

KONSTFACK - University of Arts, Crafts and Design

Bachelor examination

Interior architecture and furniture design. vt 2022



The Warping Voices

Embedded human emotions in the
digital-fabricated form

Yuqing Tang

Project tutor: Einar Rodhe

Report tutor: Christian Björk

Examinator: Einar Rodhe

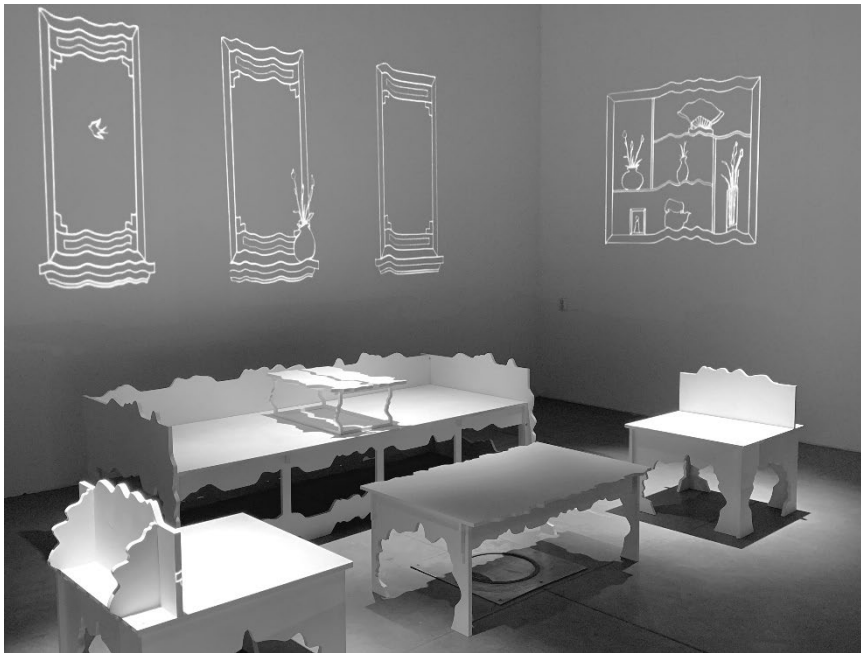
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ABSTRACT

My degree project aims to create a set of furniture and space which all “warped” by the voices of my beloved family member.

I investigated how to record and translate the voices and materialize them into furniture. I processed the emotion of missing my family by materializing their voices through my “voice embedding methods.” Which I translate voices into form.

My “warped” space aims to reflect the power of human emotions. The voice curves that I extract from the “voice warping method” are rich in information and emotions. I want this “warping complexity” to question the ideology of the clean and empty “ideal space,” which is the tendency in today’s interior architecture and furniture design.



THANKS TO

My mom and grandma. Two most extraordinary women I have ever known. Your voices, wishes, and supports are my greatest motivations.

All my teachers and tutors: Einar, Christian, Inger, and Gunnar.

And to my favorite musical buddies that I met this year, The Cosmic jam: Yang, Dejan, and Sari. Your amazing people expanded my horizon to a new level. You inspired me to be loud, take more space, and have the audacity. Love you guys!

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INTRODUCTION

Aims and goals

My degree project aims to create a set of furniture that is “warped” by the voice of my beloved grandma.

I want to process my missing family by materializing their voices through my “voice embedding methods.” Which I translate voices into form.

I want the “voice warped” furniture to reflect human emotions’ power. I want this “warping complexity” to question the ideology of the clean and empty “ideal space,” which is the tendency in today’s interior architecture and furniture design.

Framing of questions

How to translate and materialize human voices into spatial forms?
What form can accurately and aesthetically perform the transition?
What kind of space results from the “voice warping” process?

Background

During three years of design education, I opened my eyes to the world of interior architecture and furniture design. I've seen different works created by other designers. I see a tendency in today's design world to always be after the clean and simple "ideal spaces." The "erase the complexity" action can be seen everywhere in the design world, from the flawless interior magazine shot to the trend of photo-realistic rendering of the "perfect space." We long for the aesthetic of the "ideal" and “clean” but ignore and even despise the "real" and "complex."

