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Communication between singers and composers: Theory, reality, and hope for the future

Lectio Praecursoria

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I wrote the following two years ago in a grant application : "*Voice is Voices* (2021) is an audio installation opera about voice and identity. It is composed for four coloratura sopranos." As is the case with many grant applications, this is a lie. *Voice is Voices* was not composed for any four coloratura sopranos. Instead, I composed it specifically for Kajsa Dahlbäck, Annika Fuhrmann, Marika Hölttä, and Kaisa Ranta.

To be sure, they all do identify themselves, more-or-less, as coloratura sopranos. They have even made *careers* primarily based on singing roles that are in the category of coloratura soprano roles. But my statement remains: I could not have composed 50 minutes of music for four coloratura sopranos as such. Actually, even though I tried to compose one act of that opera solely thinking of these four musicians as coloratura sopranos, I failed miserably; it was clear in my head what quotes would be funny for Annika, or how Kaisa Ranta speaks German. Even my body started to fight against this process.

Why did I lie? And - why do I open up the most prestigious academic talk of my life (so far) by confessing to this lie?

We will come back to that. But first, I would like you to follow me on a little trip. I have divided our journey into three segments that each try to answer one question. Those questions are what, how, and why.

What is the Voice Map Method?

I would like to talk about the *Voice Map Method*, the theme of this project. I devel-

oped it to enhance the communication between singers and composers. This communication takes place when they decide to work together. It is a starting point that will proceed with the composer writing a piece for the singer, and later the singer performing it.

The Voice Map Method can be helpful for any composer, but composers not very experienced in vocal music can benefit even more. With this method, the composer can learn much about the voice of a specific singer. In addition, an inexperienced composer can learn a great deal about voice in general: things like vocal registers, producing text, and so on.

The Voice Map Method consists of two parts: First, the computer-aided Voice Map Analysis, which is the process of creating a graphical map of the potential of this singer's voice. The second part is the list of good questions. It provides a structure for the discussion between the singer and composer. It ranges from the details of the map to the general skills and wishes of the singer.

Oftentimes it is the use of analysis software, the idea that you can analyse a singer's voice thoroughly and quickly, that takes all of the attention. However, we must not be seduced by efficiency and digitalism. The goal of the Method is to enhance communication. The value of the Voice Map and the Analysis is in how they can create common ground between the singer and the composer.

Although this section is about the question 'what', I do want to mention two sources of motivation. Firstly, during this process I used the Voice Map Method with 22 singers and talked to many more. As different as these singers were, a vast majority, in fact almost all of them, agreed that *some kind* of tool or method was desperately needed to enhance this sort of communication. In many cases, it does not even exist at all.

The other motivation was, and is, my own - and I will use it as the first step in describing the whole development process. All my life I have been working in different roles with different voices. Whether as a singer, performer, production assistant, director, or composer, I have been able to observe the good and not-so-successful processes used when a composer and singer create a new piece together.

Intuitively, I started to collect these good practices and utilise them in my work. Now, speaking from this stage, those practices still seem good, but somewhat naive. Luckily, for me, most other young composers seemed to understand the functionality of the human voice even more poorly than I did. As the saying goes, "in the country of the blind, the one-eyed man is king". I was able to involve some of these practices in my own pedagogical work, but I started to doubt myself. I was happy with the results, but I was not quite sure WHAT I was actually doing. This seemed like a good starting point for a doctoral project. I was able to find names and more formal shapes for my intuition, so that other composers and singers could also benefit from it. Indeed, it started a positive circle.

