been said during the interviews and what sparked the attention of the interviewer.

4.2 General views AI and experience with it

The respondents were asked about what they think about the rise of AI within music education and the positive and negative aspects, as well as their experience with it. As expected, one can discern that there is a mixture of technological skepticism and technophobia, as discussed by Mitcham (1994), whereas some of their expressions surprisingly match with technological positivism. This is elaborated on in the section about ethics.

All respondents think of AI as a tool or some sort of sparring partner that can help them. Seven out of nine respondents (B, C, D, E, F, H, I) also perceive it as scary or dangerous and that caution is needed when using AI. This is quite contrasting, because usually when you find things scary or dangerous, you do not tend to use it or see it positively.

All mention to have experience with AI, but their uses vary. Four respondents indicated to use it for personal use or experimenting (Respondents C, E, G, H), while five others mentioned to use it for their job (Respondents A, B, D, F, I). Respondent A has implemented AI in many elements of his teaching, while other respondents use ChatGPT for information and formats, while they also allow students to experiment with it. They do not copy it as such. Furthermore, plugins are mentioned by instrumentalists, because these are very useful for their lessons. So, the use of AI varies, either by subject or work vs. personal use.

As AI could be quite dangerous in this profession, it is counterintuitively still used. This can be explained: some think that AI has a lot of benefits for teaching and state that if you simply look out and keep thinking for yourself, this danger can be (largely) avoided. Moreover, they express that it is important for students to be able to use it, because they envision AI being present in the future. Respondent A, who is very positive about AI and seems to know quite a lot about it, states that “the current version is the worst one that you will experience. It will only get better”, while respondent D said: “There are many new opportunities, but the development is going so fast, that it worries me”. These citations seem contradictory, but they perceive it as an ethical paradox: while some of the respondents say that they like the new tools that are available and that they are useful, these respondents also stress the negative sides of it. Respondent H stated that “it is basically that they [AI] have children’s feet which they want to fill very big shoes already.”, which causes a lot of problems for the implementation. Various respondents perceive problems such as bias, loss of creativity and control, its truthfulness and reliability, loss of jobs and creativity, laziness, and copyright/ownership. Yet again, this technology seems quite dangerous for the creative sector.

Respondents do not always express themselves negatively about AI. Respondent F thinks that they now get various tools to help musicians, "just like we have gotten these tools through music history, think of the help from synthesizers, drum computers, editing software (like DAWS)", which symbolizes the idea that most of the respondents have: they have to use it as a tool and not let it get in the way of their student's and their own creativity. This, however, clashes with Moura & Maw's (2021) research, which expects professional musicians to be negative about AI in the context of compositions.

Remarkably, AI is seen in the context of the Gartner Hype Cycle (2006), about which respondent A expresses that the plateau of productivity has not been reached yet. He experiences a lot of discussion in the media about the negative parts of AI, which corresponds with the Trough of Disillusionment. Respondent F puts emphasis on copyright and ownership, which stresses the need for regulations again.

Nevertheless, very positive elements about AI are also perceived: it saves time, so they can focus more on the interaction with their students, it enhances accessibility for students, it can help to develop class material faster, it makes timelines and grading rubrics, it enhances creativity by developing ideas, there are useful plugins for instrumentalists and vocalists (e.g. samplers, stem splitters), and is accessible for video/visual makers.

Concluding, many respondents behave as technological positivists by expressing their positivity about the technology. They express that it can improve society and hence improve education by solving problems. The negative expressions match with technological skepticists, who doubt AI's ethics, which matches with technophobia too, because they emphasize the negative impact on society and culture, in contrast to technological positivism.

4.3 Using AI in education

Various educators have different expressions and perceptions on how AI can be used in their lessons and preparations, and how much AI should be used. Cojean et al. (2023) expects that while teachers think AI can be used as a tool, they think ethics are important to consider. This matches the findings in this section, which will be elaborated on.