I think the "ideal" aesthetic echoes the ideology of the western modernism movement. The ideas that developed during modernism were the "utopian" and the belief in the "universal solution." The task for the modernistic designer is to make the "ultimate form" that suits all kinds of people. Even though the later post-modernistic

movement has questioned modernism ideology, in my observation, the whole western mainstream design world is still under its impact.

I want to form and develop my own design ideology in my degree project. I want to go against the western "ideal form" tendency and pitch the "inclusion of human complexity" to the design world.

For me, there is no "universal solution." There is no single voice that should dominate the design world. I want the designer to be able to hear and be inspired by the voices of all different people worldwide. I want the form that we designers create can include messy but beautiful human complexity.

Method

My method is embedding human voices into forms with three phases of action and, in the end, showing the results in an exhibition.

Phase one: Record

I collected different voices from different people to investigate the aspects of human voices. The final sound source that I chose to use is a voice message from my grandma.

Phase two: Translate

The translation is to "visualize" and "materialize" the invisible voices. I want to visualize the voice with my interpretation and the help of a digital program to translate the voices into graphic materials. Then I use the visual material to transform a set of basic furniture shapes to create a fluid new form.

Phase three: Digital fabrication

The result from phase two will be the blueprint for the manufacturing process, and I choose the CNC milling technique. The "cutting out silhouette" method with CNC milling can preserve the most information from the phase two translating process. It can manufacture forms that are most near my interpretation of the emotional power in the voice.

The exhibition

The "warping voices" were exhibited during the Konstfack spring exhibition 2022 as a set of furniture and a spatial installation. The exhibition room was a living room with a traditional Chinese furniture set that "warped" with my "voice warping" method.

Together with an audiovisual installation projected on the wall and being “warped” by the voices in the exhibition room.

DESIGN PROCESSES

Background

In the beginning stage of my degree project, I searched for a suitable element that is a "human emotion carrier" and can represent "human complexity." I tried hand movement, grabbing forces, body language, etc. These aspects carry human complexities, but they are not resonating with me.

"When are you coming back?" Asked grandma in a voice message on Chinese New Year 2022. I didn't visit her for more than two years since the pandemic. "I don't know," I said back. All I know is that her voice hit me right in my heart. I feel emotional. I feel homesick. It is incredible how much emotional value human voices can carry. The force of voice can easily "break" the most rigid shapes.

The "voices" perfectly represent the "human complexity." Thus the "voices" naturally become my selection of the representation of "human complexity" that I will work with during my degree project.

Design references

Lap-see Lam

Artist Lap-see lam, who 3D scanned Chinese restaurants in Sweden, gave me major inspiration. She recorded and stored the spaces as digital "phantoms" as a memoir of the closing of Chinese restaurants. Her scanned "phantoms" are raw, bizarre, and unique. It is because the artist is loyal to the technique's flaws and the process of capturing and translating. In this way, her "Phantoms" all have a layer of "complexity" from the technology and are a perfect representation of blurry memories of the Chinese restaurants.

Her way of showing her work with multiple projectors also inspired me. I thought: "it will be nice if I can interact with this work during her exhibition." That's why I begin to explore the audiovisual interaction in my project.

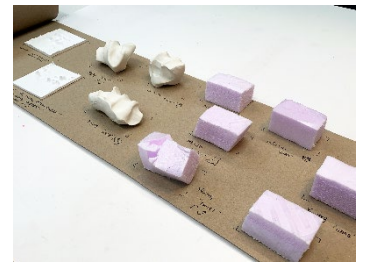


Figure 1 Early sketch in searching for a "human emotion carrier"



Figure 2 Video message from my Chinese family

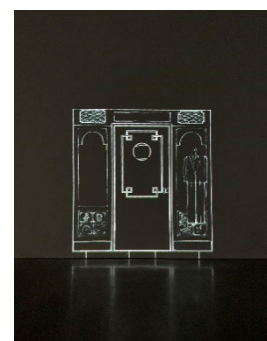


Figure 3,4 Lap-see Lam, 'Dreamers' Quay, Dreamer's Key', (2022)

Learning from fellow artists, I want my design to include a layer of "complexity" representing human emotions and showing human voices' complexity with an audio-interactive program.