In the Figure above, I have collected the whole process and all the cycles that

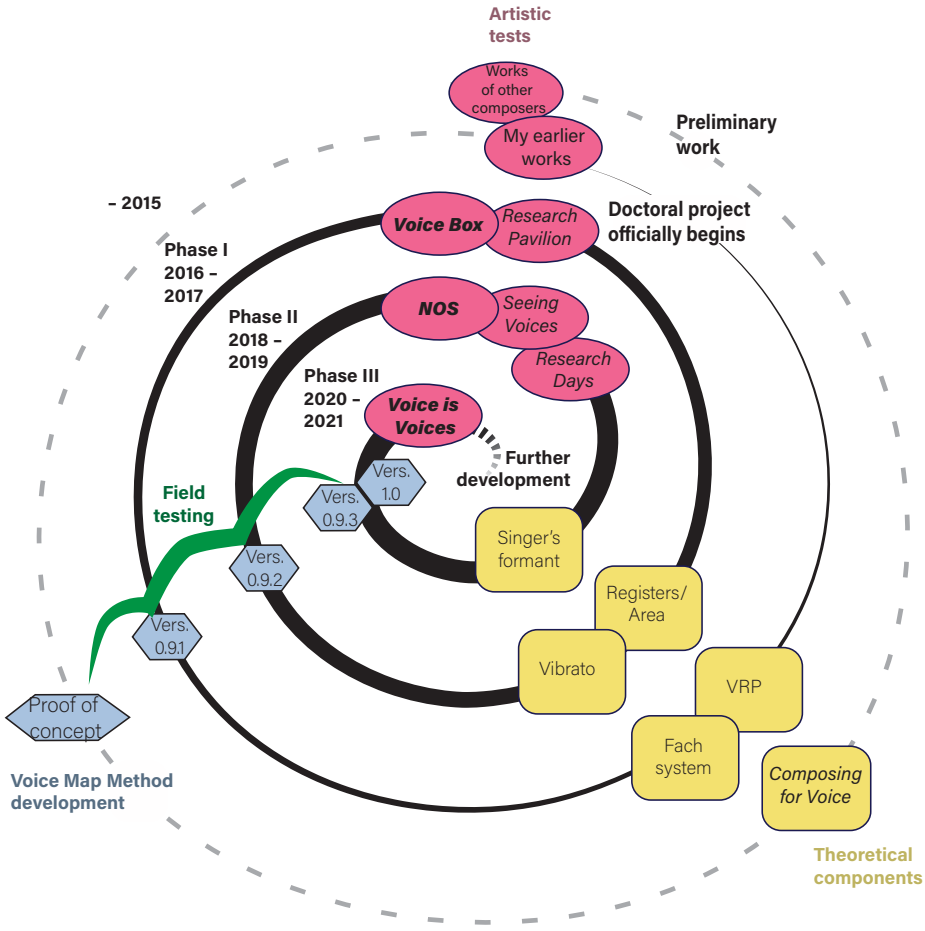

Figure. Iterative development.

took place in this project. It portrays a great deal of information, and I will go through it loop by loop.

1. I had questions or ideas stemming from the artistic work. To better understand them, I studied literature written by vocal pedagogues and voice scientists. It helped me find a technical description, and sometimes even a solution.
2. I then used it to develop the Voice Map Method further.
3. This new version of the Voice Map Method was used in creating a new vocal piece. This then created new demands, and the circle began again.

So, when we started the process, I was trying to find words for my intuition. As I went through the literature, I did find important ideas that could help me further.

Especially helpful were the "Vocal register" and a system called the *Voice Range Profile*. The latter is a method used by voice scientists to analyse a person's voice and create a visual version of it. The questions posed by the Fach system also caught my eye, to be considered later.

These two were the main components I used when I created the first version of the Voice Map Method. It took some parameters and ideas from the Voice Range Profile, but I had made alterations that would specifically help singers and composers to communicate with each other.

There are also similarities between the Voice Range Profile and the Voice Map Method. The person whose voice is being analysed sings through their whole voice, both as softly as possible and as loudly as possible. These results are then written in a graph, with the frequency of the sound on the x-axis and the dynamic on the y-axis.

However, the crucial alterations and individual decisions included 1) creating a program using the Max/MSP programming language, which is by far the most common in the composing world; 2) deciding what kind of scales could best help the singer to go through their whole range; 3) disregarding some of the precise numeric data that would not be helpful for communication; and 4) finally, deciding that the process would proceed register by register, and not directly through the whole range, as is typical for Voice Range Profile.

The latter is an important parameter for a composer to consider, and can create good and sometimes heated discussions. There are numerous different theories and terminologies concerning vocal registers. What do I mean by a "register"? Manuel García's definition seems to be the most widely accepted:

> By the word register we mean a series of consecutive and homogeneous tones going from low to high, produced by the development of the same mechanical principle, and whose nature differs essentially from another series of tones, equally consecutive and homogeneous, produced by another mechanical principle.[1]

In addition, a large part of the education of a classical singer involves equalising the voice. That is, hiding the differences between the registers. However, from the composer's point of view the registers can nevertheless be an interesting tool. Composers use their knowledge of the voice and the registers, and can practically orchestrate using the different registers. For more precise examples, please refer to my report.

