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# SPEAKING BEYOND WORDS

*Instrument Design for  
Integrating Music Novices  
into Social Jam Sessions*



Master Thesis - Integrated Product Design  
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“

*It's nice how simple music can be.  
If I play something very simple and  
ten others play something very  
simple, it gets very cool and very  
complicated.*

”

# PREFACE

My initiation to jam sessions took place when I was sixteen years old. It turned out to be a critical turning point for my musical life; after nine years of classical violin classes, I was beginning to lose interest in playing music, and the influence of my parents' expectations to this effect was diminishing. My interests were shifting, I signed out of violin lessons and only played it once in a while as a way to show off. It was on one such occasion that a friend heard me play and suggested we "jam" together. It is then that I discovered this fascinating activity of cocreating music live.

To my friends and me, at that time, jam sessions meant making noise. Underground, in the school's music studios, we cranked up the amps and played our hearts and eardrums out.

We formed a band, wrote songs, and had concerts. Jam sessions meant potential. They might be the birthplace of the next big hit song. We gathered twice a week in a dimly lit studio full of Persian tapestries, playing for hours. We preferred improvisation, musical sparring, to practicing and refining old songs.

These band gatherings did not go down in complete harmony. Andy hogged the spotlight, facing his own amp as he soloed at lengths on his guitar. Our singer Anna's repetitive lyrics and melodies was a source of reproach. Toby's appearances became rare—it had been some work to convince him to join the band in the first place. Jam sessions also meant drama. They confronted us with social challenges, prompting us to seek solutions to our disagreements.

The band soon disintegrated, each of us going separate ways to study or start our careers. In absence of the noise, the potential, and the social challenges linked with co-inventing music, I longed to jam again. The public jam sessions I found in bars were often hostile places where the audience consisted of guitarists eager to replace the musicians on stage and show off their skills.

It is only years later that I began frequenting jam sessions again; invited by a friend, I learned of "Resonance", a small association in Zurich where jam sessions were just a natural component of a weekly social gathering. Here, playing music was placed on the same level as conversing around a beer or playing a round of table football.

People who frequented these gatherings were there to enjoy the atmosphere and connect with others. The stage often served more as a space for experimentation than for performance.

Many members of this association hosted jams of their own, in the intimate setting of their living rooms or in the casual setting of a park. These venues have become my safe

space. I have a deep conviction that these social jam sessions promote harmony and mutual respect. Gently moderated by the nature of the musical output, of which the appeal lives off variety, dynamism, playfulness, and an interplay of dominance and reservedness, they are a place where boisterous, inattentive individuals may learn to listen, and where restrained introverts may gain a voice.



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# 0 - SUMMARY

*In this graduation project in integrated product design, a musical instrument was designed to complement standard inventory of instruments at a social jam session, such that music novices can more easily learn to play music within this environment.*

“Jam sessions” being a vague term, “social jam sessions” were defined for the purposes of this project as the social activity of playing unrehearsed or improvised music in an informal setting, accommodating musicians of varying levels and not focused on performance.

Preliminary research supports the theory that this activity **benefits mental wellbeing and social development**. As such, it has potential as vessel to combat sinking happiness and growing loneliness in young adults in the Netherlands (Ministerie van Volksgezondheid, Welzijn en Sport, 2023), especially considering the widespread interest in music.

Prior experience with such events had made apparent that **beginners in music, or “music novices”, rarely frequent social jam sessions** or return after single-time participation. A poll with young adults from the TU Delft, shown in Fig. 1, indicated

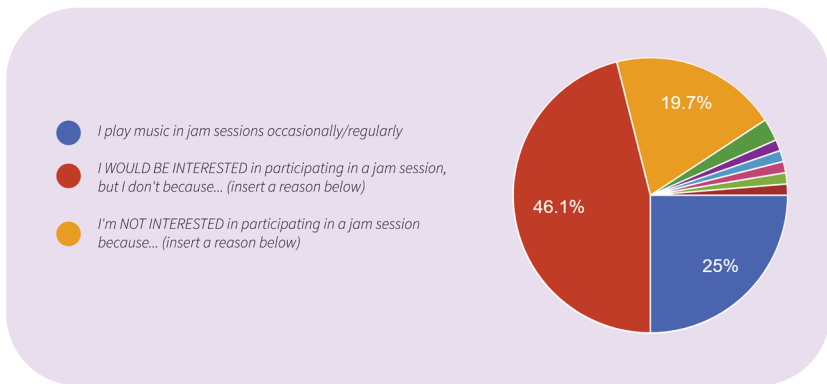


FIG. 1 A QUESTIONNAIRE (N=76) HELD WITH YOUNG ADULTS AT TU DELFT INDICATES A HIGH RELEVANCE OF THE PROJECT TOPIC

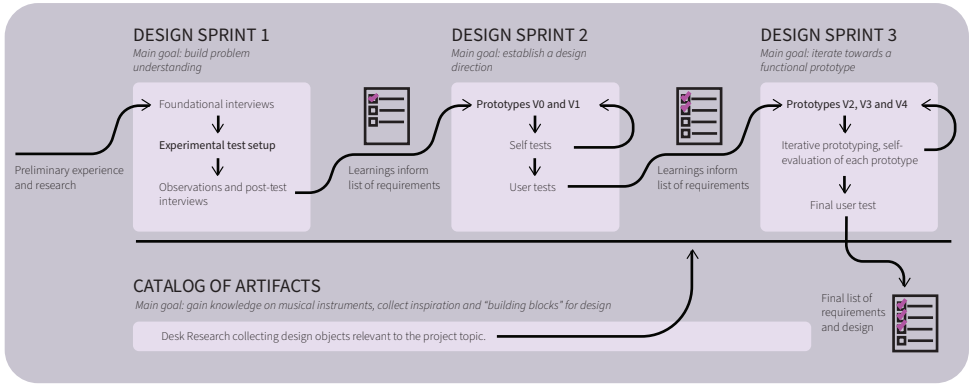


FIG. 2 DESIGN PROCESS

significant interest in joining this activity, paired with reasons for not doing so. With most such reasons revolving around musical instruments, **instrument design was chosen as a design space for the project.**

**A user-centered approach was chosen with an iterative, research through design approach**, consisting of consecutive design cycles of prototype production based on the collected knowledge, user tests of the prototypes, and evaluation and interpretation of the tests, leading to an increased level of knowledge, as shown in . This knowledge was used to update a list of requirements to the design, informing the next design cycle.

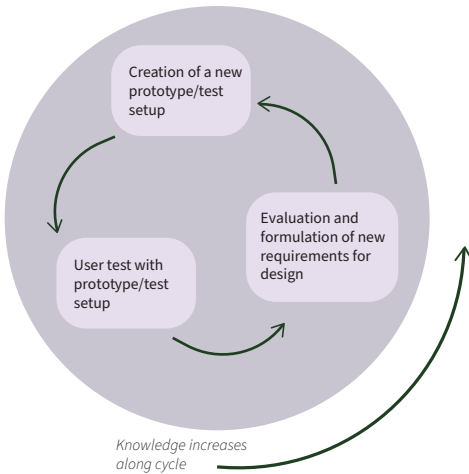


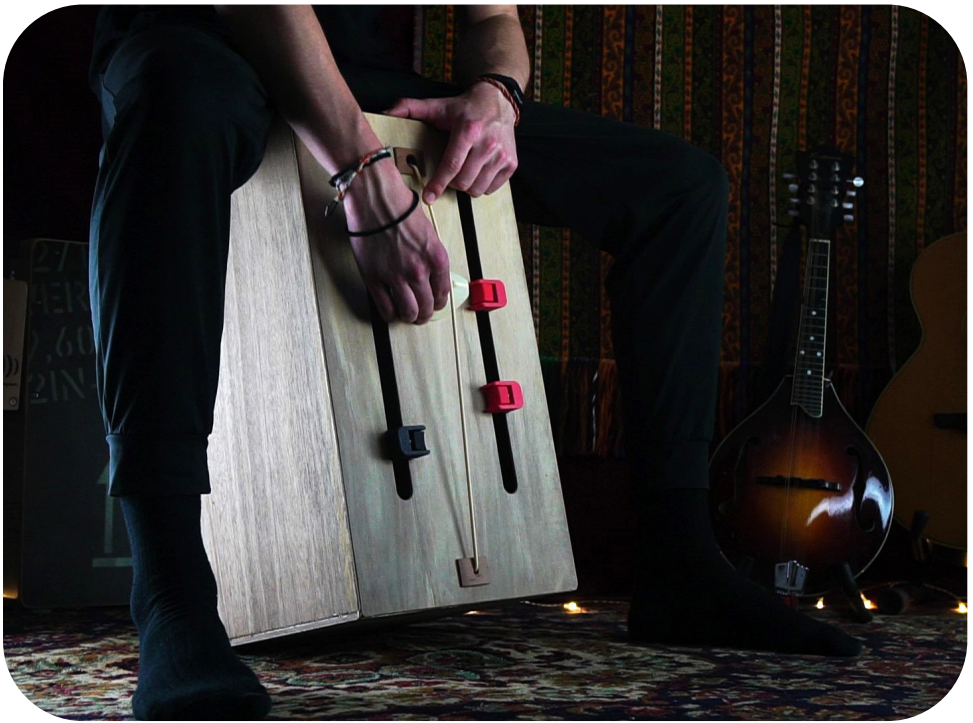
FIG. 3 THIS CYCLE IS THE BASIC BUILDING BLOCK FOR THE ITERATIVE, USER-CENTERED DESIGN APPROACH APPLIED IN THIS PROJECT

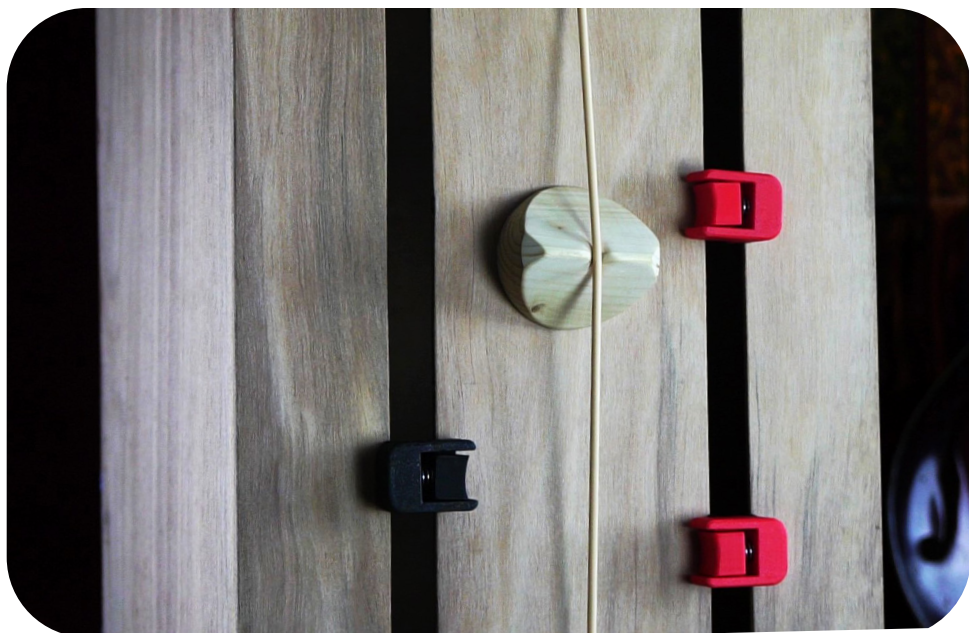
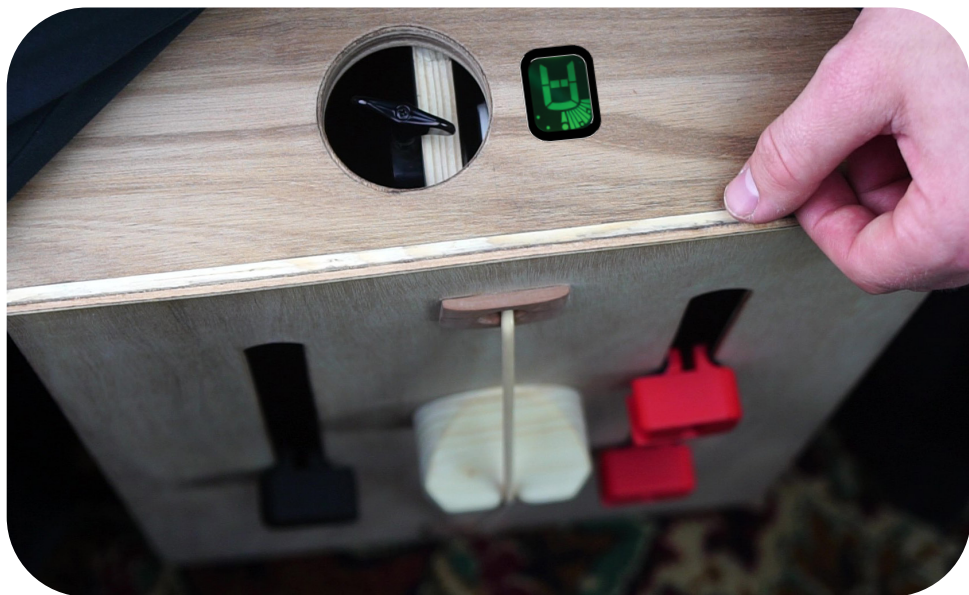
With these iterative design cycles as building blocks, a higher-level segmentation of the project was made in 3 "design sprints". The first aimed at establishing an understanding of the problem, the second aimed at forming a general direction for the design, and the third aimed at developing a functional prototype instrument. Throughout these cycles, one experimental test setup and five prototype instruments were produced. In parallel, design artifacts were collected in desk research to expand knowledge on jam

session and instrument-related designs, as a source of operating schemes (Simondon, 1958) to inspire the creation of a new instrument.