Gyonyoung Yoon

Gyonyoung Yoon is a graduated student from Konstfack. Her work "Filling in Physical Reality, Living in Digital Reality" inspired my project tremendously. In her Master's degree project, she created a colorful and joyous digital room as another "layer" above her clean and empty bedroom. She made the digital space to express her emotion of missing home and family, exactly like my intention in my project.



Figure 5,6 Gyonyoung Yoon, 'Filling in Physical Reality, Living in Digital Reality', (2020)

The Night Revels of Han Xizai

The space containing my warped furniture should also be fluid. It should be full of life and sound, and human intimacy. Thus, I choose to create a living room full of love and life.

With the living room as a starting point, I remembered an ancient Chinese painting from the Tang dynasty: The Night Revels of Han Xizai (Gu Hongzhong 10th-century), illustrating a minister's night party. I was greatly inspired by the furniture and the room atmosphere in the painting. The big "bed sofa" is called the "Luohan" bed, which sits on the top with guests and has tea and snacks on the small table. "Luohan" bed can also use as a bed for daytime napping. This furniture is the main character in a traditional Chinese living room and thus will be the main character in my project. The atmosphere in the painting is vibrant. The viewer can almost hear the music and singing voices from looking at the painting. Everyone seems so relaxed. I want my living room to be a place where people can feel free to do whatever they want and feel comfortable and chill. Chinese hosts always say to guests: Don't see yourself as guests. Make yourself at home.



Figure 7 Gu Hongzhong, The Night Revels of Han Xizai (10th century)



Figure 8 Zuoyou sofa (2021)

Christina Kubisch, Silence exercises

The work from Christina Kubisch, Silence exercises (2011), is a work in which the artist records the word "silence" in different languages and spoken by other people worldwide. Then the artist visualized the sound and cast the image into a building. I found the work during my



Figure 9 Christina Kubisch, Silence exercises (2011)

exploration of visualizing voices. It is interesting to see another artist who does similar work as my project.

Sketches

To see how human voices can transform into form, I did a series of sketches at the beginning of the project, such as carving on a clay surface and making an object collage. I made all the sketches while I listened to my grandma's voice.

After this sketch exercise, I analyzed my action. I did a "translation" process in which I translated the voices into my hand movement or the arrangement of objects. The "translation" is essential in my project, which will determine the result of the furniture form. So what is the exact translation process for my project?

I sketched further and created a wide range of objects with different methods: 3D printed "voice" relief with frequency spectrogram as height map; 3D printed form warped in two directions, and laser-cut form warped in one direction.