To summarise, singers are somewhat reluctant to talk about their registers, and the different theories pertaining to them are somewhat confusing, so that a composer inexperienced in vocal music would especially benefit from understanding them.

My solution was to use a new term. Instead of registers, I speak of areas. Registers

[1] Garcia, Manuel 1847. *A Complete Treatise on the Art of Singing*. Part 1. Edited and translated by Donald V. Paschke 1872. New York: Da Capo Press.

are a technical term: something technical, measurable, with right and wrong answers. Area, on the other hand, is an object of discussion, a communication tool that the singer and the composer can use to talk about certain aspects of the voice. The singer could decide how many areas they have or what to name them. The names of these areas were not just labels; they also carry certain associations. A composer would listen to an area quite differently if it was called "Mixed head" as opposed to "the golden area".

This concern of singers wanting to equalise their voices even when working with the composer was not only theoretical. Many singers were indeed reluctant at first to talk about their registers or areas. Only once or twice, and only after explaining the theoretical background I came from, and sometimes only after discussing examples from the classical repertoire, were they willing to reveal their areas. However, after the analysis, all of the singers were quite happy that they could see their own voices from a different point of view. Singers that took part in my artistic components and for whom I composed new music were especially pleased.

First phase: Creating the application and the opera Voice Box

This brings us back to the theme. I created a Voice Map Analysis software package with the help of programmer Hadas Pe'ery, and after some preliminary trials I used it with one singer, Mia Heikkinen. This test later grew into the opera *Voice Box*, which premiered in 2017. Other performers included Jacintha Damström playing the flute, doing circus stunts and singing, as well as Maija Parko, playing keyboards, lecturing, and singing. The first artistic component is a celebration of different vocal techniques, and emphasises the many possible aspects a composer can use when they understand details of the voice; for example, the areas.

Voice Box is a lecture opera, a comical experimental music theatre. I wrote the libretto myself, and it is heavily based on my theoretical findings. The areas of Mia Heikkinen's voice were used as the basis of the composition dogmatically. All of the vocal music, and much of the instrumental music, were composed to or around these registers, and the musical motives were all inspired by them. In fact, even the structure of the whole opera was based on these areas.

The opera is divided into 5 lectures, each presenting one of Heikkinen's areas. For example, lecture number four, called "Fachsystem, Boo!", uses vocal fry sung by all the performers as a timbral element. On top of that, I used some of the dynamic options and even rhythms of the vocal fry area when composing this lecture.

Second phase: Areas of the voice and the opera Nomictic solutions

During all these phases, I was also using the Voice Map Method with different singers, in order to optimise the analysis process. At this point, the question of vibrato received a lot of my attention. In some cases, the software did not easily recognise the pitch of the voice. It was evident that especially dramatic voices with a noticeable vibrato were tricky for the software. After some testing and finding a new object in the Mas/MSP tool kit, the question of dealing with vibrato was solved.

Part of creating something new is not being able to predict everything. Rather late in the process, I decided to utilize one scene of the opera *Nomictic Solutions* from the year 2018 as my second artistic component. This changed my plans somewhat.

This opera was commissioned by the *Münchener Biennale – Festival für neues Musiktheater* and performed at Starnberg, near Munich, and part of the concept was allowing the audience to travel with the performers. The artistic team consisted of video artist Babylonia Constantinides, stage and costume designer Anna Maria Münzner, and composer Nicolas Kuhn. We all worked in an interdisciplinary way. However, the concept of two composers creating an opera together is particularly special. Because of this, I only used very specific music, composed solely by me, as the artistic component.

This part was composed for Martina Koppelstetter and we used the Voice Map Method in our work. Koppelstetter is somewhat special as a singer; her voice is extremely low. So much so, that only after an extensive analysis of the areas could I comprehend it. Tones that would be roughly in the middle of the range of most female voices are already extremely high for Koppelstetter. Simultaneously, her voice reaches so low that it was actually comparable to a light tenor voice.