Eight out of nine respondents wanted to use AI sometimes or often. However, respondent I did not want to use it, but she thinks it can only be used if it is functional. Remarkably, most educators want to use AI for the preparation of their classes, but not in their class. However, for instrument classes it is seen as a functional tool, which other classes could use as well e.g. for transcribing software, generating grading rubrics, stem splitting, transposing music, generating ideas, but also administrative tasks and quick emails. Furthermore, educators find that AI could be used to grade multiple-choice tests, but open-ended questions are not seen as an option yet. However, Nazaretsky et al. (2022) mentioned that teachers' opinion on this can change when confronted with the fact that AI makes mistakes just like humans do. Respondent D, in contrast, thinks that AI might be more objective when grading students.

There were various remarkable statements. Respondent E mentioned that if AI can decipher bad handwriting, it would be helpful. What was quite surprising and counterintuitively to find was that some educators do not mind if students use AI to write papers, as long as they edit it and fact check, because it could help them in the writing process. This should be done in a responsible way, which they eventually also state, while this is of course difficult to do, considering the power of tech firms. Respondent E found that for music therapy it could be

helpful if AI can analyze for groups of patients in an improvisation session why one patient has a breakthrough. For at home exercises, it can also be useful to signal progression. Here, confidentiality is very important and critical, because the safety of the patients' health and their data is in the hands of AI. This should then only be used with proper regulation.

Just as Cojean et al. (2023) predicted, many educators see AI as a colleague that is available 24/7. Respondent G mentioned that "it is just like you are having a conversation with a colleague, which is quite cool". However, this has a darker element to it. The rapid progression of AI concerns various educators and its realism and the way it presents facts is something that they think should be approached with caution, because misinformation and not thinking about the information that you are receiving would be problematic in education. Respondent C find the realism of AI concerning: "In the beginning when I was texting with ChatGPT, when I left the conversation, I actually wanted to say bye", which she found improving even more later.

Respondent I mentioned that although having AI as an assistant to provide structure can be helpful for students, she does think that they need to have a developed mind when it comes to knowledge about their profession, because there can be false information and bias. She says: "The scariest thing about it [AI] is when you enter privacy-sensitive information. What happens with it?", because as a student you write about various new ideas which need to be protected in some way, so transparency is an important topic. Respondent B finds reliability important as well, because ChatGPT changes answers continuously if you say you doubt it. He then thinks out loud: "What you are saying now, is from this moment on unreliable, totally unreliable, so you have to use your own skills and expertise". Many respondents find the interaction that they have with their students and patients irreplaceable, like respondent E stated: "I want to keep the things that bring me joy".

Concluding, the educators want to use AI as a tool and try to keep in control of the ethics. Respondent G states strikingly: "You want to stimulate your student to do something and anything that fosters that, I find legitimate".

4.4 Perceptions and experiences of ethics

In this section the research seeks to develop an interpretation of the perceptions of ethics that music educators have. The perceptions, expressions, and meaning that they give to AI become an important source to explain how they view ethics from a music academy perspective. Important in this section is that in spite of the risks of unethical behaviour and power abuse from tech firms, they seem to disregard this, which is a contradiction.

As mentioned before, because the respondents want to use AI as a tool, they must deal with the ethical dilemmas that come with AI. In their perception, AI tools can be highly unethical when they look at it from an educational point of view. For instance, they mention that plagiarism is an issue or that AI tools are company products. This is also what scientists mention, such as Cugurullo, who points out that "The problem is not that humanity has lost control over AI, but that only a minority of powerful stakeholders are controlling its creation and diffusion, through politically undemocratic processes of decision-making" (Cugurullo, 2024, p. 1). Hence, power abuse of tech firms as an ethical issue is a subject you would expect among music educators. Although this is not often expressed explicitly, it shows in the topics that they mention to find important. These can be put into three categories:

- Category 1: misinformation, reliability/truth finding, transparency, and bias
- Category 2: privacy, plagiarism, authorship, copyright, ownership, safety and security
- Category 3: human vs. technology, and maintaining originality while using AI

Of these categories, every respondent mentioned at least one subject of category 1 and 2. Surprisingly, category 3 was mentioned less. However, the meaning the respondents give to this category is that they want AI to not to take disrupt and limit their students' and their creativity, which is discussed via humans vs. technology.