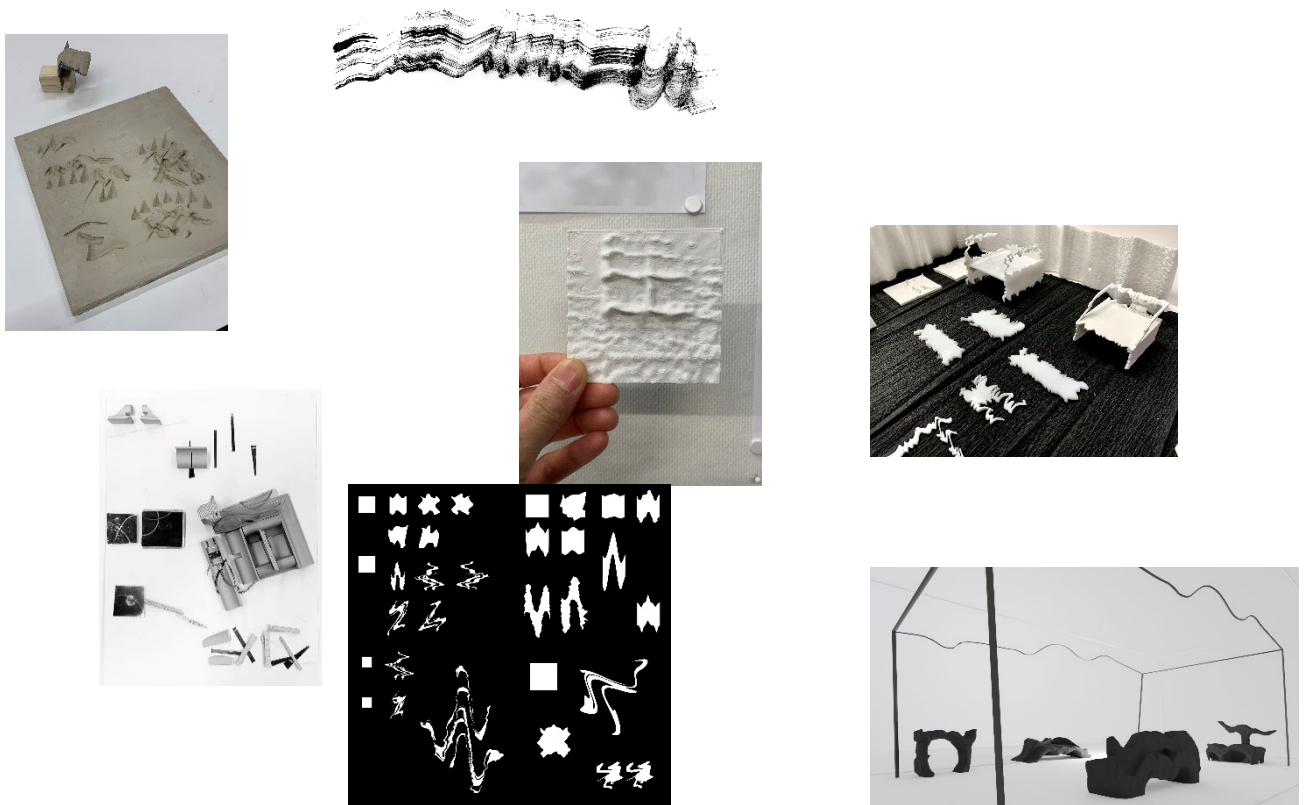


Figure 10-16 Early sketches.

Translation process

Sensory change

The way we perceive furniture is often by looking and touching. Therefore, making the voice into furniture transforms the perceiving senses from hearing to seeing and feeling. In other words, I need to let the voice go through a visualization and materialization process to be perceived the same way we perceive furniture.

The visualization process extracts a visual factor in the voice message, and the materialization process uses this factor to transform a furniture shape.

Most people can't translate the visual and sensory senses into sound; that's why my project does not need to do the reversing translation to identify the voice from the form. People who use my furniture don't necessarily need to know the exact voice and words embedded in this furniture. But by understanding the background story of this furniture, the viewer will understand the uniqueness and the emotional complexity.

Visualization of the voice

Visuals are about shapes and colors, and voices for us humans don't have shapes and colors. It is a vibration that we humans cannot perceive by our eyes. I need to translate the vibration into shapes and colors that can properly represent my grandma's voice message.

I developed a translation method using digital tools and my aesthetical judgment in my project.

Using the digital tool Sonic visualizer (2010), I experimented with translating the sound into different maps: waveform, frequency spectrum, and frequency spectrogram. They all represent a different aspect of the voice.

Waveform represents the volume of the voice throughout time, but it can't describe the sensitive changes in the language.

The frequency spectrum shows the voice frequency at a time, and it changes every second when people are speaking. Even though it represents the unique identity of one person's voice, it lacks the aspect of the time and the continuous nature of language.

The frequency spectrogram is a diagram that draws the highest point of the frequency spectrum into a timeline. It is my final choice for

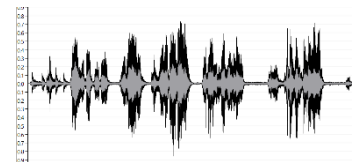


Figure 17 My grandma's voice message in: Waveform

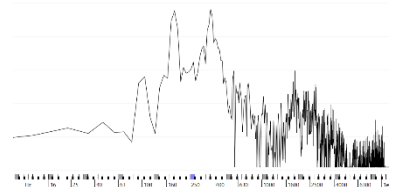


Figure 18 My grandma's voice message in: Frequency spectrum at a certain time

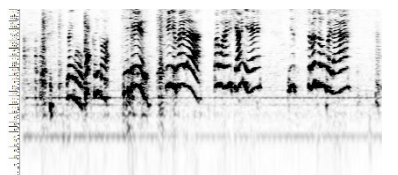


Figure 19 My grandma's voice message in: Frequency spectrogram

visualizing the voices because it represents small changes in each word and the time aspect that includes the information in the message.