The final design is a one-string acoustic bass instrument with a moveable bridge, called the “Bass Box”. Its size and playing position is the same as in a cajón, a widespread percussive instrument at social jam sessions. The pitch of the instrument can be changed dynamically by moving the bridge to create melodies. To give the player orientation, note markers can be clipped into the

elongated sound holes to use as references. This allows music novices to receive guidance from advanced musicians in setting up the instrument, either manually or through oral instructions, with the assistance of an integrated tuner. For music novices, the Bass Box represents the missing step between simple percussive instruments such as the shaker, and complex melodic instruments such as the guitar. The Bass Box provides an entry into harmonic improvisation while simultaneously filling a gap in acoustic jam sessions by providing audible bass notes.





# 1 - INTRODUCTION

## *A Personal Perspective*

*For years, I have been frequenting and organizing “social jam sessions”, defined in the context of this graduation project as informal gatherings in the name of playing music together in an unrehearsed, improvised manner. In contrast to “stage jam sessions”, which emphasize performance, social jam sessions have a primary focus on the communal aspect of music-making and welcome musicians of all skill levels. My peers and I experience social jam sessions as an activity that contributes to wellbeing and social growth. However, music novices do not appear to integrate well.*

Based on my experience attending social jam sessions, I attribute significant positive attributes to this activity, experiencing it as a wellbeing enhancer and observing similar positive effects in others. I appreciate the possibility to express myself musically as well as the challenge and reward of

collaboratively crafting something without the need for words.

**One of the great things about music is that it doesn't need to be complex to be considered beautiful.** The social jam sessions I have frequented have predominantly been mixed level, accommodating amateur musicians with various levels of experience. A product of the musical contributions of whoever participates, much of the appeal of jam is in the creative process of building something beautiful from what each person has to offer in terms of musical skill and experience. Furthermore, the social jam session is a place for learning and evolving, with music enthusiasts sharing tips and trying out each other's instruments. Since I joined my first social jam session with the violin as my sole instrument, I have learned to play multiple other instruments in jam sessions, and I have observed others do the same. Thus, mixed level does not mean that more advanced musicians get bored. Social jam sessions offer a dynamic environment that allows participants to grow socially and musically.





“

*Even as a person without music talent,  
we still have the desire to express our-  
selves through body, voice and music.  
We still want to create something!*

”



My experience joining social jam sessions is that of someone privileged with a good musical basis from years of violin classes and an early initiation to jam sessions. **Many young adults around me have given up playing an instrument in their teens, or never played an instrument at all.** Can these users benefit from jam sessions in the ways described above?

Over the past two years, I have been hosting biweekly social jam sessions at my home in the Netherlands. These gatherings primarily attract students, featuring a mixed-gender demographic that includes both Dutch locals and international participants. As such, these sessions are a melting pot, attracting music enthusiasts who are open to forging new friendships. About 15-20 people are at one jam session on average, two thirds of whom are regulars, meaning that they attend every one to three sessions, while the remaining third consists of sporadic attendees and first-time participants. It is, unsurprisingly, in the group of recurring attendees that similar positive associations with social jam sessions are reported. These participants perceive the jam session as a boost for personal wellbeing as well as a social catalyst, as exemplified by one regular participant's quote: "[Jams are] a nice way to meet people. Especially for introverts!" Furthermore, having followed such participants over the course of multiple social jam sessions, I have observed them sharing musical knowledge, improving skills

in their instrument as well as picking up and learning new instruments in this environment.

However, the recurring attendees rarely include people with very limited experience in music, or "music novices". Most music novices who accept my invitation and actively partake in the music-making mostly do so with shakers, or other small percussive instruments such as the triangle or tambourine. I have rarely seen any of these people move on to play another instrument. As it is rare for music novices to continue frequenting jam sessions, they have less chance at profiting from the benefits jam sessions appear to offer.

Additionally, it is common for my friends to react with enthusiasm and interest when I mention jam sessions, but to switch to apprehension and reluctance when I suggest they join.

**Based on these observations, I deduce that music novices are met with barriers that impede them from learning instruments in social jam sessions, making this activity largely exclusive to more advanced musicians. In this graduation project, I aim to identify what inhibits music novices from joining social jam sessions beyond one-time participation with a shaker, and to address these barriers through instrument design.**

## The Jam Session

*To effectively address and design for “jam sessions”, a conversation about this term is necessary. In this chapter, I show that the current-day use of the word surpasses dictionary definitions. Following this, for the purposes of this report, I make the distinction between “social jam sessions” as social gatherings centered on the activity of playing unrehearsed music together, and “stage jam sessions”, which additionally incorporate the element of performance for an audience.*

In interviews for this project, the term “jam session” was repeatedly associated with the musical style of jazz. The jazz movement, illustrated by Fig. 5, is in fact widely accepted to be the birthplace of the term, with a variety of different plausible origin stories for the name.

In dictionary entries, “jam sessions” or “jams” are defined as **gatherings where musicians come together to play improvised or unrehearsed music**. These definitions often diverge in portraying the activity either as a casual meeting for the enjoyment of the participants or as a formal performance. Jazz as a prevalent music style in jam sessions is commonly cited in these definitions.

However, the term is used more widely nowadays, extending to other disciplines such as dance and theater, and even science and business: For instance, IBM’s “Innovation Jam”, a commercialized event and online platform for the exchange and development of business ideas (Bjelland & Chapman Wood, 2008).

The word “jam” appears to be used in contexts **where multiple actors come together to utilize both their experience and their intuition to innovate and build on each other’s contributions**. Besides expressing this group dynamic, the word is strongly associated with the action of improvising, creating something new, on-the-fly, as can be interpreted from Native Instruments’ choice for the name of their digital music midi controller, the “Maschine Jam”, shown in Fig. 4. While the product is not made for cooperative or multi-person use, its naming brings forth associations with this characteristic of creating on the fly.



FIG. 4 THE MASCHINE JAM, A MIDI CONTROLLER USED AS AN INTERFACE FOR MAKING MUSIC DIGITALLY ON A COMPUTER.

All-in-all, we see that “Jam session” is a loosely defined term that encompasses the following common elements:

- Unrehearsed
- Use of experience and intuition
- Goal of experimentation and expression

In this list, I have omitted the element of performance, or playing for a public other than those actively participating in the jam session. Discussions on this topic are very present in prominent academic historiographical and social analyses of jazz jam sessions, as collected in Ricardo F. Pinheiro’s paper “The Jam Session and Jazz studies”. One of the featured papers by Scott DeVeaux discusses jam sessions in Manhattan in the mid-forties and describes clear tensions in accommodating the audience’s entertainment expectations and embracing the creative, experimental nature of jam sessions (Pinheiro, 2014).

This tension may be the reason for the variations in format seen in amateur jam sessions in the Netherlands. Focusing on musical jam sessions, there is a clear distinction to be made between occurring formats: one category, which I will call **“stage jam sessions”** for the purposes of this report, includes to a substantial degree the aspect of performance, meaning that it involves the presence of spectators who do not necessarily partake in music-making. Stage jam sessions may be found in public spaces, hosted in bars or cultural venues, and generally include some form of



FIG. 5 PIONEERS OF JAZZ MUSIC IN A JAM SESSION IN NEW YORK CITY, 1943

dedicated stage for the musicians. The second category, which I call **“social jam sessions”**, is focused on the social activity of playing improvised music together and is not catered towards performing for others. Social jam sessions are usually less formal events, occurring in private homes, community centers, or in outdoor public spaces. **Social jam sessions are the focus of this project, because they do not exclude beginners by nature;** in absence of a stage, participants are not required to play at any given time, reducing pressure and leaving space for experimentation at one’s own pace. In contrast, musical performance on a stage implies entertaining listeners musically, setting unrealistic standards for someone without extensive musical experience.

## Musical Contribution and the Building Blocks of Music

*Throughout this report, I occasionally use the term “musical contribution”, sometimes qualifying it with adjectives such as a “harmonious” or “satisfying”. In the context of social jam sessions, the use of this term reflects a fundamental functioning principle for collaboratively playing unrehearsed music. In a well-functioning jam session, each participant “contributes musically” by listening to the inputs of other musicians and offering a musical input of their own to enhance the music.*

But what is the content of such a musical input? Educational resources speak of a combination of **musical elements**, building blocks of which the number is not clearly defined. Taking for example “Young Person’s Guide to the Orchestra”, these can include melody, harmony, timbre, dynamics, texture, and form (Britten, 1945).

For the purpose of discussing musical contributions in this report, I propose a simplified framework which includes only three foundational elements of musical inputs in jam sessions: rhythm, pitch and dynamics, as represented in Fig. 6.

1. **Rhythm is time in music**, having a specific tempo (or speed), and defining one major dimension on which musicians in jam sessions establish a musical rapport.
2. **Pitch is the highness or lowness of a musical sound**, as defined by the frequency of the sound. It is the basis for building melodies and harmonies (aggregation of multiple pitches), which greatly effect how we experience a musical piece.
3. **Dynamics is the measure of relative loudness or quietness of music** and is a third tool with which musical expression can be created.

These three elements are presented as the three main tools at the disposition of a musician bearing an instrument at a jam session. The elimination of other elements of music allows for a clearer and more effective conversation. This elimination is justified, in the case of Britten’s selection of elements (Britten, 1945), for the following reasons:

- **Timbre**, or tone color, is the sound quality of a musical note, which, for instance, makes different instruments distinguishable from each other. As such, it is greatly influenced by the acoustics of the instrument played. While a musician still may have an influence on the timbre of the instrument’s output through technique, observing this as a foundational concept is overcritical.
- **Harmony and melody** are higher-level

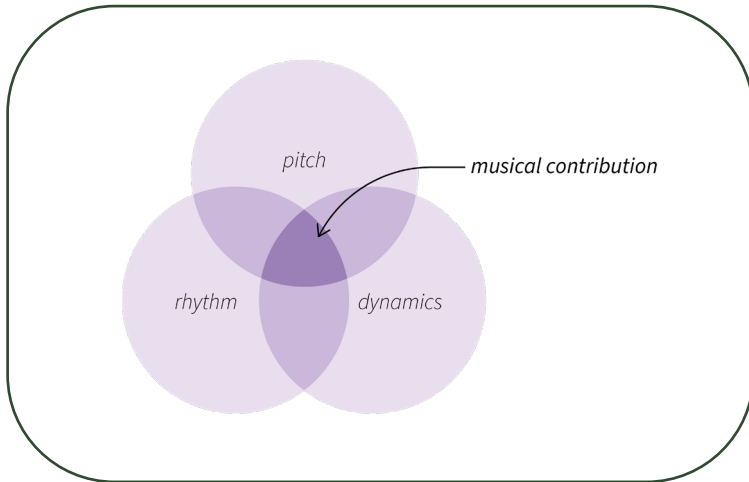


FIG. 6 THE THREE MAIN MUSICAL ELEMENTS FOR MUSICAL CONTRIBUTION WITH AN INSTRUMENT

concepts that depend on pitch as a core element; harmony is the simultaneous sounding of multiple pitches, and melody is a sequence of pitches played one after the other.

- **Musical texture and form** are both higher-level concepts, the former describing the relationship of melodies to each other, and the latter describing the interplay of all elements throughout a musical piece.

While there are no hard rules on how to correctly select pitch, rhythm, and dynamics to contribute to a jam session musically, there are many frameworks which could be used to describe what makes a musical contribution nice. **Music theory** offers concrete structures and guidelines as a basis

for creating music as built on historical development of this expression form.

However, the appeal of a specific musical output remains a highly subjective matter. Neurologist Mark Jude Tramo's research shows that a big part of appreciating specific combinations of pitch, rhythm and dynamics has to do with conditioning of the brain (Radiolab, 2023). This makes sense, considering historical shifts in popular music styles as well as diverging musical preferences in different parts of the world. For the purposes of this project, **it is reasonable to assume that music novices interested in participating in musical jam sessions have a sense of musical taste and preference**, due to widespread exposure to music in our society. The assumption is made that this musical

sensibility can enable them, given an environment where they can acquire the capabilities to produce desired pitch, rhythm, and dynamics with musical instruments, to ultimately participate in the “musical negotiations” that are part of collaboratively creating music.

This reveals an issue with the observed activities of music novices who currently do join jam sessions: shakers appear to be an instrument that they can pick up quickly, allowing them to practice musical contributions involving dynamics and rhythm. **However, they do not have the opportunity to practice choosing pitches.**

Additionally, while the frameworks of music theory are certainly heavily applied in social jam sessions, the mastery of music theory is not a prerequisite for successful participation. Many advanced musicians in jam sessions do not rely on knowledge of music theory, but apply it implicitly as learned musical taste. In an environment where music is created on-the-fly, the application of theory can be seen as submitted to the scrutiny of musical taste.

**Thus, in my approach, I stay away from music theory, and focus on the more pressing question of allowing music novices to develop fluency in employing all three basic building blocks of music, including pitch, in the context of unrehearsed music-making with a musical instrument.**

“

*I don't really understand music,  
so if you say like "this is a note"  
or "this is a rhyme", I really don't  
know what you're talking about.*

”

## The Case for More Jam Sessions

***From my experience organizing various formats of regularly occurring jam sessions in the past five years, testimonials from participants show attribution of the activity to personal well-being. Further investigation supports the assumption that social jam sessions are beneficial to psychological wellbeing through their function as a space for honing social skills and through their focus on nonverbal communication and expression through music.***

In recent years in the Netherlands, the happiness and satisfaction of young adults has been sinking and cases of loneliness have gone up (Ministerie van Volksgezondheid, Welzijn en Sport, 2023). Simultaneously, young adults' time spent on social media has been growing steadily (Centraal Bureau voor de Statistiek, 2018; Oosterveer, 2023). A 2017 poll by CBS showed that over 25 percent of young adults aged 18 to 24 felt addicted to social media (Centraal Bureau voor de Statistiek, 2018). This invites to reflect on more healthy, appealing and fulfilling social activities for these users.