This made clear to me yet another important aspect of the Voice Map Method. The Voice Map, the visualized information about the voice, is important for finding a common ground for communication. However, it is even more important that the composer should listen to the voice of the singer while doing the analysis. The composer will have a very concrete idea of how the singer's body moves when these tones are produced. Without seeing these efforts physically, in the same room, I would not have actually understood Koppelstetter's voice, since it seemed to go against everything I knew about voice. When I finally grasped it, however, it was hugely inspiring.

Koppelstetter sang in the section "From Mythology". She sings from the deck of a ship, which is sailing on Lake Starnberg along with the audience, who are on the top deck listening to the song. I will not go into the details of the plot, but to summarise: a German company Nomictic solutions is trying to sell to the audience a mysterious supervision method that is based on listening to people's voices. Koppelstetter's character, the press officer, was there to lure the people into believing the company's lies, and to keep the potential buyers from digging too deeply into

the ethical questions. The music was very ornamented, and all of the words were so fragmented that it was difficult not to get lost in all of the interesting colours, to not think about the meaning of the words and sentences.

In this case I also used the singer's areas as a compositional tool. If *Voice Box* was split into discrete musical sections dedicated to specific areas, in *Nomictic Solutions* the areas and colours changed like in a kaleidoscope. Koppelstetter's voice had many areas, and especially in the very lowest part the smallest melodic gestures could almost automatically create a wide timbral spectrum.

Third phase: Singer's formant and Voice is Voices

In the third and final phase, I was interested in the question of the singer's *formant*. This is a phenomenon of voice that allows classically trained singers to project their voices through an orchestra. Researchers, especially Juhan Sundberg, have been able to identify it in different voice types. According to them, dramatic mezzo-sopranos, tenors, baritones, and bass voices are more likely to possess it.

During the early stages of my project, I decided to primarily focus on testing high and lyrical voices, mainly people who would see themselves as sopranos and coloratura sopranos. The argument was that these kinds of voices are the most popular among composers, which would also provide a clear and technically approachable starting point. From that point on I tried to introduce lower voices into my testing, and was successful in creating a system that can identify a singer's formant well enough to aid in communication. Nevertheless, this is one of the points that will still require further study.

Knowing that this would be the final stage of my development project, I wanted to create a production that would put the method to an ultimate test, but still remain within the limits of my original plan. I decided to use the original limit of high lyrical female voices as a tool. I would compose "a piece for four coloratura sopranos".

I want to make this point clear: dividing people into different voice types has been a habit for centuries, and it can not be stopped. The opera industry, the global net of opera companies, for example the hundreds of houses in Germany, needs an even more specific system. The solution is called the Fach system, and it is strongly connected to the book *Handbuch der Oper*.[2] The concept of Fach is so important to the opera industry that it would be highly unethical to let a young singer graduate from an art university without them having a good understanding of how they are positioned within this system.

For a composer, however, this system is simply not usable. We are not trained to understand its nuances, and it does not give us enough information about the actual

2 Kloiber, Rudolf, Wulf Konold, and Robert Maschka 2002. *Handbuch der Oper*. Kassel: Bärenreiter.

voice that will perform the piece. I will come back to this theme in the last section.

So, the process of creating *Voice is Voices* (2021) started for me when I decided to compose for four interesting singers with interesting voices:

- Kajsa Dahlbäk, who sings a lot of early music.
- Annika Fuhrmann, who is especially known for expressive contemporary music.
- Marika Hölttä, a younger singer that had experience in both classical music and pop techniques.
- And Kaisa Ranta, who was probably the most classical personification of an agile voice that also had a certain singer's formant or dramatic bite.

By utilizing the Voice Map Method, I could understand these voices very specifically. While composing, I did not compare these voices, they were not competing, they were - coexisting. And, surely enough, certain unexpected combinations did occur, and certain areas of certain singers proved very similar. In the next moment, however, with relatively small gestures, I could show that the voices could not be more different, more unique.

Voice is Voices is an audio installation opera, and so only a recorded version exists. This allowed me to compose materials that very specifically showed these similarities and differences in a way that created a dramaturgical arch.

The opera premiered in 2021. Louna Hosia on Gamba and Pinja Nunes on cello took the role of the orchestra and Maija Turunen was the Tonmeisterin. A different aspect of the theme, Voice and Identity, was demonstrated in each of the six scenes.