Frequency spectrogram to furniture

Materialization is to use the frequency spectrogram as a reference to transform forms.

Why use the frequency spectrogram as only a reference? Because directly using it as the input for the furniture “warping” process does not match my feeling about the voice. Even though the map shows all the complexities in the voices, it is not what I subjectively perceived and interpreted the voices.

Differ from a scientific and logical translation of the sound, which sees the sound merely as the vibration of the medium; I'm working more emotionally and aesthetically. I am not a machine, I am a human, and my human interpretation of the voices is more like a “force” equal to the bending force from our hands that pushes and influences the physical forms.

Force to me is a vector, is a direction. The forces that abstract from the voices is a set of vectors that transform a basic form.

I flattened and abstracted the frequency spectrogram and re-draw it into a single curve, representing the "force vector" that each word and sound in the voice message carries. It is a process of “extraction” that extracts out the points that I think to represent the "force." Human complexity doesn't always result in complex forms. As long as there is emotional value in the form, it includes human complexity.

The fundamental forms that I want to warp with the voices are made by primary geometrics—straight lines, squares, circles, etc. The shapes have been praised for their simplicity and “nothingness”. I want to embed the voices into those shapes.

I used rectangles and circles as fundamental forms to create a set of furniture. The furniture is inspired by The Night Revels of Han Xizai (Gu Hongzhong 10th century)

I then changed parts of straight lines or circles into the "force vector curve" to create the shape resulting from the "voices warping."

Since I know all the words and tones behind every "force vector," I carefully cut and paste the words to every line so that every part of "warping" is a word or a sentence that makes sense. I try to recreate



Figure 20 The Voice curve and the translation of the message.

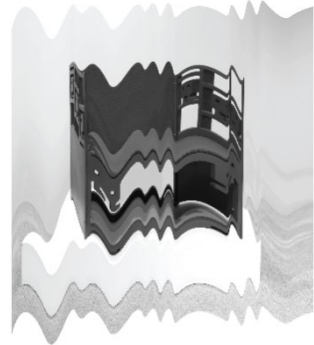
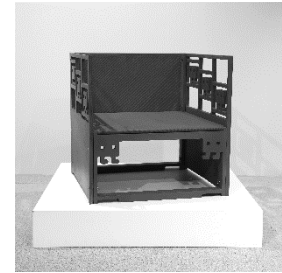


Figure 21 The “Voice warping” principle, using the “Voice curve” to transform the object into a more fluid new shape.

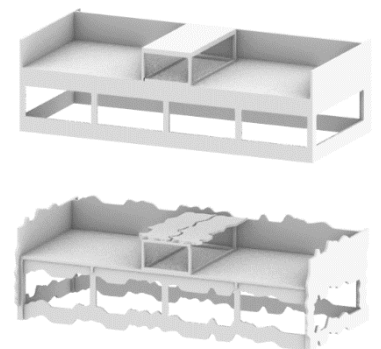


Figure 22 Warp a “Luohan” bed using the “Voice warping” principle.

an illusion of physical "force" by warping the most shape in the same direction.

Digital fabrication

Since the "force vector curve" is digitally processed and extracted, the choice of manufacturing the furniture with a digital fabrication method comes naturally. The most direct translation between a digital curve and a physical 3d form is through digital fabrication. Making the two-dimensionally warped furniture parts is like cutting the shape out of a paper. I made several test models with laser cutting, and the method works well. The manufacturing method like the laser cutting but on a grander scale is CNC milling, so it became natural to use a CNC milling machine to cut out "voice warped" furniture parts from the MDF board. The material is not a focal point in my project. The most important is the form and the embedded "voice curve."

The "voice warped room"

My expectation of the result will be a set of pieces of furniture together to create a space that resembles a living room. The room will include one Luohan bed, two chairs, one table, and one screen that is the rest material from the CNC milling process.

For me, the living room should be a place of joy and togetherness, and very personal I'd like it to be a place for a music jam. I used the "voice warping" method and made a stand for my Guzheng, a traditional Chinese instrument, and placed it in the living room space.