In their research article "The secondary aspects of collective music-making", Cunha and Lorenzino (2012) discuss the significant impact of the process of collective amateur music-making on social relationships,

physical welfare, and mental health, through learning and teaching experiences in which participants hone collaboration skills such as listening, sharing ideas, and conveying emotion (Cunha & Lorenzino, 2012). In his book "The Body Keeps the Score", Bessel van der Kolk, a world renowned psychiatrist and author discusses activities of "communal rhythm" (activities of alternative forms of communication, such as theater, music, and dance). He provides empirical evidence of the effectiveness of such activities in treating trauma-based mental disorders that are ubiquitous in western society (Van der Kolk, 2014). Both Van der Kolk (2014) and Cunha and Lorenzino (2012) decouple these communicative activities from performance, focusing on the social and self-awareness aspects of engaging in joint activities involving verbal and non-verbal communication, including improv theater sessions, dance, or creative music making.

Furthermore, the value of honing nonverbal communication is underscored by the recognition that the development of human cognitive ability is dependent on the communication tools we have at our disposal: Mute and deaf people were considered intellectually disabled until it was understood that language "unlocks" intelligence and that by learning sign language, these individuals could become "intellectually, linguistically, socially, and emotionally "normal"", as explained in the neurologist Oliver Sack's book "Seeing Voices" (Sacks, 1990). Experiments



performed by Diana Deutsch show that speakers of a tonal language such as Mandarin are far more likely to have perfect pitch than speakers of a non-tonal language, supporting the idea that language can unlock further “senses” (Deutsch, 2004; 2006). Consequently, spoken language, while serving as a vessel for the development of our mental capacities, also represents a limitation through its finite nature; there are only so many words and expressions available. It is then not surprising that the use of auxiliary forms of expression such as music can allow us to bridge internal gaps by expressing the non-explainable, and to enhance social coherence via the exercise of nonverbal, nonfinite communication.

**Musical jam sessions represent a promising vehicle for increasing wellbeing in young adults;** among the various forms of artistic expression mentioned above, music emerges as a particularly compelling medium to focus on due to the profound integration of passive music consumption into the daily lives of many, especially when considering the current-day popularity of music streaming services. This widespread enjoyment of music suggests high potential for individuals to develop an interest in actively engaging in music-making.

## Considerations on Instrument Design

***The goal of this project is to address barriers that impede music novices from joining social jam sessions by means of (musical) instrument design. As such, the design space is constrained to musical instruments or instrument-bound concepts. This prompts a reflection about musical instruments.***

Musical instruments are inextricably linked to the creation of music. Defined in dictionary entries as “devices for producing a musical sound”, **they embody music, and as such, are a testimony for its existence:** a bone flute from the stone age is considered to be the earliest evidence of music (Siemer, Siemer & Schlesinger, 2023). The designs of musical instruments carry cultural significance, and the evolutions, adaptations and influences of these designs can be traced across borders and throughout history.

In the Netherlands, musical instruments played in social jam sessions typically create sound acoustically. Using the well-established Hornbostel-Sachs classification, sound is produced by a vibrating body (Idiophones), via a vibrating membrane (Membranophones), by vibrating air (Aerophones), or by vibrating strings (Chordophones, often amplified through a body) (Kolassa, 2023).

The production of musical sound using electronic means has been proposed by Sachs as an additional category (Electrophones). However, the emergence of new digital instruments remains scarce, with live electronics and laptop music remaining primarily constrained to control via a mouse, piano keys or midi fader boxes and with only the Theremin, invented in 1920, and the Ondes Martenot, invented in 1928, gaining widespread attention as new electronic instruments, as discussed in Sergi Jordà's (2004) paper “Digital Instruments and Players: Part 1 – Efficiency and Apprenticeship”.

While this may prompt the design of a new-age instrument that effectively utilizes the possibilities of digital sound creation, this diverges from the project goal: The project at hand is about examining and **enhancing the standard inventory of instruments found at social jam sessions**, such that novice musicians can enjoy this activity the way experienced musicians do. As such, it makes sense to strive to design **an instrument that produces sound acoustically**, for the following reasons:

- Digital instruments are **rarely used** in social jam sessions. Both standalone digital instruments and computer-based controllers appear, in my experience, not to mesh well with this activity. Understanding the underlying reasons for this and addressing this issue is a design challenge that exceeds a reasonable scope for this project.

- Many electronically amplified instruments such as the electric guitar are commonly used in social jam sessions, but these rely on an acoustic working principle and are **founded on an acoustic counterpart**, such as the acoustic guitar. This suggests that, to introduce a new instrument worthy of its name, it is beneficial to create an instrument that doesn't require the need for amplification. Amplification can always be incorporated into the design subsequently.



FIG. 7 THE KAZOO OFFERS LIMITED POTENTIAL FOR EXPRESSION, WHILE THE VIOLIN HAS A STEEP LEARNING CURVE

- Social jam sessions are often primarily acoustic and may take place outdoors or **in venues where amplification equipment is not readily available**. Acoustic sound production ensures a low barrier to participation by eliminating the need for an amplifier and/or a source of electricity.

Jordà's (2004) paper sheds light on some important considerations regarding the required qualities of an instrument design for its successful adoption by the public:

*“Music instruments must strike the right balance between challenge, frustration and boredom: devices that are too simple tend not to provide rich experiences, and devices that are too complex alienate the user before their richness can be extracted from them. The kazoo is easy to master, but its possibilities are quickly exhausted. We should be able to design well balanced instruments that can appeal to both professionals and dilettanti;*

*instruments that like the piano, can offer a low entry fee with no ceiling on virtuosity.” (Jordà, 2004).*

Applied to the project at hand, this implies that even if the design is to be catered to the needs of music novices, it should also be designed to be appealing to play by an advanced musician. This is necessary to achieve a design that can be accepted as an instrument, and not a mere leaning tool for beginners.

**To sum up, the goal of this project is to overcome music novices' barriers to participation in social jam sessions through the design of a musical instrument. It is sought to create an instrument that makes sound acoustically, without need for electric amplification. A requirement is set that the instrument be engaging to play both for an advanced musician as a secondary user.**

## Evaluating Project Potential

*A questionnaire (n=76) conducted at TU Delft's Industrial Design faculty supports the relevance of the project topic. It indicates that many young adults in this demographic are interested in joining social jam sessions, but face barriers that prevent them from doing so.*

Throughout the past years, numerous young adults in my surroundings **have expressed interest in actively participating in jam sessions, but also inhibition and fear to do so.** Discussions thereover have pointed towards the following reasons:

- Jam sessions are commonly seen and implemented as a performance-centered activity that is about demonstrating musical skill, and not as the collective activity of musical communication, coined here as “social jam session”.
- Lack of technical music skills (in playing an instrument) is seen as an insurmountable barrier to joining a jam session.

In order to substantiate these assumptions, I performed a questionnaire (see Appendix 2 on page 131) at the faculty of Industrial Design at the TU Delft. At the start of the questionnaire, “musical jam session” was defined as a social activity in which one plays/sings improvised music with others.

The respondents were asked to describe their relation to musical jam sessions by selecting one of the following four options:

- I play music in jam sessions occasionally/regularly.
- I would be interested in participating in a jam session, but I don't because...
- I'm not interested in participating in a jam session because...
- Other: (respondent can input an alternate response)

The users were then prompted to complete the unfinished sentences, should they have chosen one of these options, giving one or more reasons as to why they don't go to jam sessions despite their interest, or why they are not interested in participating.

The survey participants' ages ranged from 19 to 31 years, with an average age of 23. Among the respondents, 56% identified as male and 43% as female. A significant majority, 84%, were current students at TU Delft, while the remainder consisted largely of alumni due to the channels employed to share the questionnaire.

Out of the 76 respondents, **46.1% affirmed they would be interested in participating in a jam session, but cited a reason as to why they do not do so.** 25% Said that they already play music in jam sessions, and 19.7% said that they were not interested in participating in a jam session.

This result provides clear evidence that

within the respondent demographic, this topic has a high relevance. While the result is unequivocally skewed (people who have interest in jam sessions are more likely to respond than people who do not, based on the title of the questionnaire), the outcome shows a substantial number of target users – in other words, there is a potential market, should I be able to enable these users to overcome their barriers to participation in social jam sessions through product design.

**This survey specifically targeted industrial design engineering students at TU Delft.** It did not aim to cover a predefined user group, but served to gauge interest within a conveniently available subset of the broadly defined demographic of “young

adults in the Netherlands” discussed in Chapter 1.4.

The assumption is that the needs and interests of the industrial design engineering students at TU Delft are representative of the broader demographic of young adults in the Netherlands with comparable cultural and educational backgrounds. This implies broader applicability of the design alongside uncomplicated access to test participants for prototype tests.

Evaluating and adapting the design for users with further diverse backgrounds is desirable, but lies outside of the scope of this graduation project.



FIG. 8 THE QUESTIONNAIRE INDICATES A HIGH RELEVANCE OF THE PROJECT TOPIC AT THE INDUSTRIAL DESIGN ENGINEERING FACULTY

“

*For some reason having an adult life and learning something new is also not very normal, like, maybe having Duolingo in your phone is, but...*

”

## Learning in Jam Sessions

*Traditional instrument lessons focus on building skill in one instrument over time by playing musical pieces or dedicated technical exercises such as arpeggios, scales, or rudiments (percussive techniques). These lessons often involve episodic preparation towards a particular piece or performance. In contrast to this, learning music in social jam sessions is, to a certain extent, continuous. When playing in a jam session, one isn't practicing for a later time. At any given time, the focus is set on using one's existing musical skill to the best of one's ability, as well as experimenting, observing, and receiving guidance through others.*

This difference in learning modes caters to different motivation mechanisms; the reduced focus on performance and unstructured, learning-by-doing environment of social jam sessions can help develop musical skills in those who struggle with attending regular lessons and with practicing alone.

Unlike traditional music lessons, social jam sessions also provide the means to observe, try, and transition to other instruments. Musicians who have a strong foundation in one musical instrument (possibly through

traditional music lessons) can relatively easily learn to play new instruments, as their experience allows them to quickly reach a level with which they can express themselves musically with the new instrument. But how does this look in music novices who do not share this initial momentum?

From my experience hosting social jam sessions, I have observed that **shakers and other simple percussive instruments are the only instrument that a large majority of music novices actively play**. In the past, some of those who have participated in multiple social jam sessions have asked me what I recommend as a next step. I quote the most recent such question: “Arthur, I feel I'd like to start learning a real instrument now. What would you recommend? A guitar? Or maybe a ukulele is better to start with?” This constitutes a clue as to how this novice attempts to build a hierarchy in instruments, potentially as a function of variables like size of the instrument. These questions, paired with the scarcity of music novices picking up any other instruments, suggest that there is no logical next step after shakers.

**This is the basis for a first design framework for creating an instrument: The instrument should be positioned as a bridge between basic percussion such as a shaker and a melody or chord-playing instrument such as a guitar. It should enable novice musicians to develop the skill of harmonic improvisation.**

“

*As I grow older, I enjoy music more and more, but I feel like I've lost the skills. I become embarrassed to come back to the music creation process.*

”



“

*When I came to your jam, I was very hesitant. I saw everyone with bass guitars and electric guitars, and I was like, damn bro, this is going to be a life challenge.*

”

# 2 - PROCESS

## Design Approach

*The approach to this project follows a Research Through Design methodology (Stappers and Giacardi, 2014). Three consecutive design sprints are employed to gain understanding. Each design sprint builds on the outputs and learnings of the previous sprint, informing new design iterations.*

The design process is iterative and user-centered, consisting of multiple cycles of **creating a prototype or test setup, testing this setup with users, and evaluating the results to implement learnings in the following cycle**. The basic buildup of one such cycle is visualized in Fig. 9.

This generally defined iterative cycle forms the basis for **three design sprints** performed in this project, displayed in Fig. 10. These sprints can contain multiple design cycles, distinguished by the introduction of a new prototype within each cycle.

First, foundational interviews with target users are held based on questions and assumptions raised in my past experience in

jam sessions and based on preliminary research. These Interviews serve as an initial input for the creation of a first test setup in design sprint 1. The output of this design sprint is a deeper, informed understanding of the identified problem, and a list of requirements based on this knowledge.

In design sprint 2, the understanding of the problem is further increased through the

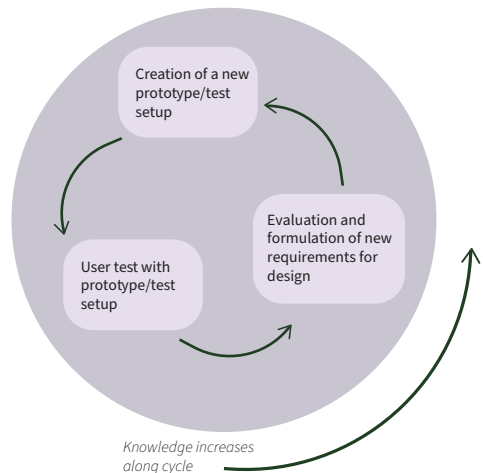


FIG. 9 THIS CYCLE IS THE BASIC BUILDING BLOCK FOR THE ITERATIVE, USER-CENTERED DESIGN APPROACH APPLIED IN THIS PROJECT



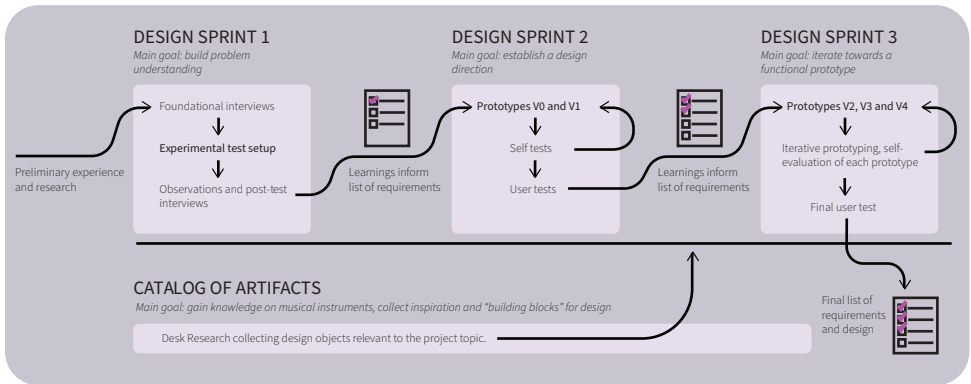


FIG. 10 DESIGN PROCESS

production and testing of prototypes aimed at fulfilling the requirements established in the preceding design sprint. User tests are conducted to evaluate how effectively the prototypes meet these requirements. The output is an updated list of requirements.

