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LIMITATIONS AS STIMULATION

Rethinking the music performance ecology

ANDERS LIND

NOTE

The video excerpts below document two compositions completed as part of my artistic research, as highlighted in the text. They are used as examples of how limitations in a medium and a creative environment can be used as stimulation and a creative force in the music composition process. Before continuing reading, please watch these short videos:

Put Your Hands Together – Live performance of a composition for electronics and a handclapping audience in 24 individual parts, conducted using animated notation: <https://youtu.be/FlodUGpJBLE>

Embracing Distance – A live Telematic Performance (Networked Music Performance) between three continents: <https://youtu.be/r0hMFagkxAE>

INTRODUCTION

As a composer and artistic researcher, I am interested in exploring new mediums¹ in my work, in how a new medium can affect a creative process and bring to life unexpected sides of a practice. I am exploring new mediums ability to create a reaction in the artistic activity, which may help us define the content of a tradition, and even make way for the development of new traditions and practices. But, most importantly, how a new medium and its embodied limitations may be highlighted as a frame that will strongly shape both the creative process and the generated artistic output, in this case the music.

In the last 8 years, I have initiated and been working with different artistic research projects within the field of Human-Computer Interaction. My research is situated within a contemporary art music context and has included work on and the development of: a mobile phone orchestra platform² (Lind et al., 2021), animated music

notation systems (Lind, 2018), interactive sound art exhibitions³ (Lind et al., 2016, Lind, 2020), audience participation concepts^{4, 5} and telematic performances (or networked music performances). A new medium is always in the centre of my work and the majority of my projects have focused on participatory concepts and strategies for how to involve non-musicians in contemporary art music performances. In this text, I adopt a media ecology perspective to reflect on my composition processes. I make use of the terminology and metaphors of media ecologists such as Marshall McLuhan, Neil Postman and Lance Strate to illustrate and discuss the experiences made with my projects. Two compositions of mine, where one or several new mediums are involved in the performances, are highlighted and discussed as examples of thinking music composition from a media ecology perspective:

1) Put Your Hands Together, music for a

¹ In this text, I use the term “new medium” to refer to mediums that are new and not yet commonly found in the tradition of a practice, in this case: the orchestra music performance practice.

² Mobilephoneorchestra.com and solo chamber musicians. Retrieved 27 Jan. 2022 from: https://youtu.be/Zfc_2eYDFmk

³ LINES – interactive sound art exhibition. Retrieved 27 Jan. 2022 from: <https://youtu.be/hP36xoPXDNM>

⁴ Collectiveness – Excerpts from performance including 20 non-musicians using their voices as instruments, animated notation and chamber orchestra. Retrieved 27 Jan. 2022 from: <https://youtu.be/OyMq13Uc6DY>

⁵ Voices of Umeå – Excerpts from performance including 200 non-musicians using their voices as instruments, animated notation and interactive sound art instruments. Retrieved 27 Jan. 2022 from: <https://youtu.be/VFebLXpeofo>

handclapping audience, electronics, and animated notation; and 2) Embracing Distance, a telematic live music performance between three continents. From an artistic standpoint, I claim that any type of medium, including any sound object, any space environment – physically or digitally and in any combination of performers – even regardless of their musical background, can be used to generate a rewarding artistic expression for an audience.

This text addresses creative practitioners generally, but especially music composers, arrangers and educators who involve new mediums (in terms of alternatives to the traditional music instruments, music scores, music performers, performance spaces...) in their music activities. In a wider perspective, the ambition is to highlight and put focus on a new medium's ability to affect a creative process; most importantly, how limitations in a new medium can be used as a desirable creative force rather than a limiting aspect of a creative activity.

THE MEDIUM IS THE MUSIC

The medium is essential for how information or content is created, transformed and distributed as an output to affect an experience. An artist works with a medium or several mediums to communicate artistic ideas and visions to a receiver. Media ecologists like Marshall McLuhan talk about the medium as an extension of the human, where the content is highly influenced and shaped by the medium being used (McLuhan, 1964). Artists have long understood the McLuhan metaphor “the medium is the message”, which Strate exemplifies as: “Musicians will tell you that when the same melody is played on violin, trumpet, and xylophone, you have three different pieces of music” (Strate, 2008). Neil Postman, who coined the term “media ecology” in 1968, highlights his interest in the inter-

action between media and human beings while talking about media as environments (Postman, 2000). A medium may be seen as an ecology of different cells interacting with each other. However, each cell in this ecology can also be seen as one separate medium (REF). All mediums in an environment affect the ecology depending on their respective embodied characteristics. No media is neutral, transparent, or free from values. Similarly, no user of a media is neutral, transparent, or free from expectations of the media and its characters. In other words, a media defines a frame for people to interact with, encouraging certain actions while discouraging others. McLuhan underscored this phenomenon in one of his famous quotes when stating that “every extension is also an amputation”.