Audiovisual experimentation

I want to use a fun way to demonstrate how the voice can transfer into form. So, I investigated the interactive audiovisual design. I created a program that draws out a "voice curve" and warps an image of drawings that resemble a room in real-time. The audiovisual program enhances the "space" aspect of my living room. It represents the space that is also "voice warped."

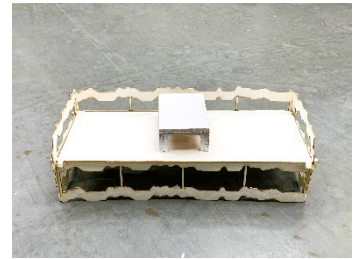


Figure 23 Laser-cut paper model



Figure 24 CNC milling

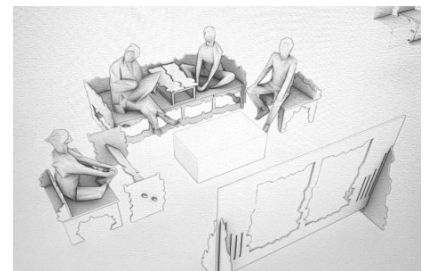


Figure 25 3D model of the "voice warped room"

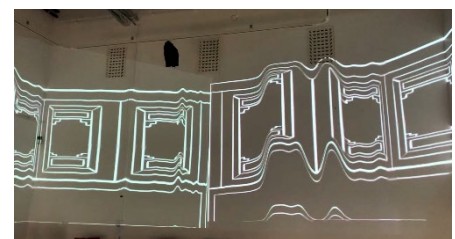


Figure 26 Audiovisual program in development



Figure 27 Node network inside the audiovisual installation, programmed in software Touchdesigner.



Figure 28 Konstfack spring exhibition 2022

DESIGN PROPOSAL

The end proposal of “The Warping Space” is a set of furniture that is "warped" with my grandma's voice. Together with the audiovisual installation builds up a “Warping space.”

Exhibition

“The warping voice” was exhibited during the Konstfack spring exhibition 2022. It was a week’s exhibition with a musical jam performance on the first day.

I placed the furniture like what I pictured as a typical Chinese living room: A Luohan bed in the middle and two chairs on the sides. This placement assures that everyone can easily talk to each other wherever they sit. I pointed to three spotlights on three sitting furniture. I didn’t feel the need to highlight the table. Later, my classmate Molly pointed out that this is an action to highlight the social areas, places where people are. I decided to mark out the essential element in my project: people.

Performance

My idea of doing a music performance in my “warped space” was inspired by the painting of Gu Hongzhong. The form that I created with the “voice warping” method is not suitable to be in a room of silence and stillness. I want the instrument and human voice to take over the space and reach the same “volume” as the furniture. The audiovisual installation on the wall will “dance” with the sound in the room. When every element gets into the same “frequency,” which means the same intensity as the human voice, furniture form an audiovisual installation, they might create an effect of “resonating.” Viewers might feel that there are invisible ripples in the room, and the “space” itself is warping.

The living room

I stayed in the room during the exhibition and introduced my work to the visitors. I found out that most people didn’t realize the background reacted to the sound, so I always began my demonstration with a shout or clapping my hands. After explaining that the forms were from my grandma’s voice, the visitors understood my work. I think my project has a concept that is easy to understand. Many of them are moved by this concept because it might remind them of their own family.