In design sprint 3, prototype instruments are iteratively built and tested with regards to the updated list of requirements. A final user test is performed in a jam session environment. The output is an updated list of requirements and an updated instrument design based on the learnings of the final user test (See "Progress Update 3" on page 84).

Although I am not the principal target user, self-tests are included in some steps of the process. This is justified by the condition set that the product must be adequate for use by an advanced musician, as discussed in

chapter 1.5. As an advanced musician, I can make informed judgments, enabling efficient iterations and improvements on this criterion before testing with the primary target users. Therefore, while each design sprint concludes with user testing involving primary users, multiple self-tested prototype iterations are conducted within some design sprints.

The goal being to design for the dynamic and multi-faceted environment that is social jam sessions, performative research is conducted: In design sprints 1 and 3, user tests are conducted in a jam session environment, organized for the occasion. Testing prototypes in this practical context not only provides insights into their effectiveness in addressing previously identified design challenges, but also uncovers additional relevant variables and challenges that have not yet been identified.

Design sprint 2 includes user tests in which the jam session environment is heavily simplified; participants are asked to play an instrument over a recording of a jam session. This abstraction is reasonable when focusing on the technical playability of the prototype, however it is important to keep in mind that such a setup offers little information on the overall suitability of a prototype in a social jam session environment.

In parallel and throughout the project, a “catalog of artifacts” is compiled, consisting of design artifacts that contribute to the discussion. They are mostly related to jam sessions, music and musical instruments, but are not required to be. Their purpose is to contribute to the ideation process through the recognition of operating schemes (Simondon, 1958) that can be implemented in a new instrument design through analogy.

“

*A group of friends were also doing them. In their house [...] Basically they would have a piano, guitars, one of those boxes you sit on and hit on, shakers, and how do you call the group of instruments you inhale ?*

”

## Design Brief and Target Users

**The following design brief is formulated based on preliminary observations and research presented in the introduction chapter:**

**How can the design of a musical instrument foster the integration of music novices in social jam sessions?**

The primary target group for this product design project is broadly formulated as young adults living in the Netherlands who are considered music novices, meaning they have little or no prior experience playing music, and who have interest in joining musical jam sessions.

Having showed that there is a substantial number of such users within the engineering design faculty at TU Delft, **the research in**

**this project has been focused on this subgroup of target users for convenience.**

This represents a limitation of the outcomes of this project; further research would be necessary to evaluate the suitability of the proposed product for a broader target user group, especially in demographics that diverge significantly from that found in the Design Faculty in TU Delft in terms of education, culture, socio-economic factors and more.

**Thus, we can adopt as a persona Alvin, a 23-year old engineering design student in Delft depicted in Fig. 11, enthusiastic about exploring new hobbies, but with very little prior experience playing music. Alvin enjoys the collaborative and creative atmosphere he has seen at a social jam session at his friend's house, but is reluctant to return, as he does not feel like he is capable enough to participate the way other musicians do. Although he would like to, he can't imagine playing another instrument than the shakers in a jam session without years of music lessons.**

**Secondary target groups** include other people who may have interest in playing music in jam sessions, but have another musical background than the target user formulated above:

- People with prior musical experience, such as classically trained musicians, who have never played improvised music.
- Musicians with experience playing music in jam sessions.



FIG. 11 UJJAYAN IS A TARGET USER AND PLAYED THE ROLE OF THE PERSONA "ALVIN" IN MY EXPLANATORY VIDEO





## Design Sprint 1

***The first design sprint was dedicated to creating a solid understanding of users' relationship to social jam sessions and substantiating the barriers that inhibit them to participate in this activity.***

The questionnaire discussed in chapter 1.6 (“Evaluating Project Potential” on page 24) confirmed that users with little or no musical experience have interest in participating in jam sessions, but experience barriers that hinder them from doing so. This raises questions about **how these users understand a jam session, what barriers they encounter, and, since I am constraining my project to instrument design, what their perspectives on**

**instruments are.** Additionally, in chapter 1.7, I established that music novices who attend jam sessions eventually seek a next step after basic rhythmic instruments such as shakers. These considerations were used to formulate the following **research questions:**

- For target users, what is the significance/role of instruments in jam sessions?
- How do users choose the instrument that is “right” for them?
- What are the users’ preferences and predispositions for specific instruments?
- Where does the intimidating aspect of jam sessions come from?
- What does the term “jam session” evoke in users?
- Have users encountered social jam sessions?

---

### ***Interviews 1 – Identifying Barriers to Participation***

The research questions above were the basis for the generation of an interview guide that can be found in Appendix 3 on page 138. It is structured in four parts:

1. Introduction/profile of the user, including questions on the user’s expertise areas, their learning methods and their social life
2. The user’s relationship to music
3. Questions on the user’s perceptions and experiences around jam sessions
4. User perspectives and aspirations concerning musical instruments

Using this interview guide, six user interviews were conducted to use as a basis for the first ideation, with the goal of creating a low-fidelity prototype or probe and testing it with target users to further frame the problem. From the interviews, I extracted quotes that I believed contributed to the discussion as raised by the research questions. Using affinity mapping to group these quotes (See Appendix 5 on page 171), I collected insights on the motivations of target users and the barriers they encounter:



**Insight 1:** Target users have an accurate idea of what a social jam session entails. They describe jam sessions as a collaborative activity of musical expression

“ I previously have been at dance jams. In the dance session they have a music jam as well. Dancers are triggered by the music and dance together. They trigger each other, together. ”

“ It's where people come together and express their feelings and views through music ”

“ I see it as playing a game where you build upon it and end up with something in the end ”

**Insight 2:** Target Social jam sessions are perceived as an exclusive activity:

“ Those groups give off a vibe, that **protected vibe**. A closed circle, only friends can join, only people they select can join. Maybe it's just what a lot of us have in our minds, if I'm not good I shouldn't be doing it. It's not shame, but that feeling that holds you back, you think “you shouldn't mess up” ”

**The following barriers were identified:**

**Barrier 1:** Perceived/expected pressure to play and perform

“ I'm generally an extrovert, but I'm afraid of performing [...] We had mandatory performances in school with content that I didn't like that much. I'm traumatized by performing. ”

**Barrier 2:** Skepticism about possible progress on an instrument as a novice

“ It gets kinda scary like, okay. I come there, and maybe I can learn a few things. **But how much can I learn? And while I'm like borrowing someone else's guitar or something?** ”

**Barrier 3:** Fear of disturbing the harmony of the music being played

“ They are making something beautiful and I don't want to ruin what they are making. The closest analogy I can think of, I'd say I'm pretty decent at beach volleyball, and then someone asks to join, but they don't know what they are doing, so you're not enjoying it anymore, but you always try to be nice and inclusive. You don't want to like ruin it for them as well. When someone joins in sports, you smile and try to cheer them up, but you're really just like “just leave” ”

**Barrier 4:** Insecurity about proper “educate” upon arrival in a social jam session

“  
*When you were playing outside. Stuff is always happening, even if you want to jump in, I don't know if I have to wait for a pause, since you don't really understand what is happening, will I ruin it, should I introduce myself?*  
”

**Barrier 7:** Incapability of being creative/ expressive due to mental overload

“  
*The thing is, I don't have any brain space free to be creative. I'm focusing all my energy on trying to get the basics right*  
”

**Barrier 5:** Doubt in the ability to contribute musically

“  
*When he or she's inviting me, and I feel like, Hey, man, maybe you have a misconception about me. I don't know how to play. So I cannot be of any assistance whatsoever, what can I do? I mean, I can cook...*  
”

**Barrier 8:** Users express unfulfilled wish for guidance in social jam sessions

“  
*Like to me, I would kind of need someone to say, Hold up! Wait, wait, wait! Let someone play this, and then you add something to it.*  
”

**Barrier 6:** Intimidation due to music (theory)'s perceived complexity

“  
*But I don't really understand music, so if you say like “this is a note” or “this is a rhyme”, I really don't know what you're talking about. And in all the strings and “octaves” I think they're called, I really don't know music terminology, so sometimes it's hard to communicate with people who really know what they're talking about because you don't speak that language*  
”

## Formulation of Design Challenges

The following eight tentative design challenge formulations are based on the insights and barriers discussed above and carry corresponding numbering:

### HOW DO WE...

1. Change the **assumption** that one is expected to immediately play music (well) at a social jam session?
2. Make participating in a social jam session **seem worthwhile** to music novices?
3. Eliminate the (perceived) **disturbance** caused by a music novice in a social jam session?
4. Guide music novices along the **first steps** in joining a social jam session?
5. Give music novices the feeling that they can **contribute** to the music in a social jam session?
6. “**De-mystify**” music making/cater to a common language between musicians and novices?
7. Allow for **musical self-expression**, even in the user’s first social jam session?
8. Enable the **sharing of knowledge/skill** between experienced and inexperienced participants of the jam session?

To enable more effective ideation, a subset of these design challenges was selected to focus on: 2, 3, 7 and 8. This selection avoids redundancies and tackles the central issues that impede novices from effectively integrating into social jam sessions.

**Design challenge 2** can be linked to a steep initial learning curve on common

instruments such as the guitar, which was frequently mentioned as a desirable instrument to learn. Music novices do not expect they can make any substantial progress on such an instrument within a social jam session, making participation appear less worthwhile.

**Design challenge 3** outlines a dilemma between the sounds produced by a music novice as they engage in much-needed experimentation with a new instrument, and the harmony of the ongoing music in a jam session.

**Design challenge 7** is rooted in the function and value of a social jam session as a space for expression through music. Interviewees mentioned incapability of being creative due to lack of control over an instrument and due to mental overload. As long as a music novice does not feel empowered to be creative and express, they are not obtaining some of the main benefits and rewards of the activity.

**Design challenge 8** brings forth a logical strategy to improve integration of music novices into a social jam session and generally improve cohesion by creating a tighter relationship between advanced jam session participants and novices. In interviews, novices mentioned a wish for guidance, and this directly addresses the goal of enabling music novices to learn within a jam session by benefiting from the knowledge of others.

### **Bass Guitar Test Setup- Observing Users in Action**

To complete and complement the learnings from the initial interview, which concern expectations and perceptions from music novices who had limited or no prior exposure to social jam sessions, an experiential test setup was devised that allowed the observation of music novices attempting to play a new instrument in a jam session. This test would enable the observation of barriers in-field, substantiating the fears and reservations for joining in the first place, identified in the interviews.

The setup is sketched in Fig. 12 and consists of a bass guitar (electric bass) that is connected to three outputs: one amplifier and two headphones. The bass guitar was chosen out of the following considerations:

- Unamplified, the bass guitar is very silent and cannot be heard in the context of a jam session.
- Most user interviews (for transcripts see appendix 4 on page 139) revealed guitar, or electric guitar, to be an instrument that the users admire and would like to be able to play. After attempting to play the bass guitar, an instrument of the same family, without prior knowledge, users can lead a more informed discussion on the challenges they are faced with in-action.

Two jam sessions were organized for the test, each with four experienced participants and two target users (jam novices). The latter

were shown three possible configurations, which they were told to select from and change as they wished throughout the course of the jam session:

1. The speaker turned on – the music novice can be heard by all participants, which is the base case that one would typically be in in a jam session
2. The speaker turned off, one pair of headphones worn by the music novice who is attempting to play the bass guitar – only the music novice can hear themselves
3. The speaker turned off, one pair of headphones worn by the music novice who is attempting to play the bass guitar, and one pair of headphones worn by any other participant of the jam session – this “person of confidence”, chosen by the

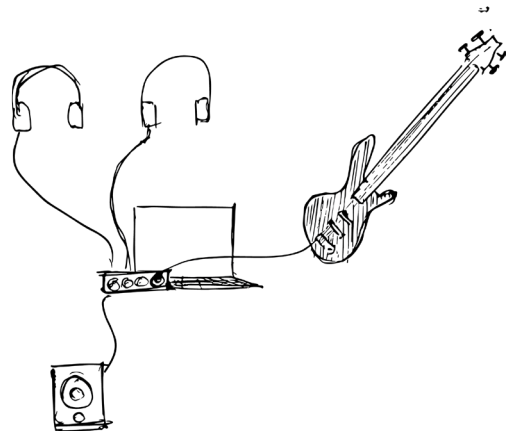


FIG. 12 A SKETCH OF THE TEST SETUP 1

music novice, can thus also hear the sound coming from the bass guitar.

It was suggested that the headphones be worn on one ear only, so that the ongoing jam session could be heard. The sessions lasted roughly two hours each. The experienced jam session participants had the role of emulating a jam session environment, laying down a musical foundation that did not rely on the involvement of the music novices. Neither the novices nor the experienced musicians were given specific instructions on what to play or how to interact.

The setup had the purpose of testing following assumptions:

**Assumption 1:** The option to regulate the audibility of their instrument to others can allow the user to gain footing in an ongoing jam session without the concern of disturbing others.