Speaking of humans vs. AI, in contrast to Cojean et al. (2023), some respondents do see AI taking over certain jobs, e.g. jingles and administrative tasks. This is confirmed by Moura & Maw (2021), who state that in low involvement contexts such as marketing and commercials, there are opportunities for AI to take over portions of it, but they talk about it from a profit perspective, while the music educators talk about it in terms of that they want it to be a tool to enhance their artistic freedom.

This type of freedom is given a high status. Therefore, categories one and two are important topics to foster this. When music educators talk about these categories, they mention that students and educators need tools to be critical, as well as being able to detect bias. This confirms the unreliability of the system that they are using. They want users to think about how it is generated, where the information is coming from, because as an artist, copyright, plagiarism, ownership and authorship are important to protect yourself, your work and that of others. If they enter their work into AI software, they need transparency about what happens with it, because they find privacy important. The same goes for when they get information from AI: they need to know whether it is someone else's work. Respondent F wants transparency for voice generation, because if it is known which artists voice or instrument is used, they could get money from it, if registered well.

Concluding this, the meaning of ethics in a music academy is much involved around using AI in a responsible way. For this to be effective, they think students need to be knowledgeable about their profession, which then underlines the importance of having a proper education in research and the tools that can be used (such as responsible use of AI). This way, they do not rely solely on a machine to produce answers. This also implies a change in the curriculum, which respondent G perceives can be done by making the process more important than the final result. However, this would not be applicable to practical skills such as solfege and recitals.

AI is also seen as a helpful tool for students with learning disabilities, such as dyslexia. Respondent B experienced this with a student who used ChatGPT to check his answers and stated: "But how is this exactly different than when the student would have said that he is very dyslectic and he asked his grandpa to check it?", which is a valid point to make, because AI makes mistakes in grading, just as humans make mistakes. The only difference here is that algorithms are used, which are made by humans.

Concluding, awareness about AI is needed in the curriculum, because it seems like they accept the technology as it is, because they can modify it to their own needs, while taking precautions. Then the question remains: how much control can they have over AI, since it is already in use? This corresponds with "the myth of the uncontrollable AI" (Cugurullo, 2024, p.1), influenced by powerful tech companies. Music educators mention transparency and

accountability, but this supports the monopoly of these firms, which is not how you destroy their corrupt, unethical power abuse. Therefore, the discussion about the ethics of AI should be held at a higher level, so more power is given to these educational institutions, in order to opt for better regulation and clearer rules that match with the core values of music education.

4.5 Implementing AI

This section wants to highlight how the music educators feel about the implementation of AI and how they perceive various opportunities and threats.

When AI is given meaning in terms of the tool that it is, an important part mentioned by many is control. While music educators want to gain freedom to spend on their students and craft, they do not want to use it for 100%, on which respondent I answered: “I think that you need to think of it as in are you going to switch to AI 100%, or is it going to be one of the tools just like compass, pencil and mobile phone?”. They are right about its usefulness for tasks such as administrative and other simple tasks to relieve their burden. Although, when it comes to being in control of your own creativity, some respondents are in favor, but only if it helps the process when it is stuck, and not for the sake of using it. Some respondents indicate that AI has the tendency to create blueprints that guides them and students, which they believe could lead to all music sounding the same, hence limiting creativity as well. So, there is a paradox of AI enabling creativity, as well as limiting creativity.

This comes with certain feelings. Respondent A mentioned that “when my lessons are prepared, exams are graded, and I get a grading form…. I would be deeply saddened if that was it [being a teacher]”, which illustrates that while the technology can be helpful, it can also harm the motivation and job satisfaction. Respondent E stated: “Does it all have to be better and faster? Does this improve the happiness in this world when you compare it to people who lived in 1974 without social media and without the internet”, because he was wondering about the arrival of this new technology and compared it to the mobile phone, which people found unnecessary during its introduction, but now it is seen as a helpful tool. Strikingly, both respondents perceive negative emotions, however, respondent G also mentions that AI would be good if it helps with self-studying e.g. apps to do stem splitting and ear training, so the paradox of usefulness vs. the ethical danger presents itself here yet again.