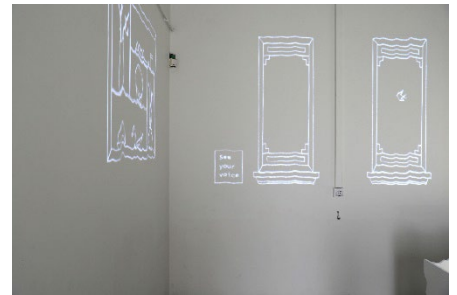


Figure 29 Audiovisual installation

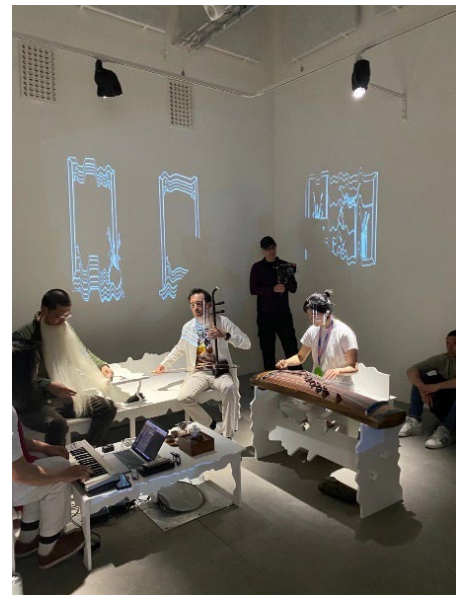


Figure 30,31 Live music jam performance during Konstfack spring exhibition 2022

SUMMARY AND REFLECTION

Complexity and simplicity

I had a reflection after the exhibition about the “complexity” of my project. Where exactly is the “complexity”? What does it mean if the complexity doesn’t show in the form?

One of my aims is that the designed space should reflect the complexity of humans and that people using your furniture should understand” the emotional complexity behind it.” But according to my tutor’s feedback and the responses from the visitors from the spring exhibition, not everyone understands the emotional complexity of my furniture at first glance. They knew the meaning behind the curves only when they heard about the background story.

My furniture alone can’t contain enough emotional complexity, and they failed to communicate the concept. But do I want the furniture to be a tool for storytelling?

The reflection at the end of this project is: I don’t think my aim of furniture design in my degree project is a way of communication with other people. I aim to process human emotions and generate a method that others can use and process other ones’ feelings and emotions. In my project, it is not a matter that the chairs are comfortable to sit on, if they are simple or complicated, or if they can understand or be readable by the viewers. The matter is the process of making them, the “voice warping” method.

In other words, my focus is not on designing a set of furniture but rather on “designing a method of designing” a set of furniture.

I received a comment during the examination that I’m a process-based designer. I think this comment revealed the true nature of this project. It is mainly about the process, less about the result.

Further research

“The Warping Voice” will be further developed during my Master’s degree in Konstfack. Maybe not as a furniture project, but as a research project about the acoustic/ voice / visual in relation to the spatiality. During this project, I used the word “volume” to describe

the intensity of the curvature of the form. I feel like the forms are “screaming” if they have intensive curves and “whispering” if they have soft and calm curves. For me, the forms and spatiality connect tightly with sound/ voice. The endless possibility of the sound/voice is an ocean of inspiration for more unexpected forms and spaces. I will work more on building bridges between these worlds and develop more methods similar to “The Warping Voices.”

LITERATURE AND REFERENCE LIST

Chris Cannam, Christian Landone, and Mark Sandler, *Sonic Visualiser: An Open Source Application for Viewing, Analysing, and Annotating Music Audio Files*, in Proceedings of the ACM Multimedia 2010 International Conference. [2022-02-14]

PICTURE LIST

Figure 1-4, 10-16, 20- 31: Yuqing Tang 2022

Figure 3,4: Lap-see Lam, 'Dreamers' Quay, Dreamer's Key', 2022, installation view, Bonniers Konsthall, Stockholm. Picture by Yuqing Tang.

Figure 5,6: Gyonyoung Yoon, 'Filling in Physical Reality, Living in Digital Reality', (2020) <https://konstfack2020.se/master/gyonyoung-yoon/> [5/24/2022]

Figure 7: Gu Hongzhong, *The Night Revels of Han Xizai*, By After Gu Hongzhong-
<http://depts.washington.edu/chinaciv/painting/4literat.htm#hanxizai>,
Zhongguo lidai huihua: Gugong bowuyuan canghua ji, vol. 1 (Beijing: Renmin meishu chubanshe, 1978), p. 89., Public Domain,
<https://commons.wikimedia.org/w/index.php?curid=3653507> [2022-04-13]

Figure 8: Zuoyou sofa, *Qiankun Luohan bed*

<https://www.zuoyou-sofa.com/portfolio/c6399/> [2022-04-13]

Figure 9: Christina Kubisch, Silence exercises (2011) *Silent Exercises - video installation at Donaueschingen Festival 2011 - short documentation video*

<https://vimeo.com/54846164> [2022-04-13]