**Assumption 2:** The option to selectively include a “person of confidence” allows the user to request and receive guidance from a more experienced musician, while limiting disturbance for the rest of the participants of the jam session.



FIG. 13 MUSIC NOVICES USING THE TEST SETUP IN A JAM SESSION

Thus, on the one hand, the test setup described above makes it possible to observe barriers 2 and 7 (steep learning curve and mental overload), which are linked with the use of the instrument itself, and on the other hand, it is a first prototyping experiment that directly influences barrier 3 (disturbance of others) and represents a first test in attempting to alleviate barriers 3 and barrier 8 (wish for guidance).

---

### ***Bass Guitar Test Outcome***

The bass guitar test setup puts music novices in a live social jam session setting, allowing them to play an electric bass guitar either amplified, unamplified and with headphones - unheard by others, or to give a second pair of headphones to a person of confidence. The test was followed by one-on-one interviews with the test participants (for interview transcripts and selected quotes, see appendices 7 on page 174 and 8 on page 197).

Two test sessions were held, each with four experienced jam musicians and two novices present. All four novices spent the majority of the time in the two-headphone configuration, whereby they gave the second pair of headphones to the other music novice present in every case. Three test participants reported feeling musically disconnected from the ongoing jam session. All participants reported difficulty or inability to both play the instrument and listen to the ongoing music simultaneously. Towards the end of both test sessions, advanced

musicians instructed/supported the novices

In the following, I will discuss the results in more detail in relationship to assumptions 1 and 2 and subsequently lay out takeaways from test setup 1.

### **Test outcome regarding assumption 1:**

The option to regulate the audibility of their instrument to others can allow the user to gain footing in an ongoing jam session without the concern of disturbing others.

“  
*For me personally it adds pressure if someone else listens to me, although they would be super nice about it and everything. But I was like, at first I want to hear myself.*  
 ”

Every novice participant began by listening by themselves and, consistent with insights from interview round 1 (barriers 1 and 3), reported choosing this configuration to lower the pressure to perform and to avoid disturbing the ongoing music. Most music novices appeared to feel comfortable sharing their attempts only with another novice; only one novice chose to play the bass guitar in amplified configuration for an extended period of time.

Based on the test results, it is reasonable to assume that assumption 1 holds true: the test participants all chose a configuration that lowered their concern of disturbing others.

### Test outcome regarding assumption 2:

The option to selectively include a “person of confidence” allows the user to request and receive guidance from a more experienced musician, while limiting disturbance for the rest of the participants of the jam session.

“ *I think I really enjoyed the interaction with [Test Participant 1]. I had fun with it, you know? Because she was also so lost. Not someone teaching me, but someone also wondering, laughing about it.* ”

“ **Q: [Test Participant 4] was also a beginner and had never played a bass before. Yeah, yeah.**  
**Q: But you still see value in them listening?**  
*Yeah, because [...] you're so much in the zone of playing that you don't know whether you are you playing good or bad! Because you're playing and you're not listening to yourself.* ”

*So you need a peer to give you feedback saying that, “yeah, I don't think so”. Or “It's coming out perfect”, and that can be from an amateur - I believe that everyone has an ear for music. That's my thinking. That's what my ideology is.*

*So even if you're normal or a layman person who is just walking down the road and sees, uh, the tones are not coming good, he or she can just say “I guess something is not right. You should try in a different way.” They may or may not give a very technical answer, but they can give you a generalized answer.* ”

“ *In the end, when I managed to make the melody. I also saw her approval. In her face, like “this sounds nice”* ”

The assumed tendency to choose a “person of confidence” held true – all participants spent most of their playing time sharing their sound with another jam participant. However, contrary to expectations, this person of confidence was consistently the other music novice present, and not an experienced jam participant. The novice musicians expressed higher comfort in sharing with someone experiencing similar challenges and reported being satisfied with the help that another novice could offer. Test participant 3 explained that a novice was just as suitable as an advanced musician to act as a monitor for the musicality of the output.

---

### Further Observations

#### Guided Instruction Boosts Novice Confidence:

Despite the novices' decision not to choose an advanced musician as a person of confidence, both test sessions ended in instructive exchanges between the advanced participants and the music novices. Test participants 3 and 4 were particularly vocal about the value of the instruction they received, in the form of the

designation of specific notes to play. Mark, the advanced musician in question, could show the music novices where to place their fingers in order to play a basic bassline to the ongoing song, without needing to hear the output. These basslines usually consisted of 2-4 different notes. Quotes from the interviews reveal that this guidance increased the novice users' confidence.

“  
*And once I, I don't know if it was intentional or not intentional, but after a few breaks and everything, Mark started teaching me which was really nice because I could play a quite confidently.*  
 ”

“  
*I mean, I learned because Mark taught us some stuff. And then when he taught us, I was like, wow. Like I can maybe play an instrument, you know, in the future.*  
 ”

### Guitar Fretboard Instruction Challenges:

When it comes to instruction through an advanced musician, the bass guitar proved to be impractical: Mark had to repeatedly show the finger placements for the same notes. One test participant alluded to this:

“  
*Even just after Mark pointed at the places, I sometimes hit the wrong spots, the orientation is not easy at first*  
 ”



FIG. 14 MARK SHOWING FINGER PLACEMENTS FOR A BASSLINE

### Difficulty Syncing with Jam Session:

All participants reported difficulty or incapability of playing the electric bass guitar while syncing with the ongoing music. Three of the participants said that this led to a feeling of disconnection with the ongoing jam session. When experimenting, the novice users focused entirely on the instrument they were playing without paying attention to the ongoing jam.

“  
*To be honest, in the end I don't think we managed to join the jam vibes, I tried to listen with just one earcup from the headphones, but I couldn't really follow it.*  
 ”

“  
*I felt I was part physically, but I didn't contribute.*  
 ”



“  
*Basically I went along the whole fretboard. I checked everything, I checked playing all the strings, I tried some melodies, some combinations...*  
 ”

“  
*I would use the headphone setup again until a point where I can actually play/I feel confident.[...] To know which notes to play when. To have, not perfect pitch, but something like that, know how to improvise.*  
 ”

### Lack of Significant Progress:

The novices expressed having made little or no significant progress on the bass guitar within the session.

“  
*I wouldn't say I learned in terms of music. Maybe I learned to embrace the unknown. Trying without worrying.*  
 ”

“  
*If I come to your place soon and I try to replicate it, it's in my memory. I can remember my finger movements at that moment and everything like an image, but to replicate it would take a time [...], as if I was trying for the first time*  
 ”

### Bass Guitar Test Discussion

While the test results support the assumption that a silent, headphone-monitored instrument lowers the barrier to begin playing a new instrument in a social jam session, this setup had the side-effect of isolating the headphone-wearer, thus **supporting segregation of the music novices from the ongoing jam session.** This side-effect is counterproductive in the attempt to integrate novices into jam sessions.

In terms of the design of the instrument itself, picking up the bass guitar in a jam session is a large step for a novice because it gives no constraint in the number of different notes

that can be played and displays all the notes at first glance (in this case, five strings and 21 frets). This does not mean that a novice cannot “learn by doing” with a guitar, but it means that the novice is invited to experiment and try to understand the workings of the instrument in an isolated manner for an extended period of time, leaving no space for the development of musical awareness or monitoring skills – in other words, no space for trying to mesh with an ongoing jam session. The goal being to integrate the novice into the jam session, the instrument should, at the start, not be much more complex than shakers. Shakers are an example of an instrument that invites the novice user to develop listening/monitoring

skills, as the novice is not overstimulated and intuitively tries to match the tempo of the music that is being played.

The bass guitar does have some good sides to consider: It is common for bass contributions to include only a small number of notes. **Having framed the instrument as a step between simple percussive instruments and melody-playing instruments, it is important to keep in mind that substantial and beautiful musical contributions can be made with few notes** – sometimes even one note, referred to as a “drone”. this can be the key to avoiding mental overload in music novices.

While advanced musicians were not involved via the headphone monitoring solution as expected, the rather intimate setting of the test session paired with an overarching focus on the music novices’ interaction with the test setup ensured an instructive exchange between novices and advanced musicians, which was related as useful and positive by the music novices. Naturally, interactions and a flow of knowledge between these two parties is desirable considering the goal of integrating music novices into social jam sessions.

**In direct contrast with isolated experimentation, pointers given by advanced musicians gave novice users concrete tasks that allowed them to experience higher confidence and adherence to the ongoing music.**

Consequently, it stands to reason that the instrument designed within this project should facilitate such guidance by advanced musicians, as underlined by the cautionary example of the disorienting fretboard of a guitar.

The items discussed above yield the following guidelines for the instrument, which can be incorporated into a list of requirements:

- The instrument should allow for uncomplicated support by experienced jam session musicians.
- The instrument should appear simple (and not display an unnecessary number of options for novice users’ purposes).
- The instrument should have a learning curve that is shallower than that of a guitar.

“

*I think I really enjoyed the interaction with [Test User 1]. I had fun with it, you know? Because she was also so lost. Not someone teaching me, but someone also wondering, laughing about it.*

”

## Progress Update 1

Design Sprint 1, consisting of foundational interviews, an experimental test setup and the interpretation of observations and quotes from post-test interviews, is completed. The design process is shown in Fig. 17. The catalogue of artifacts assembled throughout the duration of the project can be found in chapter 5 on page 48.

The high-level output of Design Sprint 1 can be described as a well-founded understanding of the problem space. This understanding was made tangible by producing an explanatory video that summarizes the findings up to this point, linked below Fig. 15. This video served as an update to “followers of the project”, as a means of growing this following and receiving feedback, ideas and pointers from viewers, and as a means of recruiting test

participants for future user tests. Additionally, the jam session recorded for the video’s background music was used as an audio backdrop for user tests in Design Sprint 2 (page 52) and for prototype self-tests throughout the project.

As a tool to keep track of influencing factors on the design, the product requirements identified throughout the iterative design stages were collected in a loosely structured list of requirements, as seen in its current stage in Fig. 16. This list will evolve throughout this report. Leading design challenges have been included in orange boxes. Many requirements remain abstract or high-level and can only be evaluated through qualitative measures such as user tests and feedback sessions. The requirements in green boxes are concrete, measurable requirements set for the design.



FIG. 15 THE EXPLANATORY VIDEO CAN BE VIEWED HERE :  
[HTTPS://YOUTU.BE/3UEK79FKB50?SI=B3VTUGFXPShSI59S](https://youtu.be/3UEK79FKB50?si=B3VTUGFXPShSI59S)

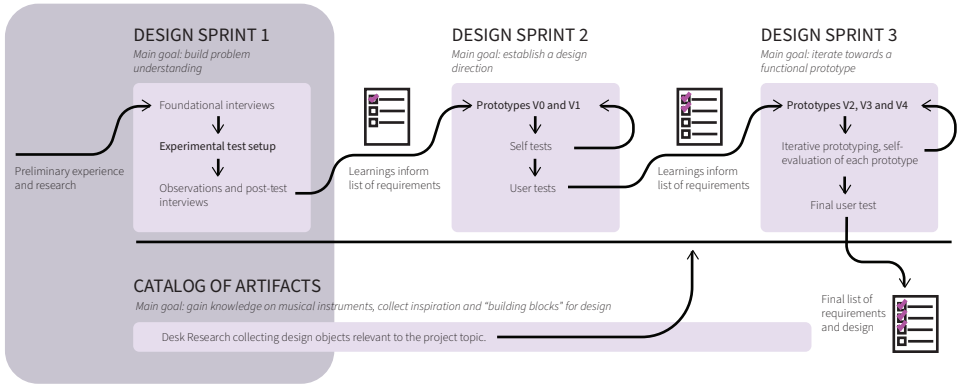


FIG. 17 DESIGN PROCESS

### List of Requirements

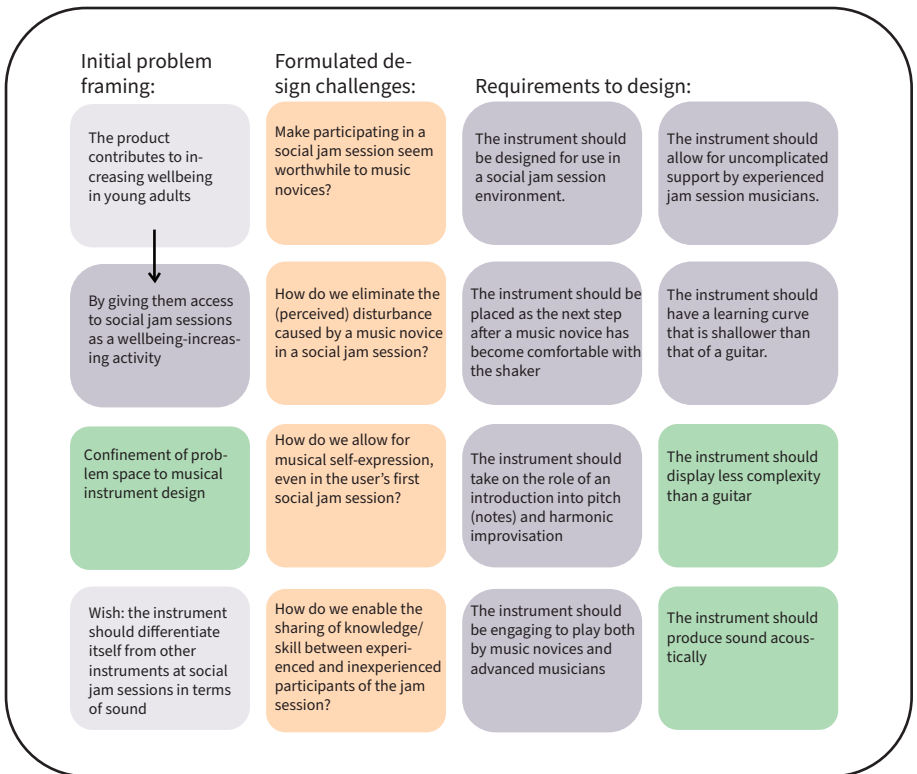


FIG. 16 LIST OF REQUIREMENTS AFTER DESIGN SPRINT 1

“

*I wouldn't say it was specifically made for the melody that was playing in the background, but I do think that if I had played it in the speaker, maybe the jam would have welcomed it somehow... I think it happened before with another instrument that I was trying and I realized how people also changed.*

”

“

*And the other thing was that after I tried to play the bass, the tip of my fingers became a bit numb. And the beautiful thing is that I found I really liked it.*

*It was like, hey man, it's like a medal that you wear on your shirt like, yes, I have something, I have a skill, something like that.*

”

## Design Sprint 2

***In Design Sprint 2, the understanding of the problem was deepened by producing and testing prototypes based on the requirements established in the previous sprint. The output of design sprint 2 was an updated list of requirements, forming the basis for an actionable direction for the creation of a musical instrument.***

In design cycle 1, I gained an in-depth understanding of the barriers that music novices are faced with that inhibit them from actively participating in social jam sessions through interviews with target users and through a test setup. The latter was designed to observe target users in-action and evaluate assumptions by offering a direct solution to one of the main barriers (inhibition due to fear of performing/disturbing).