To enable defining the characteristics in terms of extensions and amputations in a new medium, we need to know what this is compared to. In this text, I use a traditional orchestra music performance environment within a contemporary art music context as the tradition in which the new mediums are compared to. I have chosen the orchestra performance ecology as a framework since it is a concept that relates to the majority of my artistic work.

Music as an ecology – through the eyes of a composer within contemporary art music

As a composer and sound artist, I am interested in sounds; the sound itself as the essence; and sound as a resonating body within a space. While creating variations and combining different sounds, which is part of the composition process, a new sound is generated. Adding the parameter of time, and also organising different sounds over time, will result in a musical structure like a rhythm or a melody. Further organising of different musical structures over time and working with contrasting elements and variations of them to create a musical form

is for me when the sounds, the combination of sounding textures, transcends into what may be defined as music. The composer Edgar Varese put it succinctly in one of his famous quotes: Music is organised sounds⁶. From a media ecology perspective, the sounding music can be seen as an environment where each sound is an individual medium interacting with the other sounds as mediums. Each sound has its own embodied characteristics and also an embodied tradition in which we have learned that the sound traditionally is situated within. The embodied characteristics of a sound may be the musical parameters defined as pitch, frequencies, dynamics, timbre, density, time and so on. A composer works within the musical parameters and organises sounds in various combinations, resulting in new sounds and musical textures, which depending on the musical parameter in focus and the type of interaction over time may musically be defined as a chord, a rhythm, a melody and so forth. If we think of music as organised sounds, the sounds used in a composition may not need to be limited to sounds only generated by traditional music instruments.

As a composer, the embodied tradition in which a specific sound is situated and your knowledge of that tradition will affect the choices made in a composition process. Working with, for instance, a sound of the piano, the tradition of how piano music traditionally sounds in different contexts and genres, and your relationship with and knowledge of these traditions, will certainly affect the creative choices. Being aware of this, a composer can choose to go along with working within a sound's embodied tradition or to go against it. Either way, the embodied tradition of the sound will affect the choices made in the composition process. Seen as mediums, all sounds have specific frames for a composer to work with, encouraging certain actions, while

discouraging others. In any event, the embodied characteristics and tradition of the sounds as mediums will affect the composition process.

A Traditional Orchestra Music Performance as an Ecology

The two essential mediums generating the artistic expression within the orchestra music performance ecology are the orchestra medium and the space medium. The audience also forms part of the ecology, but in the orchestra music performance tradition has a role as a receiver, not as an active medium, to affect the artistic expression.

First, we have the orchestra medium, which includes the performers, the music instruments, the scores, and the conductor as individual mediums. The embodied characteristics of a traditional orchestra instrument both define what is needed to interact with the instrument, and what type of sounds can be generated. From a composer's perspective, the traditional orchestra instruments offer a wide and diverse range of possibilities for artistic expressions in terms of musical parameters like pitch, dynamics, articulations, timbre, and rhythmic variations. As a consequence, instruments such as piano, violin, trombone, flute and so on are very hard to master as a performer. The embodied skills and experiences of the performers are accordingly very essential for the traditional orchestra seen as an overall medium. Then we have the score as a medium. The embodied characteristics of the score are the musical signs giving instructions to the performers regarding how and when to interact with their instruments. Still, the often-detailed scores for orchestra music are not enough to communicate all the information of a complex musical texture. This means how the score is interpreted depends on the embodied tradition of the score; namely, how the score has been interpreted historically in a specific musical

6 https://www.inspiringquotes.us/quotes/tUoB_ovjxUvkX retrieved: 2022.03.23

context. Once again, the embodied skills and experiences of the performers deeply affect the embodied tradition and skill of the orchestra seen as an overall medium. Further, we have the conductor who also interprets the score and has a leading role in the artistic expression generated by the orchestra medium. Similar to a performer, the conductor has been trained within one or several music traditions, but has also of course gained individual experiences and skills due to personal and professional lived experiences, which have a further effect on the overall artistic expression.

Second, we have the concert hall as the space medium in which the performative interaction traditionally takes place. The main parameter affecting the artistic expression is the embodied acoustics in the space; in other words, how the sounds of the orchestra resonate and add an acoustic character of a sound depends on the embodied characteristics of the concert hall as a space. Then we have the tradition that is embodied in the traditional concert hall. The tradition in which we have learned what type of activities the space is used for will affect the musicians' experiences, as well as how an audience behaves in this space, which might affect the artistic expression. In the traditional music performance ecology, the audience is there as the receiver and not regarded as a medium that generates the artistic expression.