We can state that respondents find the spread of misinformation and its unreliability dangerous, because they think it leads to students/teachers not mastering the material and being passive/lazy. They need a system to overcome this. Respondent F mentions that AI could be implemented well if the student and teachers need to explain why they used it and why not, and how it influenced their choices. Hence, the process becomes more important. A system which could help them too is the TPACK-model, which respondent A mentioned. This model can assess whether AI is implemented well in a lesson, because it is a Venn diagram of 3 circles that overlap with three subjects: technological knowledge, pedagogical knowledge, and content knowledge. When these are balanced, you have the perfect lesson in which AI does not overtake the whole process. However, this is a simple way of presenting the problem, because the AI is not only present in the lessons, but also outside of it. Furthermore, they find it hard to judge students using AI creatively. They believe that if they talk about it openly with them, they can help to guide them, because they believe it contains valuable tools.

Concluding, while they do find ethics important, they seem to want to use it responsibly, and teach this to their students. The curriculum would hence need to change to a more process-oriented approach. Like in the previous section, although ethics are involved, they think they can avoid problems with this by developing a system in their education.

4.6 Visions on AI's future within the music academy and beyond

This section explains how music educators envision the development and implementation of AI in the music academy, as well as how they see AI for future professionals. Therefore, this section focuses more on the future and strategies.

Respondent D stated strikingly: "I think that the balance between what we want with AI and what can be done with it should remain a discussion topic". This would preserve the institutions' goals while following the trend of AI. Despite the controversies, the academy is interested in the topic, while some departments might show resistance. As stated by Cojean et al. (2023), educating educators is important if they want to implement AI. This prevents a difference in skillsets, respondent F remarked. He also envisions a shift towards performance and a change in musicians' business models, which might show in the future curriculums of the music academy if AI will be used on a more advanced level.

However, not all areas are perceived replaceable, e.g. music educators for elementary schools and high schools, as well as music therapists. This is because they value connections between humans. Respondent I stated: "Where, IF it is researched well and used effectively, it can provide support. But it can never and should never be leading us. Then we lose our humanity". This thought represents the general idea about AI. Respondent G told: "I think that they [the students] should be guided a lot in that, including us teachers, because nobody really has the capability to contain what this [AI] can do and what it does.", on which respondent B also adds that training might be helpful, but that intrinsic motivation is key. Essentially, guidance is important for the future, but balance is needed to prevent various departments' connection between their students and patients to suffer.

AI is perceived as being capable for grading multiple choice questions and deciphering bad handwriting, but music educators do not trust it for grading open questions, which it actually can do. Furthermore, they think AI is helpful to structure thoughts and lessons, yet some think that the blueprints lead to uniformity and does not spark creativity, which is essential in music academies. These are examples of contradictions that can be found in interviews.

Since privacy, authorship, plagiarism and bias are good to consider, according to respondent I, she thinks that the implementation should not take place at an educators' level, but from higher up in the organization, because there a vision can be developed, with pilots to test it e.g. with software like LessonUp, which needs evaluation as well. This seems to be a logical approach, because it enables the institution to really consider if implementing AI is a good idea and it causes them to provide their own rules and guidelines on the use, which currently it seems to lack, considering the answers of the respondents.

For professionals in general, the respondents think that caution is needed when it comes to the effect on their creativity. The technology is improving fast, which can make it more useful later, although humans need to be prioritized, not using AI for the sake of it. Resilience is important, because the industry might change. There is also hope that there will be resistance

from people when technology tries to take over control, which again brings up “the myth of the uncontrollable AI” (Cugurullo, 2024, p.1) and power monopolies.