How does Voice Map Analysis function?

So far, I have shown what I was able to achieve with the help of the Voice Map Method, so this would be a good moment to explain HOW it actually works. I will mainly concentrate on the Voice Map Analysis.

The software design, layout, and programming were done by me and composer-programmer Hadas Pe'ery, working together. It was always my role to introduce new questions and suggest new features that the software should have. Making it approachable to both singers and composers was essential. For example, the Max/MSP programming language was chosen because it is the one that most composers know and use. The Voice Map Method software is open source, as we also hope that composers will continue the development, and that would be more likely using a language they know. A typical Voice Range Profile uses frequencies as reference points, but the Voice Map Method only refers to pitches in order to maintain the musical aspect.

We were also able to be more casual with the technical demands of the analytical environment and tools. The singer may move a centimetre or two and the room may have slightly different acoustics; these points are irrelevant when the composer and singer are only discussing the general shapes and relative dynamics. Strict dogmatic limitations on the process might create somewhat more exact results, but also make the analytical environment stressful.

The Voice Map Method is comprised of the following steps:

- The singer notes down the names and approximate range of their areas.
- The composer types these into the software.
- The singer then decides in which order they want to go through all of their areas, but in the end each tone of each area is sung as loud as possible and as soft as possible.

Deciding on the many minute details of the process was not an easy task, and I want to thank all the 22 singers who have helped me in the development of the analytical process.

I wanted to make the Voice Map Method easy and reliable. My goal was also not to push the composer in any direction aesthetically. I am myself a composer of experimental music theatre and used the areas with all parameters. On the other hand, a completely different approach would also be possible. The composer could discuss with the singer and have a solid understanding of their areas, and then compose music that does not take these areas into account in any way. This is possible, but at least the decision would then be an informed one.

When creating the analytical situation, the objective was to find the essentials of each voice. The singer does not sing any existing music, and even the small figures are abstract, almost non-musical. In this way the composer can optimally concentrate on the voice itself and not get too entangled by the composition they are listening to.

After the Voice Map Method Analysis is completed, the singer and composer then proceed to read the Voice Map together.

Why the Voice Map Method

I hope that at this point my personal motivation is clear.

As I was composing the three artistic components, the Voice Map Method allowed me to find special things in all of these voices. In future studies, I will test how other composers can recognize them. However, in the context of an artistic doctorate this broader scope of testing was clearly not possible.

It might seem surprising that this communication between singers and composers would even be something that needs enhancement. But it does, it surely does.

The main concern is the education of composers. I am not referring here to any specific university, but the general state of what future composers learn about singers' voices. Which is not very much. Their knowledge is based on workshops and small projects that vary from year to year.

While instruments are studied, unquestionably, as a part of the training of a composer, there are no formal structures for learning about registers or text or a singer's formant, or about how to compose for voice.

Unfortunately, composers have not understood the gap in their knowledge. Very often, even now, composers do not even want to talk with the singers; they simply compose for a virtual soprano, and the ensuing surprise at rehearsals can be unpleasant.

More often than not, the idea of the voice type, or Fach, is faulty or limited, and the whole understanding of the functionality of the voice is flawed. In this situation, a "soprano" could really mean anything. Surely, if you are more specific and use the Fach, such as "lyrischer Koloratursopran", the variation is smaller, but still not good enough for a composer.

My hope is that composers are slowly starting to understand this problem, and working with actual singers will be part of their studies all around the world.

Interestingly enough, historically this was always the way it was done. And, according to the literature, many composers of large-scale operas still prefer to compose for a specific person. The historical evidence is clear: music tailor-made to fit one singer's voice usually can and will be sung by other singers as well. Music composed for a virtual soprano fits nobody.

It is in order to make this process, this communication, as easy and smooth as possible that I have created the Voice Map Method.

To tie up all the loose strings here, I do need to get back to the very beginning of my talk - the lie.

I told the lie because I thought that it was good marketing. People had in their minds their own virtual coloratura sopranos, and they would love the idea of hearing four identical copies of them singing together, perhaps even competing with each other, having a vocal fight. And I was right, we did get the grant - the lie was successful.

However, I also wanted to make honesty the central component of this journey. And honestly, my virtual soprano is much more boring than any of the living singers I have ever met.