The traditional orchestra as a concept offers wide artistic possibilities to work with for a music composer. Still, since the tradition is deeply rooted in another century many artistic ideas relevant today are not suited to the traditional orchestra medium. In my artistic research, I am interested in embracing the fundamental concepts related to the traditional orchestra medium, which could be working with a large group of performers, being able to divide a group of performers into multiple individual parts, working with different types of scores and conductor techniques, and working with

the concert hall as a space. However, the core of my work is putting new mediums into the orchestra context, which might be working with large groups of non-professionals as performers, working with mobile phones or interactive installations as music instruments, working with animated notation as performance instructions and a conductor, or working with home objects as sound material. From a composer's perspective, all mediums involved in a performance ecology together determine the frame within which to work in a composition process. The frame is changed when a new medium is put into the ecology. In particular, the mediums found in the orchestra environment are important from a composer's perspective. For instance, a melody performed on a piano will obviously have a different generated sound than if performed on a flute. Each instrument has its unique artistic extensions and amputations for generating and modulating sound, which will define the framework for a composition process. Moreover, switching performers will completely change the artistic expression to be generated. A jazz musician will interpret a score differently than a chamber musician. Similarly, the background, embodied skills and experience of the conductor make a deep impact on how the music is interpreted by the orchestra. Changing the space medium from a concert hall to a bar, an outdoor space or a church hall will also have a direct impact on the content within the environment. The generated sounds will resonate differently according to the space's acoustics. The performers will probably be affected by how the sounds resonate together. The tradition of how an audience behaves in a specific space may also result in unintended sounds, which would affect the artistic expression.

For this article, I chose to highlight two examples from performances in which new mediums are added or to replace former mediums within a traditional performance ecology. Both examples were chosen since

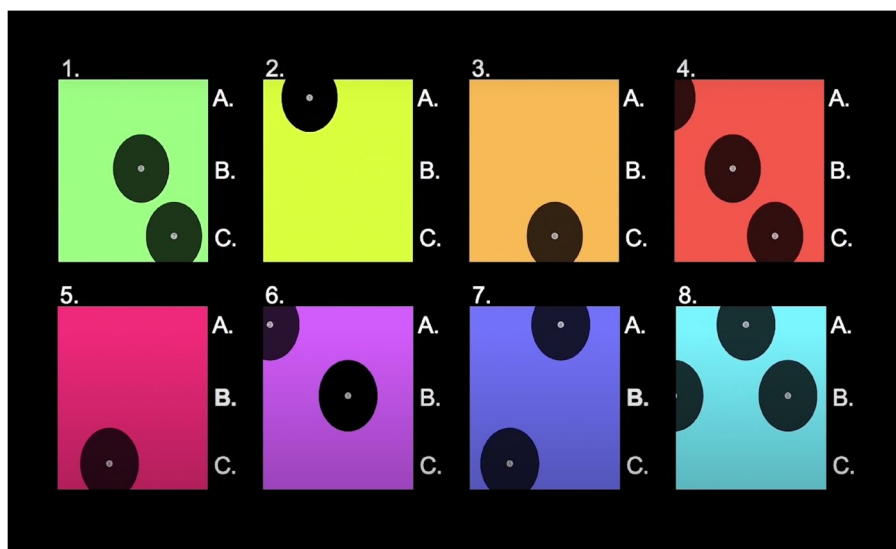


Figure 2: Screenshot of animated notation for Put Your Hands Together

they put different mediums in focus. The two examples are situated within a contemporary art music context, with the main ambition to explore the artistic extensions and amputations revealed in the environment.

PUT YOUR HANDS TOGETHER – AUDIENCE PARTICIPATION

Put Your Hands Together is a 6-minute composition for a handclapping audience and electronic pre-processed handclap sounds conducted by animated notation. The composition was premiered in Sweden in 2016 and has since been performed at various conference settings and festivals such as the New York City Electroacoustic Festival in 2017. In general, the idea of the composition was to explore the concept of audience participation from an artistic perspective. Audience participation is a concept whereby the audience is invited to participate and affect the artistic output in a musical performance. Within the field, there are two main approaches to audience par-

ticipation. Either the audience affects a music performance by voting during the concert as to how the professional musicians on stage should perform the music (e.g. Dahl, et al., 2011. Wietzner, et al., 2012) or the audience itself becomes the performers and output the musical expression (e.g. Lee, Freeman, 2013. Roberts, Hollerer, 2011). In Put Your Hands Together, I use the approach in which the audience becomes the performers of the musical material. I have also used a similar approach in my work on, and development of, *mobilephone-orchestra.com*, a contemporary art music performance platform for people regardless of their musical backgrounds (Lind, 2021). Other examples of approaches using the audience as performers of the music material include; *Moths* by Hasse, *La Symphonie du Millenaire* by Chénard, and *268°* by Áki Ásgeirsson⁷.