Various advice is given for future professionals. Generally, they want them to be inspired by AI, and that they try to use it to their advantage. They should not think that it will take over their jobs. Respondent C stated: “I cannot just say: quit what you are doing, because music will be playing out of a box soon”. She thinks, like all respondents, that humans are important for music. Respondent F stated: “Do not let it overwhelm you, you know. Eventually it is you who decides that this is what I want to make, because I think that this has potential/appeal for an audience”. At last, respondent I mentioned that while they make use of AI, they should keep an eye on the legal implications and to protect their authorship. It can be great to use to your advantage, but you need to be careful. As a conclusion, many think AI will be part of the future and necessary steps need to be taken to deal with this transformation.

4.7 Conclusion

The analysis that has been performed can now be used to answer our sub-questions in a concise way. The music academy has a technological skepticist and technophobe character, while counterintuitively also showing characteristics of technological positivism about the future of AI and the many benefits. This is surprising to find, although it can be logically explained by how they perceive the role of AI. The technology is envisioned to be part of the future as a helpful tool, while ethics play a large role. On the one hand, music educators express various ethical obstacles, which they think they can overcome by creating awareness in their curriculum and by educating their teachers as well. On the other hand, implicitly, there is a vision that the politics of AI, as in tech companies and other organizations, play a large role in how this can be dealt with, which is why many state that more regulation is needed on its use, which implicitly can be linked to the prevention of power abuse of these tech companies. Hence, the music academy is on its way to find ways to integrate AI in its curriculum in a responsible way, instead of resisting AI because of the lack of clear regulations, which would have been expected.

5. Conclusion

5.1 Introduction

As we have seen in the analysis, music educators have various perceptions about the role of AI in their music academy. In this conclusion, the key insights are given about what these perceptions signify in terms of their technological perceptions. Then, this is compared to the literature analysis. The relevance of the research, as well as future research recommendations are stated. Furthermore, the practical implications and insights from a music educational perspective are discussed.

5.2 Answer to the research question

Using Mitcham's theory (1994), we can state that the educators show characteristics from technological skepticists, as well as technophobia. However, their acceptance of the technology and general positive outlook gives the music academy a mix between technological skepticism and positivism, because there is no clear vision yet, which might develop itself if more regulations are put into action. Mitcham's theory would therefore in this case be limiting if only one category could be chosen, but this research chooses multiple, as this makes sense in the analysis.

As we found out, music educators have different notions of the politics of AI, because they look at it from an educational perspective, not per se a global one. Cugurullo's research (2024) is very relevant for this topic. This is because instead of criticizing the power abuse of large tech firms directly, they mention topics such as transparency and accountability, which are terms that imply that rules are needed to protect them from the corrupt, unethical power abuse of these tech firms, which is a very bureaucratic way of thinking. This would imply that a large role must be taken by governmental bodies to regulate AI for (music) educational systems. However, contradictory to the power that tech firms have, educators want to protect themselves from this currently vague regulatory framework of AI, by discussing topics such as plagiarism, reliability, authorship and copyright, creativity, human vs. technology, and safety and security. They believe that this will enhance the awareness of the educators and students. This implies that, in spite of the ethical dangers, AI has a role in the curriculum.

While Cojean et al.'s research (2023) stated that music educators would not think that AI can or will take over their jobs, in this research, parts of it are mentioned where it could happen, such as in administration or making jingles. They also think that a change will happen in their earnings model. Furthermore, it was surprising to find out that systems such as ChatGPT and plugins are already being used as a tool, matching Cojean et al. (2023). This underlines that it seems as if they have already accepted the technology and now try to find ways to work with it, instead of resisting it and building a safe regulatory system first. Given the issues with transparency and copyright, this would have made more sense. Therefore, what was interesting to find, was that some educators do not mind if AI is used to write papers, as long as the students edit and fact check it, since they think that the process will become more important in the future and that they would have to explain and defend their uses of AI, why they used it or why not, because if the result is good, they need to be able to judge if the students learned something. This insight is new in this research.