Collecting the design goals found previously and formulating them such that they are applied to the design of an instrument:

- The instrument should provide a basis for a music novice to develop harmonic accompaniment/improvisation skills, as discussed in chapter 1.7, “Learning in Jam Sessions” on page 27
- The instrument should allow novice musicians to feel capable of contributing to a jam session, even in their first attempt (Design Challenge 2)

- The instrument should minimize disturbance due to the novices’ lacking harmonic improvisation skills (Design Challenge 3)
- The instrument should offer room for experimentation and expression, both for novice and advanced musicians (Design Challenge 7 and Desk research insight)
- The instrument should be designed to facilitate support to music novices by experienced jam session participants (Design Challenge 8 and Test 1 discussion)
- The instrument should visually appear simple and straightforward to use (Test 1 discussion)

*Of course, some design goals may influence each other. For instance, if the instrument allows support of music novices by experienced musicians to a high level, this may increase the level at which a novice can contribute musically on their first attempt, and reduce the disturbance caused by their contribution.*

---

### Concept Generation

Music novices, lacking the experience of seasoned musicians, have fewer analogies to draw from when experimenting with a new instrument. Shakers are typically the first instrument they learn to play. However, common harmonic instruments in social jam sessions are significantly more complex, making it challenging for novices to transition to them within this context.



This motivates the goal of designing an instrument that serves as a bridge between shakers and harmonic instruments like the guitar.

As mentioned in chapter 2.3, substantial and beautiful musical contributions can be made with as few as one note. Since the test session in Design Sprint 1 revealed that harmonic improvisation poses a significant challenge for music novices, it is reasonable to introduce them to this practice by having them initially focus on selecting just one or a few notes.

This thinking forms the basis for a high-level concept I have called “the single-note pointer”, visualized in Fig. 18 and Fig. 19. It is imagined as a handheld instrument with one button or joystick, resembling Wii’s “Nunchuck” video game controller. Pressing the button plays a single note, which can be freely selected by the player to complement an ongoing song.

With the use of a joystick or multiple buttons, further dimensions of expression can be



FIG. 19 SKETCH OF A “SINGLE NOTE POINTER” WITH A JOYSTICK

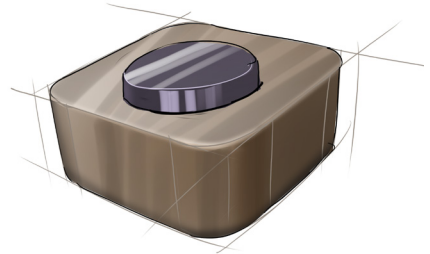


FIG. 18 REPRESENTATION OF A “SINGLE NOTE POINTER”

incorporated into the instrument, such as additional notes, dynamic control, vibrato, or pitch modulation. This aims to provide space for musical creativity. Having mastered this instrument, a user might go on to use one in each hand, increasing complexity and creative space.

This concept is proposed as a low-threshold next step that has potential to fulfill the design goals mentioned above. To touch on support by advanced musicians, it is envisioned that an advanced jam session musician might choose an initial “drone” note for a music novice to play. This would allow novices to focus on playing the instrument rhythmically, similar to their experience with the shaker, with the added dimension that the instrument is emitting a note that has a harmonic effect.

The concept above should not be seen as an embodied product. It is yet to be defined how the instrument would look, or whether it is acoustic or electric. The focus is on the functionalities that the instruments might provide. To test the outlined assumptions linked with these functionalities, prototype V0 was made.

## Prototype V0

Prototype V0 is a low-fidelity functional prototype made to test the high-level concept proposed above (“Single-Note Pointer”): an instrument with a reduced number of notes that can be individually set by the user.

The basis of the prototype was a midi controller for which a cover was fashioned to hide most of the keys and buttons. The remaining controls visible were one to four pressure-sensitive pads (concealable by adding a cover), corresponding knobs to set a note individual for each pad, and a joystick that allowed to pitch-shift the note by two half-steps in either direction.



FIG. 20 PLAYING PROTOTYPE V0 WITH A SINGLE NOTE PAD

The test objectives were three-fold:

1. Play this prototype instrument myself as an “advanced musician” and reflect on it
2. Observe music novices’ attempt to accompany a jam session with the prototype
3. Receive feedback from music novices on their experience playing the prototype instrument

With the overarching goal to employ these reflections, observations, and feedback in the embodiment of a musical instrument.

The following degrees of freedom were defined arbitrarily and not set as a primary focus for this instrument:

- The range of the instrument – this was set to be an octave centered around C2, which is considered the lower middle range on a piano
- The sound of the instrument – a relatively neutral vibraphone sample
- The dynamic response of playing the note – the sample chosen has a high attack (percussive hit), but was edited so that it can be sustained by prolonged pressing of the pad

---

## Prototype V0 Testing

The testing of Prototype V0 did not pass the self-test due to limitations that made it unsatisfactory for me to play, violating the condition that the instrument allows for satisfactory musical expression for

musicians of any level. For this reason, it was not tested extensively with target users. Prototype V1 would become an acoustic vessel for the functionalities that the digital prototype V0 was meant to test.

To test the prototype, I attempted to use it to accompany an audio recording made of a jam session (see progress update 1 on page 48) to simulate participating in a jam session. I played the instrument in three configurations:

- Setting and playing a single note
- Individually setting and playing two notes
- Individually setting and playing four notes

With each of these configurations, I attempted to contribute to the music by selecting a note I deemed appropriate and playing with rhythmicity as well as using the joystick to bend the note.

The result was underwhelming for me as an experienced jam session musician: Firstly, I felt quite limited due to the lack of expression that could be put into the notes: Despite pressure sensitivity and the possibility to bend the note, the sample felt dull and monotone. Linked with this, I felt a wish for more notes to increase my expressive range.

Secondly, the joystick was quite hard to work with: its resolution seemed limited, and it was hard to make small alterations in pitch. Thirdly, I was not able to eliminate latency to a satisfying degree.

To a large part, these shortcomings were certainly due to lacking quality of the hardware. While the prototype could still be used to catalyze discussions about the features of the instrument, **I opted to take a step further and attempt to create a prototype of an acoustic instrument that carries the desired features:** an instrument that plays a single or few notes that can be set by the user and that allows for a satisfying degree of musical expression.

## Input from Research

### The Koto

*In my ongoing desk research collecting design artefacts related to my project, I came across the Koto. This Japanese instrument employs sturdy, moveable bridges to set the note of each of its 13 strings. Depending on the song, a koto player may change the selection of notes by moving individual bridges along the length of the string. The notes are played through picking, and can be modulated in pitch by pressing down on the string on the opposite side of the bridge.*



FIG. 21 THE KOTO, A ZITHER INSTRUMENT

### Ideation: Three Possible Directions

In the following, three plausible directions found in an ideation session will be discussed. The ideation session consisted in conceiving possible instruments that have a low level of complexity, are designed to play one or few notes, and on which a specific note can easily and quickly be set by the user.

#### Concept 1: The Adjustable Tone Bar

The adjustable tone bar concept is an attempt at bringing metal percussion instruments into jam sessions while making them accessible to music novices by using the working principle of a vibraphone in a smaller, simplified instrument.

Metal percussion sounds are rare in social jam sessions; they are found in the metallophone family, which includes instruments with metal bars that produce



FIG. 22 THE VIBRAPHONE HAS A TUNED METAL BAR FOR EACH NOTE AND IS PLAYED WITH MALLETS



FIG. 23 THE HANDPAN IS A PERCUSSIVE INSTRUMENT WITH TUNED SURFACES

specific notes when struck, such as the vibraphone, shown in Fig. 22. Another metal percussion instrument that was brought to my attention was the handpan, a convex steel drum with a series of tuned surfaces that can be played by hand, visible in Fig. 23

**Both the vibraphone and the handpan have features that make them unsuitable for use in social jam sessions by music novices:** The vibraphone is large and cumbersome to transport, expensive, and, much like a piano or guitar, displays all possible notes at first glance, making it too complex for the sought application. The handpan features a small selection of notes that limits the musical output to a specific key. While this makes it easy for a beginner to play harmoniously, it limits musical expression (for instance, no “blue notes” can be played, and the opportunity for

“mistakes” are limited) and forces other musicians to play in the key of the instrument. This is not a good premise for music novices to develop harmonic adaptation or accompaniment skills.

During informal discussions and conversations about my design project, I received feedback from various individuals indicating that they find metal percussion sounds, such as those produced by the vibraphone or the handpan, to be pleasant. Thus, bringing these sounds to social jam sessions may also fill a musical gap.

To fit (melodic) metal percussion into my design goals, the adjustable tone bar was proposed. It is envisioned to be a reduced version of the vibraphone, featuring, optimally, only one metal element that can be shifted in pitch. An imagined working principle is illustrated in Fig. X.

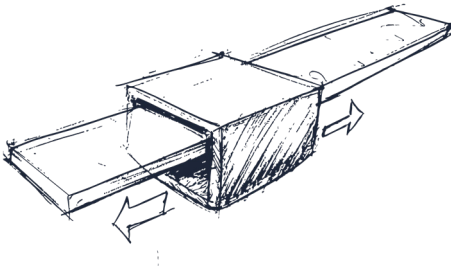


FIG. 24 INITIAL IDEA OF A FREELY TUNABLE VIBRAPHONE BAR

However, research on the matter brought forth major challenges in terms of technical feasibility. In a vibraphone, each bar must be

tuned individually to a specific note by removing material in specific locations of the bar to avoid or limit unwanted frequencies muddling the tone. This means that ideas of changing the note simply by clamping a metal bar at different lengths, as illustrated in Fig. 24, is not realistic. Experimenting with different metal profiles confirmed that choosing a note by this means is not straightforward and does not yield pleasant sounds.

The saw was found as an instrument that does yield different notes with a single metal element by using a flexible sheet of metal. A conceivable solution might integrate this operational concept into an instrument with a shallow learning curve.

### **Concept 2: The Tunable Drum**

Keeping in mind that the target user typically will have gained some experience playing shakers in a social jam session, the tunable drum concept builds primarily on this rhythmic basis. It introduces harmony to the user in a secondary manner. The instrument would consist of a drum of which the membrane can easily be tensioned to reach a specific note. As such membrane drums emit a blend of frequencies in addition to the primary note, much like some of the gongs mentioned earlier, the note may be perceived as percussive rather than melodic.

Despite this, the tunable drums would feature a visible tuning mechanism that invites to experiment with the effect of different notes in an ongoing jam session.

This could create a scenario in which a novice musician can sensitize themselves to harmony, building on their rhythmic knowledge, with limited disturbance to other participants of a jam session. Some sketches from ideation on tunable drums are shown in Fig. 25

ULTRA TUNEABLE DRUMS / PEROUSSIVE INSTRUMENT

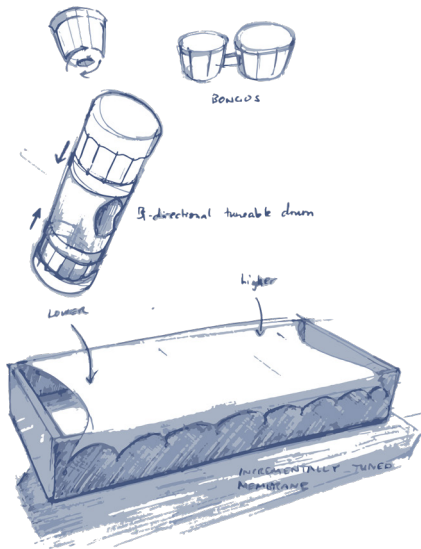


FIG. 25 IDEATION SKETCHES FOR TUNABLE DRUM INSTRUMENTS

### Concept 3: The Moveable Bridge String Instrument

The discovery of the koto during research opened a new approach for the uncomplicated selection of a note. By using the working principle of the koto on an instrument with only one string, as shown in Fig. 26, a note can easily be chosen to fit the

ongoing music in a jam session. This instrument has low complexity, a simple working principle, and includes some space for creative expression by applying pressure on the string opposite to the portion being played, as well as creative expression through rhythm/plucking technique.