More specifically, the aim was to explore the potential of using handclaps as the main artistic expression in composition, making the audience members (regardless of their musical background) a multiple-part hand-

7 Ásgeirsson, Áki. 268°. 2013. Retrieved 2020.12.14 from: <https://youtu.be/KtoN3J9DLKc>

clapping orchestra. Animated notation was used to give performance instructions and conduct the audience during the performance. Animated music notation is an emerging field within contemporary art music and has been developed by composers and researchers such as Cat Hope, Lindsey Vickery, Ryan Ross Smith and the S.L.A.T.U.R collective, to name just a few (e.g. Smith, 2016). It may be seen as a development of the graphic scores that composers like Earl Brown⁸ and John Cage experimented with in the 1960s. It could be described as moving graphics presented on a screen to give performance instructions to a musical performer (Hope, 2017). Some advantages of animated music notation include its intuitive approach and the possibility to notate any type of sound source or non-traditional instrument (Fischer, 2015). Music teachers and scholars have argued that animated notation also may serve as accessible performance instructions to get novices involved in musical interaction⁹. Icelandic composer Áki Ásgeirsson used animated notation as performance instructions involving more than 1,000 9-year-olds as performers for his composition 268°, which can be seen in a videoclip on YouTube¹⁰. There are also examples of using animated notation within music education. The researcher and music educator Shane McKenna has created an animated music notation platform called Dabbledoomusic.com¹¹. On this website, he argues that his animated notation makes music education more accessible, engaging and fun for both teachers and students. The Dabbledoomusic platform provides musical exercises for preschool classes up to the 6th grade of primary school. By using animated

graphics presented on a screen, a whole class can perform and accompany the music of videoclips, including both Irish folksongs, pop songs and classical music. The animated notation used for this performance was mainly developed within my artistic research project *Voices of Umeå* (Lind, 2018; Lind, 2016). It may be described as a cross-over between the graphic notation ideas of music composers like John Cage and the intuitive performance instructions found in modern videogames such as *Singstar*¹² and *Guitar Hero*¹³.

This text is based on my reflections as a composer looking back at my reflexive notes, and video/audio documentation from the premiere performance of *Put Your Hands Together* in 2016. The performance took place in a concert hall environment and the performing audience consisted of approximately 200 people with diverse backgrounds in terms of gender, age and, most likely, musical skills. Before the concert, the audience was given a 5-minute instruction on how to participate in the performance.

The mediums in the *Put Your Hands Together* performance ecology

In *Put Your Hands Together*, the central medium of interest, which changes the content of the whole performance ecology, is the performer's medium. The audience as a group transcends here from a passive role as receivers to an active role as the content of the performer medium, which in relation to the tradition replaces the professional music performers. Since the audience as a group does not have the musical skills embodied in a professional performer, the choice of the other mediums to be included in the

8 <https://graphicnotation.wordpress.com/tag/earl-brown/>

9 <https://www.teachingideas.co.uk/notation/graphic-notation>

10 <https://youtu.be/KtoN3J9DLKc> (Videoclip of Áki Ásgeirsson, 268° live performance)

11 Dabbledoomusic.com. 2019. Retrieved 2019.11.01 from: <https://dabbledoomusic.com/p/about-us>

12 Studio, L. 2004. *SingStar*. Sony Computer Entertainment

13 *Guitar Hero*. 2005. PlayStation2. CA: RedOctane.

performance ecology is very important. In particular, the instrument, conductor and score mediums. First, the embodied characteristics of the mediums must be very intuitive and easy to master, without extensive rehearsals, to even enable a performance. Second, the mediums need to be engaging to maintain the new performers' complete focus while performing. Scholars have argued that one of the primary factors making an instrument intuitive and easy for novices to learn quickly is that the musical control is highly restricted (Blaine et al., 2003). Still, as a result, the limited musical control of the instruments can also lead to a lack of musical depth or expressivity (Barracough, 2015). Accordingly, the main challenge in this setting is to provide for an artistically rewarding musical expression, despite the musical limitations of the mediums used within the performance ecology.

As instrument mediums, handclaps were used in this setting. Handclaps are very easy to perform and also a natural sound to be produced by this new performer medium. The control of the handclapping sound is restricted to varying the dynamics depending on how hard one claps. Animated notation was used to enable the organised handclapping sounds to be performed. The animated notation presented intuitive and easy-to-understand performance instructions for 24 individual parts in real-time and was projected on a big canvas visible to the performers. In this context, the animated notation replaces the role of the traditional conductor and score mediums. As a complement to the 24-part-handclapping orchestra, an electronic music part is used in the composition. The electronic sounds are based on recorded handclap sounds pre-processed in different musical textures and synchronised with the animated notation.