Music educators believe that awareness is needed, which can be created by being open about the use of AI, showing what can be done, and to teach responsible use. However, this does seem simplistic. Educator I states that pilots are good to optimize the systems and to see whether it is actually an addition. This is a more appropriate idea, since there are many ethical concerns that come with AI, especially for a creative and artistic community.

However, in contrast, the educators state that they do take actions to stay in control of AI. They clearly show that they want to use it as a tool, which should not interfere with the creative processes that take place, which goes against previous statements. Some say that it can serve as an inspirational tool when you are stuck, while others also state that there might lie danger in that it can serve as a blueprint which inhibits creativity, so there is a discussion going on as well. Then again, for solfege or listening to songs, plugins that enable stem splitting can be very valuable, because it enables much more in-depth analysis. This benefit is also supported by Li & Wang (2023) and Hu (2021). Furthermore, it can also help with many small or easy tasks, which provides more time for teachers to focus on educating. Therefore, the music academy should find a way to use the benefits that AI brings and also provide a guide in how to use it responsibly with respect to the users.

5.3 Academic debate and the research gap

When comparing this result with the literature of the analysis, there are similarities in that the educators question the ethics that are involved, while they do want to use it as a tool and see it as a sparring partner, which matches Cojean et al.'s (2023) research. However, Moura & Maw's (2021) findings, which expects professional musicians to be negative about AI in the context of compositions, match to a certain extent, because some say that using AI does help if used for inspiration, while some criticize the blueprints it gives and that it inhibits creativity.

What is new, which can be added to the research gap, is that this research researches a HBO-level music academy in the Netherlands, which perceptions and visions about AI are discussed. Furthermore, the implementation and especially the focus on music educators' feelings and expressions make it valuable. It illustrates, other than the current available research, that an internal struggle is going on about the benefits and disadvantages. AI is already being used, while regulations are still being made all over the world. This means that the institution is curious about what AI has to offer. Therefore, this music academy seems to function counterintuitively, given their ethical concerns. It also shows that the educators think that they are able to protect themselves from large tech firms, although currently AI regulation is being developed and hence there are many risks involved.

Given the insights of this study, new areas can now be researched. For future research, it is recommended to investigate how an educational framework can be built to implement AI in a safe way, especially with the focus on copyright and authorship given artistic educational institutions. This also implies that the impact of the EU's AI Act on music academies and these frameworks should be investigated. A study on how students experience AI and how they intend to use it would provide insights which can also help with the implementation of a framework.

5.4 Practical implications

In practice, this research finds that the institution needs to discuss more about how they want to use AI, what the rules are on its use, what ethical complications they want to avoid, and whether the use of AI is an actual addition to the curriculum. By having conversations between educators, as well as with students, the expectations about AI can be set. This can be done via having open discussions about the technology. Doing research and documenting this discussion would also add value for the music academy. However, it is not advised to use a survey, because this inhibits thorough analysis of the issues at stake. Meetings with experts, who are knowledgeable about the ethical implications of AI, are also recommended, because this study shows that AI is already being used. Hence, this will provide clarity and perhaps also a better incentive to set more regulations. Furthermore, discussions from top-down and bottom-up will make the implementation of AI progress smoother, if that is the goal. Now, if the goals and rules are set, it would also make sense to discuss this, not only within the music academy, but also with other educational institutions, because they also have to deal with the rise of AI. This way, knowledge can be shared, because as seen in the analysis of this research, much is at stake. This would provide a guide which is based on thorough knowledge, and it will serve the music academy in their AI usage.

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Appendix A: Dutch interview questions

“Interviewvragen

Intro

1. Hoe kijk je aan tegen de komst van AI binnen het muziekonderwijs?
    a. Wat zie je als positieve en negatieve ontwikkelingen bij het gebruik van AI? Welke ervaringen heb je hiermee?