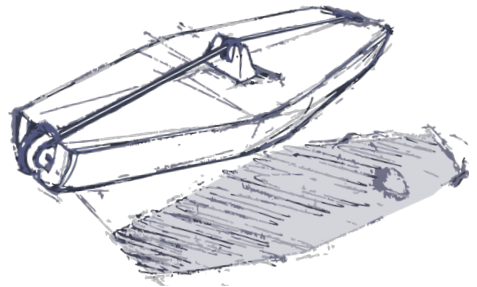


FIG. 26 SKETCH FROM IDEATION OF THE MOVEABLE BRIDGE CONCEPT

### Choice and Reasoning

While Concept 1 initially appeared to be a promising path towards an instrument that fulfilled the design goals, as well as differentiating it in terms of sound, addressing a musical void in social jam sessions, this direction was dismissed for lack of a solution deemed realistically feasible within the context of this graduation project. The central goal at this stage being to build a reduced-complexity instrument, both concept 2 and 3 represented feasible options that could be quickly prototyped and subsequently iterated upon. Out of

these two, concept 3 was chosen to prototype and test at this stage for the following reasons:

- Concept 2 (tunable drums) has a larger distance in the working principle of the target of harmonic instruments (as manifested by the guitar), remembering the designed instrument's role as a bridge between shakers and harmonic instruments
- Higher expected space for innovation in concept 3 (tunable drums exist in essence, with a variety of tuning/tightening mechanisms to be found)
- High ease and predictability of working with strings to achieve a desired result.

“

*Honestly, I would just like not to have to think. I want to be shown what I need to play. At least at first.*

”



## Prototype V1

Prototype V1, shown in Fig. 27 incorporates the working principle of the koto in a simplified, one-string instrument. It includes a tuning peg, a violin string, and a bridge. The base plate acts as a resonating body, amplifying the sound generated by the vibrating string. It is tuned by ear, plucking the string and shifting the bridge until the desired note is reached. It can be played by strumming the portion between one end of the instrument and the bridge. Pressing down the string on the opposite side of the bridge increases the tension in the strummed part, bending the pitch of the note upwards.

In contrast to attempts at playing Prototype V0, I personally felt I could contribute to the music when playing over recorded music with Prototype V1. The stretchy string allowed the production of interesting sound

effects, and it was easy to change notes. I still felt a wish to play more notes than the ones I could play by strumming the string and pressing it down to pitch bend (this gives an approximate three half-note range) and found myself shifting the bridge frequently to play a higher range of notes.

### Prototype V1 User Tests:

This time, the prototype having been more convincing in a self-test, it was tested with two music novices, with the primary goal to observe the playability of the instrument in a simulated jam session.

The functionalities of Prototype V1 were briefly introduced to the music novices, after which they were asked to attempt to accompany a 5-minute recording of a jam session with the instrument. When requested by the test participant or approximately halfway through these 5



FIG. 27 PROTOTYPE V1



minutes, I set the instrument to a suggested note for the user. This was followed by a discussion about their experience. The setup is shown in Fig. 28.

From my observation, both music novices had difficulty choosing a note that would classically be deemed in harmony with the ongoing music. While both music novices intermittently seemed to focus on the instrument and ignore the background music, they appeared to mostly remain

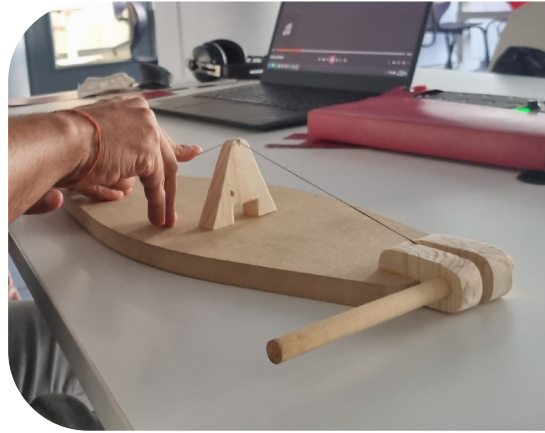


FIG. 28 USER TESTING PROTOTYPE V1

aware of the music, as noticed through adherence in strumming to the rhythm of the music.

Test participant 1 asked me multiple times throughout the duration of the backing track to set the note for them. They experimented frequently with setting the note themselves. I noticed that they tended to select lower notes. When asked about this in the discussion, they answered “Well, if I play higher, you hear me better. Lower notes are like a more invisible addition [...] I don’t want to attract attention to myself” Test participant 1 expressed little confidence in their musical contribution.

Test participant 2 seemed content playing false notes, and rarely changed the placement of the bridge to set the base note. Their focus appeared initially to be on the

## Commentary

### Bridge Topology

*While experimenting with different shapes as bridges, I found that a rounded contact surface created an interesting sound resembling that of a sitar – A buzz generated due to the proximity of the string to the surface of the bridge beside the main point of contact. In testing, both the A-shaped bridge, making a much cleaner, sinusoidal sound, and disk-shaped bridge were provided. In both test sessions as well as six instances of informal feedback by fellow students trying the instrument, the sound of the rounded bridge was preferred.*



FIG. 29 A ROUNDED BRIDGE TOP

strumming pattern, and later shifted to modulating the note by pressing the opposite side of the string. I offered to set a note midway through the backing track, leading to a somewhat more harmonious musical contribution. Test participant 2 expressed confidence in their musical contribution, saying they would soon be ready to move on to an instrument with more strings.

Both music novices made an unprompted comparison to shakers while discussing the instrument. Test participant 1 mentioned that Prototype V1, as played on a table, was quite static, and that they felt that an energetic movement such as playing the shakers gave them a sense of agency. Test participant 2 reported searching for a strumming pattern based on rhythmic experience with the shaker.

Both music novices expressed a wish for the instrument to guide them or tell them what to play.

Both novices expressed enthusiasm about the pitch bend created by pressing down on the string.

### **Discussion**

The comparisons made to the shaker reinforce the shaker as a basis on which to build and invites to look closer at its attributes; beyond being the vessel through which music novices begin to learn to contribute musically with rhythm and

dynamics, some remarkable qualities have come to light: **The shaker is inconspicuous and doesn't attract the spotlight**, which aligns with barrier 1 - perceived pressure to perform - identified in chapter 2.3. Additionally, the movements involved in playing the shaker are energetic and purposeful. A lens on the movements involved in playing an instrument emerges as a vessel for increasing confidence and clarity for a music novice.

The reduced complexity of the instrument with respect to a guitar seems to have effect: **the novices both retained significant focus on attempting to sync with the backing track**. However, regardless of whether they were cautious or confident, the contributions were not in harmony with the backing track unless the note was set for the music novices. This suggests that with this working principle, **it cannot be expected that a music novice contribute harmoniously within their first jam session if they are to set the note themselves. This invites to think more about possibilities for (initial) guidance**, particularly as both test participants expressed a wish for it. Considering the recognized value of assistance from advanced jam session musicians, it is reasonable to factor this into considerations about guidance.

Additionally, neither of the novices appeared entirely satisfied with their contribution with Prototype 1. Test participant 1 expressed

insecurity about the value of their contribution and the worry that the notes were false, while test participant 2 suggested twice that they would gladly add a string. These two views suggest a need for a more robust framework to give novices assurance, and for the instrument to offer a higher expressive range, potentially through the inclusion of a wider range of playable notes.

### **The test results with Prototype 1 point towards the following:**

- The instrument feels limiting in terms of melodic range for the advanced musician and for the confident novice.
- The instrument in its current form does not enable music novices to participate with a jam session in a harmonious way.
- This design does not satisfy music novices' wish for guidance.
- The expressive qualities of pitch bend are promising.
- Music novices use their experience with shakers as a foundation for learning new instruments.
- The instrument should be designed such that is not spotlighted, in other words, that it does not convey the expectation of performance
- Some consideration should be directed to the movements involved in playing the instrument

## **Commentary**

### **Bass Notes for Novices**

*The use of lower notes (bass notes) has re-emerged as a promising avenue for music novices to experiment with melody. Bass notes are traditionally used in an accompanying manner, with less complexity expected (bass lines often consist of only few notes). Furthermore, false bass notes generate less disturbance, as humans exhibit lower sensitivity to deviations in pitch at lower frequencies (Yost, 2009). Due to this lower pitch sensitivity, bass notes serve a rhythmic role to a higher extent – in fact, the bass is traditionally part of the “rhythm section” in musical ensembles – justifying bass as a good next step after basic rhythmic instruments such as the shaker.*

## Progress Update 2

Through the **hands-on production of instrument prototypes**, Design Sprint 2 has established a foundation for further prototype iterations. The current stage of the design process is shown in Fig. 30. **Self-tests** of the instruments served as an initial evaluation of playability and provided an indication of whether the instruments are suitable for advanced musicians. **User tests** offered additional valuable insights into

players' perceptions and identified areas for improvement in future prototyping iterations.

Based on the learnings made in design Sprint 2, the **list of requirements** was updated as seen in Fig. 31. In the table, changes or new requirements are highlighted in bold text. Additionally, comparative requirements based on Prototype V1 are shown below.

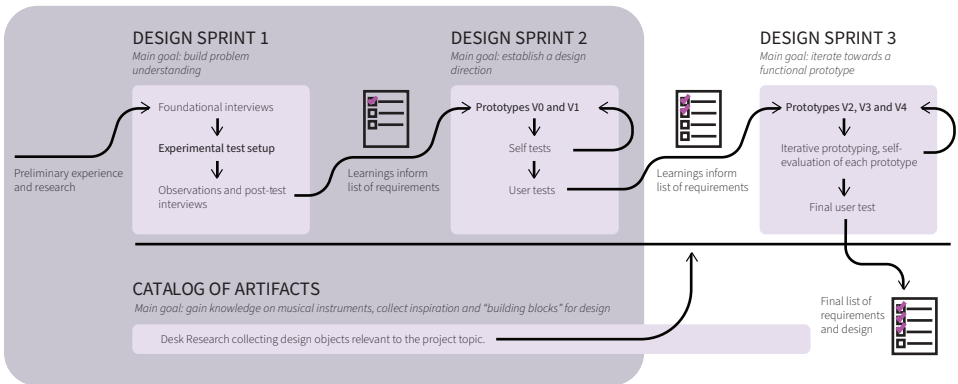


FIG. 30 DESIGN PROCESS

### List of Requirements

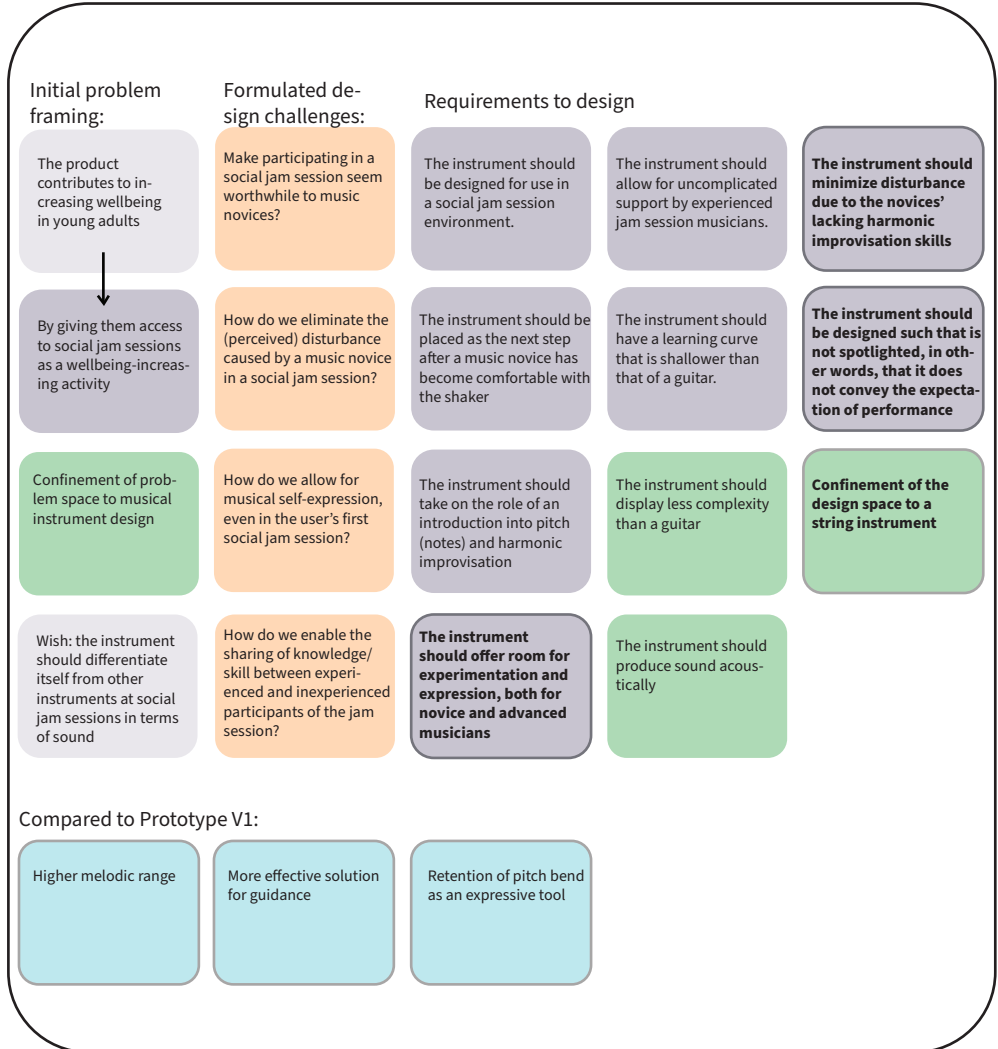


FIG. 31 LIST OF REQUIREMENTS AFTER DESIGN SPRINT 2

“

*Well, if I play higher, you hear me better.  
Lower notes are like a more invisible addition.*

*[...]*

*I don't want to attract attention to myself!*

”

## Commentary

### **As We Move on to Design Sprint 3: A Summary of the Bass Dilemma**

A large part of design Sprint 3 is overshadowed by a dilemma concerning the format of the instrument. **Initially, the instrument had been envisioned as small as possible**, making it inconspicuous to reduce the pressure to perform, and to adhere to music novices' perceptions in placing it as the next step from a shaker, as some music novices appeared to use size in determining which instrument they might progress to, as discussed in chapter 1.7, "Learning in Jam Sessions" on page 27.