Reflections while working with this performance ecology as a creative space

When the audience transcends from a passive role as a receiver to an active role as the performer medium to generate the artistic expression, the whole performance ecology changes. From an artistic perspective, the handclap as a sound may be seen to be limited in terms of creating a wide variety of musical expressions. The length of the sound is very short and cannot be further controlled. No fundamental pitch is apparent and the timbre is relatively the same irrespective how the handclap is made. The only parameter at hand to work with as an instrument are the dynamics. On the other hand, the sound is very easy to produce, no instructions on how to make the sound are needed, and the instrument is very accessible since it is only produced by the body of the performer. This means that for an audience participation context the handclap may be seen as a suitable instrument and also in this perspective as an extension in relation to a traditional instrument. Moreover, from a composer's perspective, the restricted possibilities to control the instrument's sound may foster creative exploration within that limited frame in a composition process. As a consequence, dynamics as the only parameter available to work with for the instrument became an essential part of the composition. The handclap as a sound and conceptual frame was the essential part determining the choices made in the composition process. However, since music composition is about organising sounds, the key medium in this context influencing the composition was the animated notation and its embodied characteristics. The animated notation was able to give performance instructions to 24 individual parts, which made it possible to create up to 24 layers of handclapping sequences to be performed simultaneously. In other words, the animated notation enables the organisation of very complex rhythmical structures, which may be com-

pared to the concept of composing polyphonic musical structures for an orchestra. Still, compared to a traditional orchestra, many artistic possibilities are amputated in this specific performance ecology. The embodied characteristics of the sound of the handclaps amputate possibilities to create melodies or harmonies organised in fundamental pitches. The new performer medium (former audience) cannot trigger the sounds as accurately in terms of their timing as professional musicians, which amputates possibilities of creating traditional metric rhythms based on a common beat. On the other hand, the limitations force me as a composer to work with the parameters available and to truly explore them to create variated musical material. For instance, the animated notation used could make the performers trigger sounds in multiple parts synchronised with, for instance, an electronic music part. Even if each sound from a performer is not performed totally in sync, they could be triggered within a

timeframe of 200 milliseconds relative to the trigger points of the animated notation (Lind, 2018). These timing characteristics make this performance ecology suited for performing more abstract, but nonetheless quite complex, multipart rhythmical structures in various densities, which are organised over time but not dependent on and related to a common beat. This feature in combination with the possibility of varying the dynamics of the handclap sounds in each of the 24 individual parts adds extra possibilities to a composition process. Compared to the traditional instrument, score and conductor mediums, the animated notation combined with the handclaps as instruments may be seen as an extension when it comes to being easily accessible and intuitive for the performers. Below are some examples of different musical ideas used for the composition, which can be found in the video/sound documentation of the performance presented at the start of this text.

Reference Points for some artistic ideas shown in the video documentation of Put Your Hands Togheter: <https://youtu.be/FLodUGpJBLE>

0:44-0:47. Silence. 0:48-1:23. A multipart, very low-density handclap texture with soft dynamics spread out in the concert hall space. 1:24-1:43. The electronically processed high-density texture is then replaced by a high-density handclap texture with loud dynamics. A synchronised handclap sound by the performers (former audience) starts and stops the electronic textures. 2:33-3:44. Polyrhythmic structures with loud dynamics. The handclapping orchestra performs in eight individual tempos and the electronic part adds more polyrhythmic textures to it. 3:45-4:45. The electronics play a beat. The handclapping orchestra performs handclaps to the beat. 4:46-5:40. A multipart, very high-density handclap texture with loud dynamics in both the handclapping orchestra and the electronics. The handclapping orchestra is changing the dynamics in the texture according to the animated notation to create variation in the musical texture. 5:41-5:57. An electronic high-density texture is suddenly replacing the previous texture. Fade out. END. Applause.