Praktijk: doel, hoeveel automatisering, ethiek, beoordeling

2. Als je AI zou gebruiken in jouw onderwijs, wat zou je dan graag willen wat deze zou kunnen doen in je lessen of ter voorbereiding van de lessen? Het voorbeeld hoeft niet per se te bestaan, Het kan ook een toekomstige functie betreffen. Voorbeelden: ideeën opdoen voor de les, PowerPoints maken, nakijken van toetsen, het maken van een backing track, improvisatie/theorieoefeningen, ruig mixen van een track, monitoren van antwoorden van leerlingen. Wat zou jij graag willen wat AI zou kunnen doen in je lessen of lesvoorbereiding?
    a. Wat zou dan het voordeel zijn van het gebruik van AI hierbij?
    b. Wat zou je niet willen wat AI zou doen in je lessen of de voorbereiding?

3. In hoeverre zou je gebruik willen maken van AI (als je deze zou gebruiken)? Op welke wijze zou je deze willen gebruiken en wat zou je niet aan AI over willen laten? (dus wil je het niet gebruiken, soms, of vaak, en op welke wijze)

4. Als er gebruik wordt gemaakt van AI zijn er uiteraard verschillende ethische kwesties waar rekening mee moet worden gehouden. Denk aan hoeveel gebruik van AI toegestaan is, copyright, plagiaat, data privacy, dat je kritisch moet zijn op de informatie die je binnen krijgt, misinformatie, veiligheid etc. Hoe zou je omgaan met deze ethische dilemma’s, als je zelf AI zou gebruiken in je lessen? (en voor je studenten)

    a. Welke punten vind je belangrijk om te overwegen/mee te nemen (in je lessen/voorbereiding, ook voor studenten)?
    b. Waar zie je geen ethische overwegingen? (Als in, dat is bijvoorbeeld makkelijk te voorkomen door studenten te leren om te gaan met misinformatie).

5. Wanneer zou voor jou de implementatie van AI in de lessen geslaagd zijn?

    a. Er zijn verschillende categorieën om te beoordelen of de implementatie van AI geslaagd is, (Zoals wat het oplevert voor de student, hoeveel tijd het je scheelt, of het daadwerkelijk een toevoeging is aan de lessen, of de informatie juist is, of het makkelijk is om mee om te gaan, of het ethisch goed gebruikt wordt)
    Wat voor categorieën zou je willen beoordelen om te bepalen of de implementatie van AI geslaagd is?
    b. Sommige onderwerpen kunnen lastig zijn om te beoordelen (Denk bijvoorbeeld aan de toegevoegde waarde, menselijke invloed versus technologie, of er plagiaat wordt gepleegd, in hoeverre de creativiteit wordt gelimiteerd door AI, of van wie de auteur zou zijn bij het gebruik van tools voor muziek schrijven). Wat voor onderwerpen lijken jou lastig om te beoordelen?
    c. Wanneer zou de implementatie van AI in je lessen niet geslaagd zijn? Hoe ziet jouw visie van een niet-geslaagde implementatie eruit?

Toekomstige verwachtingen

6. Wat zijn je verwachtingen omtrent de ontwikkeling van AI binnen dit conservatorium?
    a. Wat denk je wat goed zou gaan met de implementatie van AI en wat minder goed?
    b. Hoe zie je AI voor de toekomstige professionele muzikant/muziektherapeut/producer/muziekleraar?
    c. Wat zou je deze toekomstige professionals willen meegeven vanuit het conservatorium, aangezien de muziekwereld digitaal volop in ontwikkeling is?”

Appendix B English interview questions

1. What do you think of the rise of AI within music education?

A. What do you see as positive and negative developments concerning the use of AI? What experiences do you have with this?

2. If you would use AI in your education, what would you like it to be able to do in your lessons or in the preparation of it? The example doesn't already have to exist. It can be a future function. Examples: developing ideas for lessons, making PowerPoints, grading tests, making a backing track, improvisation/theory practise, roughly mixing a track, monitoring of students' answers. What would you like AI to be able to do?