EMBRACING DISTANCE – TELEMATIC LIVE PERFORMANCE BETWEEN THREE CONTINENTS

Background

Embracing Distance is a composition created to be performed in a telematic per-

formance context. Composed for six contemporary art music chamber musicians situated on three different continents; New York/USA, Melbourne/Australia, Piteå/Sweden, performing in real-time over a network. The premiere performance was held online at the Swedish contemporary art mu-

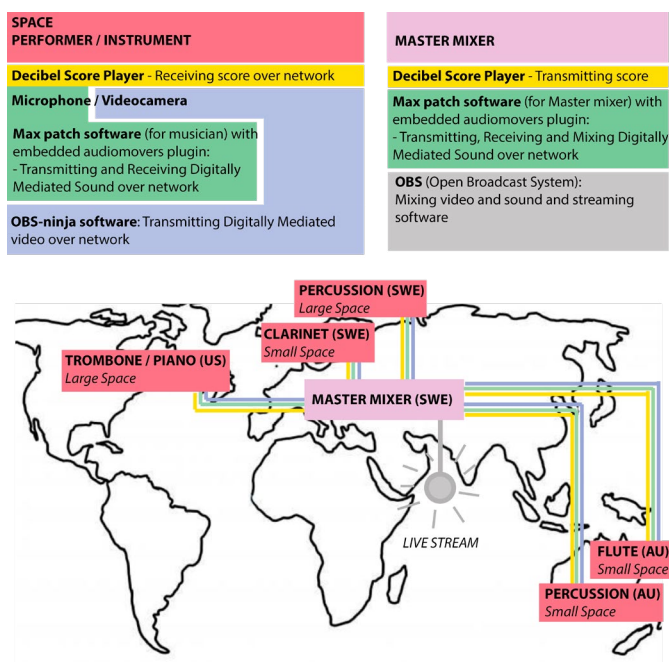


Figure 3: Illustrating the Embracing Distance physical locations and the network streaming processes

sis festival GAS festivalen 2020. The project was initiated by myself and entailed collaboration with researchers at Monash University and musicians from the Decibel New Music Ensemble (AU), Norrbotten Neo (SWE) and the Mise-En Ensemble (USA). In a telematic performance, telecommunications technology is used to bring performers together from multiple geographical locations in real-time via the Internet (Ascott and Shanken 2007; Dresser 2008). In other words; “when a group of musicians, located at different physical locations, interact over a network to perform as they would if located in the same room” (Lazzaro and Wawrzyniek 2001). The main characteristics of a telematic performance is that the traditional concert hall is replaced by a combination of several digitally mediated spaces. Emerging in the 1950s, the field has since been developed by scholars and artists such as John Cage, the League of Automatic Music Com-

posers, Chris Chafe, Pauline Olivieros, Gil Weinberg, Atau Tanaka, Georg Hajdu and Roger Mills to name but a few (Olivieros et al., 2009; Weinberg, 2005; Tanaka, 2005; Hajdu, 2017; Mills, 2014). The latency (delay) of sound as an unavoidable outcome of the digital mediation and network transmission of video and sound is widely discussed within the field. Carôt and Werner propose different approaches for dealing with latency, among others introducing the “latency accepting approach”. When taking a latency accepting approach, there is no attempt to explicitly mimic traditional musical interaction, and musicians are set to use the delay as an artistic way of expression (Carôt and Werner 2007). Other key concepts embodied in the characteristics of the telematic medium are the digital mediation of sound and space, the uncertainty and unstable properties due to the Internet connection, and the multi-located aspect of a telematic

performance (Wilson, 2020). During the COVID-pandemic, which started in early 2020, the field of telematic performance has enjoyed a sudden and rapid increase in interest, including my own experiments with the telematic performance medium. In 2020, I composed *Latency Music* for a telematic performance environment, using a ‘latency accepting approach’¹⁴. Eight musicians from the chamber ensemble Norrbotten Neo (SWE) performed from different physical locations in Sweden. With *Embracing Distance*, the idea was to further explore the artistic possibilities from a composer perspective working with and embracing the characteristics of a telematic performance medium. This text is based on my reflections as a composer looking back at my reflexive notes, and video/audio documentation from the premiere performance of *Embracing Distance* in 2020.

The mediums in the Embracing Distance performance ecology

In relation to a traditional orchestra performance ecology, this environment contains several new mediums, which may affect the interaction. From a media ecology perspective, the space mediums are of particular interest. The traditional concert hall is in this ecology changed with three different mediums. First, we have the individual and physically separated performance spaces in which each musician is producing the sounds in their own spaces by interacting with their instruments. In Figure 3, we can see that percussion 1 and clarinet is situated in Sweden, Trombone and piano is situated in the same space in the USA, and flute and percussion 2 are situated in Australia. Second, we have the network in which the sounds and video from each space are converted into digital information and further distributed through the network as a medium, as shown in Figure 3. Third, we have computers, which receive digital information and convert them back into the sound

and video distributed through the screens and headphones of each performer. Finally, the sound and video are further mixed by a master mixer and distributed once again over the network to be received by the audience through their individual screens and headphones.

Other mediums in this ecology, which may be seen as new in relation to the orchestra performance tradition, are some of the objects (for instance pen and paper) used as instruments, the big clock-digital conductor and the box notated score. However, in a contemporary art music orchestra context, these mediums or similar are more or less frequently found in the compositions of contemporary composers. Still, the embodied characteristics of these mediums all together affect how the artistic frame for a composition process is defined.

Reflections on working within the Embracing Distance performance ecology

The telematic performance ecology challenges the way we think about the tradition of music performance. The shared physical space, which is a fundament in a traditional performance, is in this context replaced by several individual and digitally mediated spaces. First, as often discussed by scholars within the telematic field, the latency of sound due to the digital mediation and distribution over the network must be considered as a condition in the environment. Compared to the traditional concert hall, latency may commonly be seen as an amputation in the telematic environment, largely because the possibility of performing together completely in sync is lost. This then makes it very hard, due to the delayed sound, to perform music to a common beat, which is how the majority of all western music in various genres is performed today. The western metric system and how we think about time and rhythm in western music, from classical music, folk

¹⁴ Video link for *Latency Music* by Anders Lind <https://youtu.be/QTnGb2kH4Ao> accessed 27 Jan. 2022.

2

26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47

Clock

B. Fl. AU

0:40 $\text{♩}=55$ Rubato feeling repeat box until you stop at 0:68
pp close to microphone

Cl. EU

0:37 $\text{♩}=65$ [Clarinete in Bb] Rubato feeling repeat box 2x and go directly to next box without stop
pp close to microphone

Tbn. US

0:27 [Computer keyboard] Tap firmly on computer keys - as if writing a message
 Play as approximate notation or similar
f close to microphone

Perc. AU

0:26 [Kalimba] Play as approximate notation or similar
p very close to microphone

Perc. EU

Pno. US

The image shows a musical score for a piece titled 'Embracing Distance'. At the top, a 'Clock' line is marked with measures 26 through 47. Below this, six staves are shown for different instruments: B. Fl. AU, Cl. EU, Tbn. US, Perc. AU, Perc. EU, and Pno. US. The B. Fl. AU staff has a box notation starting at 0:40 with a tempo of 55 bpm, 'Rubato feeling', and a instruction to 'repeat box until you stop at 0:68'. The Cl. EU staff has a box notation starting at 0:37 with a tempo of 65 bpm, '[Clarinete in Bb]', 'Rubato feeling', and a instruction to 'repeat box 2x and go directly to next box without stop'. The Perc. AU staff has a box notation starting at 0:27 for '[Computer keyboard]' with the instruction 'Tap firmly on computer keys - as if writing a message' and 'Play as approximate notation or similar'. The Perc. EU staff has a box notation starting at 0:26 for '[Kalimba]' with the instruction 'Play as approximate notation or similar'. The Pno. US staff has a box notation starting at 0:26 for '[Kalimba]' with the instruction 'Play as approximate notation or similar'. The Perc. AU staff also has a box notation starting at 0:26 for '[Kalimba]' with the instruction 'Play as approximate notation or similar'. The Perc. EU staff has a box notation starting at 0:26 for '[Kalimba]' with the instruction 'Play as approximate notation or similar'. The Pno. US staff has a box notation starting at 0:26 for '[Kalimba]' with the instruction 'Play as approximate notation or similar'.

Figure 4: Example of box-notation and approximate notation in Embracing Distance

music, jazz to popular music and electronic genres are built on the idea that music is organised in relation to a common pulse. Even when a very small delay in sound is added to one sound source, it becomes very hard to perform even simple rhythms together if they are supposed to be linked by a common beat. Yet, if we take a latency accepting approach, we may see the limitation as an extension of the ecology in relation to the traditional concert hall. If we think of the delay in sound as a condition in the environment, this may foster creative exploration of the parameter of time in a music composition process. Embracing Distance is composed by having the latency of sound as a frame attached to the time parameter for the composition. The six musicians in the ensemble are treated as individual layers and performing their individual patterns more as an ensemble of solo performers than an ensemble as a group. The musical material is box-notated material and approximate-notated material, which both are notation techniques commonly found within the contemporary

art music tradition. The performers are instructed to perform their boxes in different tempos and the approximate material is to be performed in relation to a master clock (see Figure 4). The musicians performing the notated music material in connection to a master clock, which is distributed over the network and shows the same time at each location. The sounds of the performers are organised together in time with an added latency factor, which will contribute to affect the artistic output. On a macro level, Embracing Distance is strictly organised as a fixed musical form. However, on a micro level and due to the latency factor, the start and endpoints of each individual instrument pattern will be fluently organised in relation to each other. Working with the Embracing Distance composition made it clear that this ecology is very suitable for creating various musical textures in various densities and more specifically poly-tempic music structures which overlap and intersect with each other during a performance.