A. What would then be the benefit of using AI?

B. What would you not want AI to do in your lessons/preparation?

3. How much do you want to use AI (if you want to use it)? How do you want to use it and what do you not want AI to do for you? (So do you not want to use AI, use it sometimes, or very often, and in which way?)

4. When you use AI, there are various ethical concerns that need to be taken into consideration. Think of the amount of AI that is allowed to be used, copyright, plagiarism, data privacy, being critical about the information that you are receiving, misinformation, safety etc. How would you deal with these ethical concerns if you would use AI in your lessons, or to protect your students?

A. Which topics do you find most important to consider?

B. Where do you not see ethical concerns? As in, the topic can be prevented, such as misinformation, or plagiarism, by educating yourself and your students about the topic.

5. When would the implementation of AI in your lessons be a success?

A. There are various categories that one can judge whether the implementation of AI has succeeded. (Like how it benefits the student, time saving, whether it really adds to the lessons, whether the information is correct, ease of use, correct ethical use). What categories would you want to judge to decide whether the implementation of AI has been succeeded? Which topics do you find important?

B. Some subjects might be difficult to judge. Think of the added value, human vs technology, plagiarism, how much limited creativity by AI, who the author is when using tools for writing music. What subjects do you find hard to judge, including for judging your student's use of AI?

C. When would the implementation of AI in your lessons not be succeeded? What does your vision of a not-succeeded implementation of AI look like?

6. What do you expect concerning the development of AI within this music academy?

A. What do you think will go well and not well with the implementation of AI?

B. How do you envision AI for the future professional musician/music therapist/music teacher/ mix-mastering engineer/composer?

C. What would you want the music college to give as advice and tools to these future professionals, since the music world is constantly improving digitally?

Appendix C: Interesting quotes

Respondent A	"The current version is the worst one that you will experience. It will only get better."
	"When my lessons are prepared, exams are graded, and I get a grading form…. I would be deeply saddened if that was it [being a teacher]."
Respondent B	[About ChatGPT changing its answers when you try to understand what it means]. "What you are saying now, is from this moment on unreliable, totally unreliable, so you have to use your own skills and expertise."
	[Using ChatGPT to check spelling] "But how is this exactly different than when the student would have said that he is very dyslectic, and he asked his grandpa to check it?"
Respondent C	"Yes, although I find the emotion that AI shows already quite real. In the beginning when I was texting with ChatGPT, when I left the conversation, I actually wanted to say bye."
	"I cannot just say: quit what you are doing, because music will be playing out of a box soon."
Respondent D	"I think that there are many new opportunities, but the development is going so fast, that it worries me."
	[About the use of AI and its ethics] "I think that the balance between what we want with AI and what can be done with it should remain a discussion topic."
Respondent E	[About AI replacing fun tasks] "I want to keep the things that bring me joy."
	"Does it all have to be better and faster? Does this improve the happiness in this world when you compare it to people who lived in 1974 without social media and without the internet."
Respondent F	"I think that it [AI] can be a very helpful tool in the future to make things, just like we have gotten these tools through music history, think of the help from synthesizers, drum computers, editing software (like DAWS)."
	[Talking about exploring the possibilities] "Do not let it overwhelm you, you know. Eventually it is you who decides that this is what I want to make, because I think that this has potential/appeal for an audience."
Respondent G	"It is just like you are having a conversation with a colleague, which is quite cool."
	"You want to stimulate your student to do something and anything that fosters that, I find legitimate."
	"I think that they [the students] should be guided a lot in that, including us teachers, because

	nobody really has the capability to contain what this [AI] can do and what it does."
Respondent H	"It is basically that they [AI] have children's feet which they want to fill very big shoes already."
	"Where, IF it is researched well and used effectively, it can provide support. But it can never and should never be leading us. Then we lose our humanity."
Respondent I	"The scariest thing about it [AI] is when you enter privacy-sensitive information. What happens with it?"
	"I think that you need to think of it as in are you going to switch to AI 100% or is it going to be one of the tools just like a compass, pencil and mobile phone?"