Another key characteristic of this telem-

atic medium embraced by this composition was the digital mediation of sound, which may be related to characteristics found in a studio recording environment. Having the performers' sounds picked up by microphones and being in separate spaces allowed me to work with additional approaches to modulate the dynamics in relation to a traditional orchestra performance medium. For instance, the possibility of amplifying sounds with very low dynamics and having them work side by side with high dynamic sounds. Moreover, the different spaces of the telematic medium offered an approach to add different natural space acoustics to each of the separated performers' individual sounds. Further, to have control to be able to mix the completely separated sound sources into a single combined ensemble mix, to be further distributed to an audience. Indeed, these approaches to working with dynamics are not new in the tradition found within both the music recording practice and the live music practice. Still, compared to an orchestra performance medium, they may be seen as an extension of the telematic medium. At least when it comes to the ability to separate instrument sounds performed with various dynamics and make them

work together with other sounds without having them interfere, which they would have done had they shared the same acoustic space. In *Embracing Distance*, there are many examples of where sounds with very low dynamics were combined with sounds with loud dynamics.

Compared to a traditional orchestra performance medium, the main amputation in this telematic medium is certainly that the ability to perform multipart music in sync with a common pulse is lost. On the other hand, if this is treated as a condition and a parameter in the composition process, one could argue that this aspect may be seen as an extension of the medium. In other words, the limitations in the medium may foster a composer to explore new perspectives of time in a music performance other than those present in the traditional pulse-based perspective, which is found in the majority of western music traditions. Indeed, working with approximate time concepts which are not in relation to a common pulse is not new in the field of contemporary art music. However, one may argue that the telematic performance medium is better suited for use while exploring these time concepts than a traditional performance medium.

Reference Points for some artistic ideas shown in video documentation of *Embracing Distance*: <https://youtu.be/rOhMFagkxAE>

1:53-2:15: Polytempic and poly-tonal textures between flute, clarinet and Kalimba in combination with music textures performed on computer keyboards. Also see the notation in Fig. 9. 3:37-4:25: Piano and trombone play a unison melody since they are located in the same space, the rest of the ensemble is performing with pen and paper, whose low dynamic sounds are amplified to balance with the trombone and piano. 5:10-5:35: Polytempic and poly-tonal textures between flute, clarinet, kalimba, piano and trombone, in combination with an approximate rhythm performed on a computer keyboard.

CONCLUSIONS

In this text, I have presented an orchestra music performance environment from a media ecology perspective. By looking at two examples of performances relevant to my ongoing artistic research practice, I have

highlighted the importance of being aware of a new medium's ability to affect a creative process. When a new medium is put into an ecology it may completely change its conditions, which demands a process of re-thinking the ecology. In *Put Your Hands Together*, the new content of the perform-

er medium demanded new content of the instrument, score and conductor mediums to enable musical interaction. In Embracing Distance, the new content of the space medium demanded a composition approach to embrace this new space content to enable meaningful interaction. From an artistic perspective, the frame to work within in a creative process will depend strongly on the embodied characteristics of the new medium/s used in the ecology. More specifically, the embodied characteristics, in this specific setting the available musical parameters, and the embodied tradition, in which we have learned that the medium is traditionally situated within. In this text, I have argued that concepts like extensions and amputations shown in a new medium, as formulated by the media ecologist McLuhan, may help to define the frame to work within in a creative process. Still, how the extensions and amputations are understood in a new medium are very dependent on which medium/s it is compared to and who is making the comparison. Generally, I argue that any medium can be used in a creative process and still contribute to the creating of meaningful artistic output. In this specific orchestra ecology, this means any medium in terms of music instrument, music performer, music score, orchestra conductor, and/or the space in which the performance is situated within. In any event, if a new medium is involved the chief

focus should be to work with the specific embodied characteristics the new medium offers. As a consequence, if the new medium is far away from the tradition, the generated artistic output will be far away from the tradition. Namely, in a music context, the new medium will always affect how the artistic expression will sound like. A violin can never sound like a piano and a piano can never sound like a violin, in the same way as a handclapping orchestra can never sound like a string orchestra, and a string orchestra can never sound like a handclapping orchestra. Indeed, a handclapping orchestra does not possess the same ability to variate music material like a string orchestra. However, the limitations on creating variations in music material will force a composer to work within that limited frame in the artistic process. Working with limitations is one of the core aspects from a composer's perspective. The limitations in a medium will define the creative process, formulate an artistic frame to work within, and finally be an important parameter concerning how the artistic expression will be generated. Embracing the limitations in a new medium as a creative force, rather than a limiting aspect of an ecology, will make way for creative explorations and may further open up new perspectives on how we define music and music performance practice today, and in the future to come.

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