However, **reasons supporting the choice of an instrument playing low notes**, or a "bass instrument" have accumulated throughout the project:

- The human ear has a **lower sensitivity to pitch deviations with low notes** (Yost, 2009), meaning that a bass instrument is less disturbing if played out of key.
- Bass instruments are commonly used as **accompanying instruments** rather than being the primary focus.
- Bass instruments often play **simple melodic lines**, circumventing expectations to play complex melodies.
- Bass instruments are **rare in acoustic (unamplified) jam sessions**, which constitute a significant portion of social jam sessions.

A dilemma arises because **acoustic bass instruments require a large resonating body** in order to be audible, which is the reason the double bass is so large. Acoustic bass guitars exist and have a somewhat larger body than an acoustic guitar, however, these tend to fall short in terms of volume. A bass instrument that could produce enough volume would have to be larger than the body of a bass guitar, which clashes with the mentioned goal of a small, inconspicuous instrument..

This is why, for lack of a resolution, I continued to develop the working principle on relatively small instruments, meaning they would have to play higher notes or be amplified electronically to produce enough volume. **The drastic change in format in prototype V4** was fueled by the realization that a large instrument could be made that is not spotlighted, as exemplified by the cajón, a percussive instrument that one sits on to play (See Artifact 19 on page 114). This format maximizes volume while optically staying in the background. Furthermore, the cajón's potentially cumbersome size has not inhibited it from becoming a staple of acoustic jam sessions, boding well for the design of a new instrument with comparable dimensions.

## Design Sprint 3

***Design sprint 3 is the last design cycle of this graduation project. It begins with the conceptualization of an instrument based on the learnings of the previous design cycles, followed by the selection of a final design direction. Refinement of the selected working principle is achieved through iterative prototyping and self-assessment of the prototype. Finally, two prototype instruments are tested with music novices in a social jam session setting.***

Reflecting on Prototype V1 and the project's overarching design challenges (See page 39), the principle aims for the next design iterations were set:

- Enabling uncomplicated support by advanced jam session musicians
- Providing music novices with more guidance
- Offering a higher note range than in prototype V1
- Maintaining or lowering the perceived complexity of the instrument

- Offering an instrument that is not spotlighted/does not attract attention to the player

A new round of ideation was held, opening the solution space to alternate instrument concepts, but constricting it to the generation of notes using a string. This is, on the one hand, due to aforementioned considerations about technical feasibility, and on the other hand, due to the suitability of a string instrument as a bridge towards guitar-like instruments as a staple for melody-playing instruments.

A particularly interesting challenge that the design should overcome is that of combining an increase of guidance, or reduction of (initial) space for mistakes, while simultaneously increasing the range of playable notes.

A collection of sketches from ideation can be seen in Fig. 32. Two concepts emerged from ideation. They are introduced and visualized in the following.



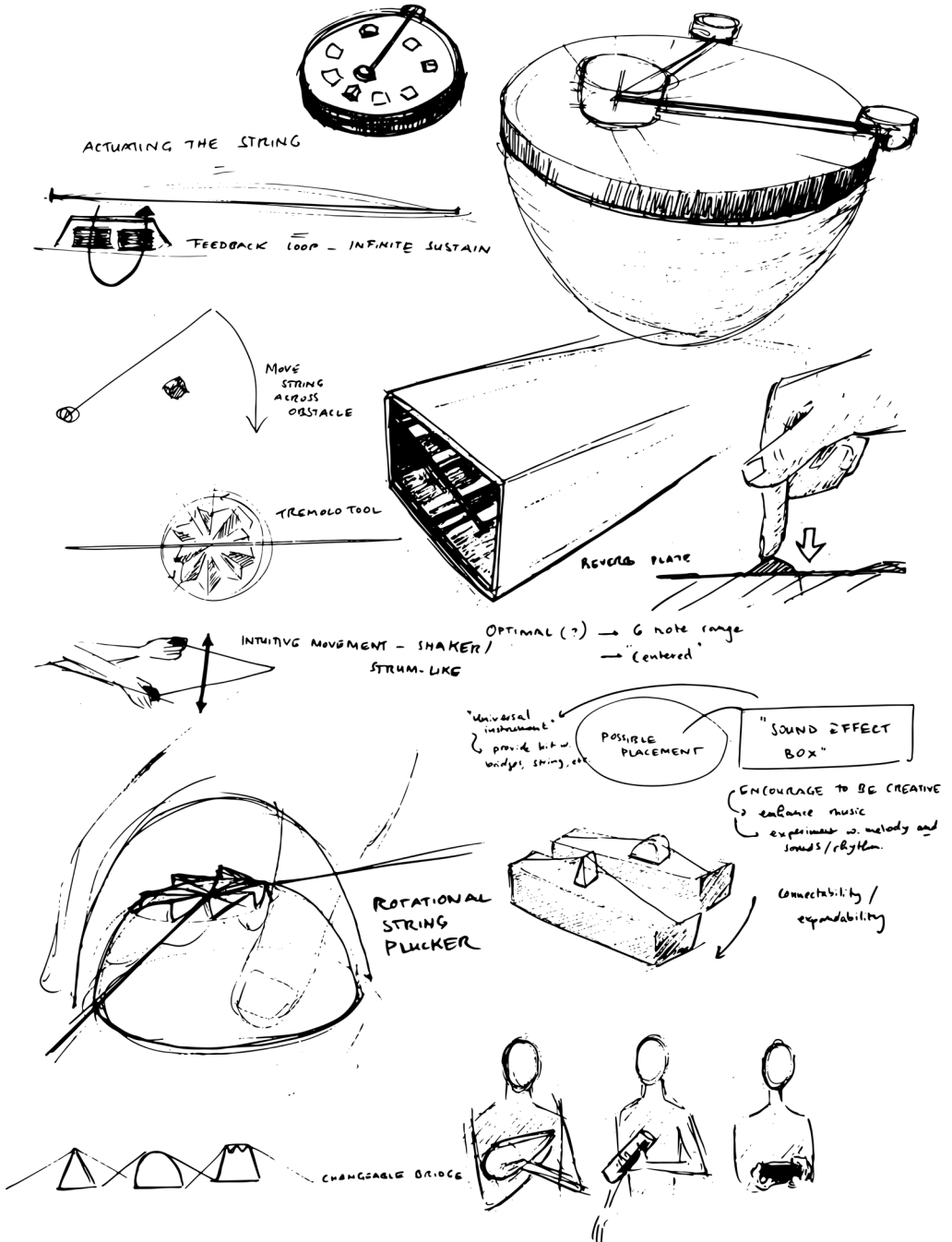


FIG. 32 IDEATION SKETCHES

### Concept A – Dynamic Bridge

Concept A, shown in Fig. 33 is based on Prototype V1, featuring a single string and a moveable bridge on a hollow body. In this concept, however, the bridge is envisioned as being moved dynamically to change notes, much like fingers are placed at different locations on a guitar string to play a melody. Instead of pressing on the opposite side of the bridge, the user can move the bridge along the length of the string to change the pitch.

By making the bridge an element that is moved dynamically, the limiting note range present in Prototype V1 at a given

configuration is removed. This means an increase in options at any given moment. To give a music novice more guidance and increase definiteness of how to play notes on the instrument, little stopping points are proposed that make use of elongated sound holes as rails. Each “stopper” can be added individually and allows the player to play a predefined note by docking the moveable bridge against it.

It is envisioned that an advanced musician can set up the placement of the stoppers or guide a music novice in doing so as a basis for the novice’s participation in a song that is being played.

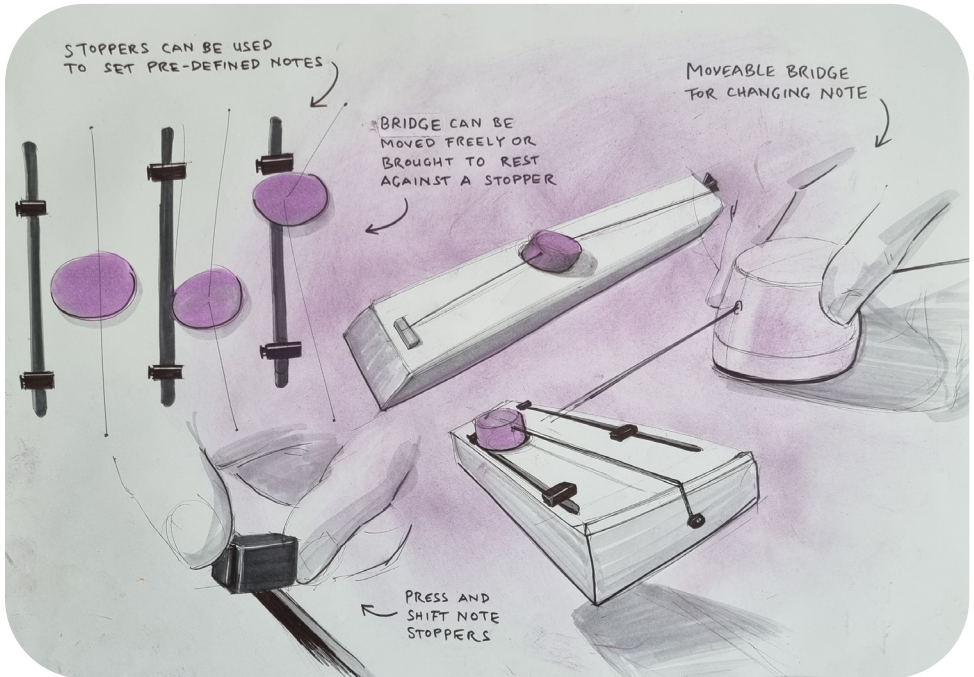


FIG. 33 VISUALIZATION OF THE DYNAMIC BRIDGE CONCEPT

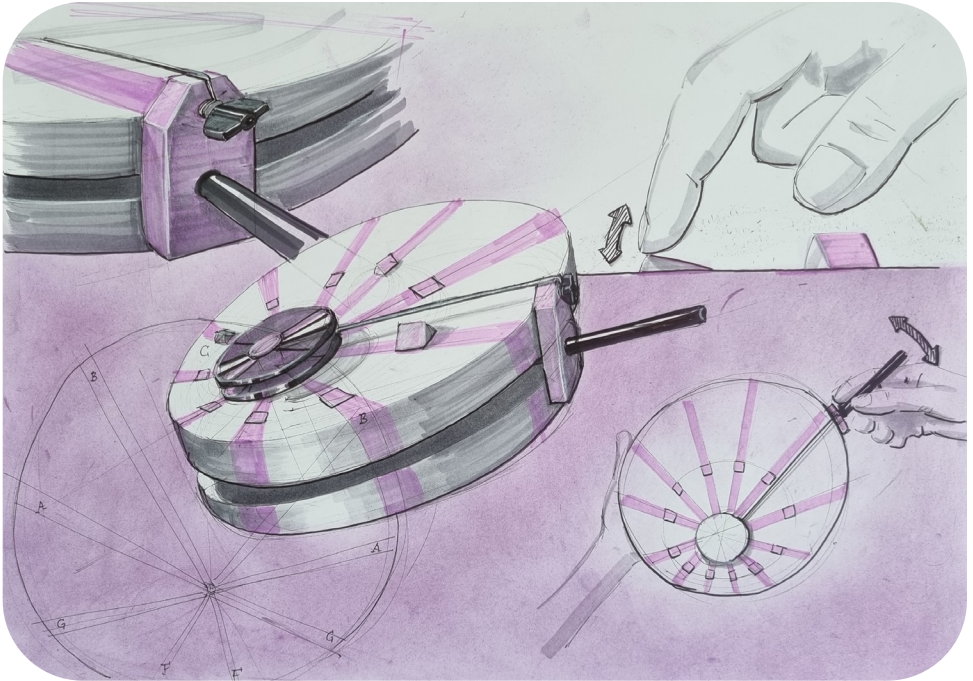


FIG. 34 VISUALIZATION OF THE OFF-CENTER ROTATING STRING CONCEPT

### Concept B - Off-Center Rotating String

Concept B, shown in Fig. 34, uses a different principle to change the note emitted by a tensioned string. One end of the string is anchored to an element that follows the circular outer edge of the instrument, while the other is attached to an axle positioned off-center. As the distance between the edge and the axle increases, the string is stretched more, generating a higher note.

To play the instrument, the player selects any number of notes to play by pressing the corresponding push-latch plucking

elements embedded in the surface of the instrument. Then, the player moves the string across the plucking element.

In theory, the instrument could be designed in a way that the player can choose any note from a full chromatic scale (half-note increments), with a sufficient range (to be determined). The instrument allows an advanced musician to guide a music novice by selecting a small number of notes that fit the chords of the ongoing music. A music novice can then experiment by adding or removing notes.

### *Discussion and Choice of Concept*

**Both instruments proposed are stringed instruments that, in theory, fulfill the goals of the project through:**

- (Perceived) simplification/reduction of instrument complexity compared to common (stringed) instruments
- A design that gives the option for uncomplicated support by more experienced participants of jam sessions
- Space for experimentation and growth on the instruments, including the possibility to make “mistakes” by opting not to restrict certain notes
- An element of novelty/uniqueness in the actuation of the instrument

**Some weak or unassessed points in both concepts remain, particularly:**

- Sound characteristics (Tension: low notes desired, small instrument desired)
- Ergonomics and overall playability of the instrument in the field (in a jam session)

However, in view of the limited time to develop a playable prototype instrument, some challenges unique to concept B ultimately led to the dismissal of this concept: To build this instrument, a high number of challenges remain that were deemed too time-costly and uncertain to proceed:

- The function of the push-latch buttons, their material and their topology as adequate string exciters.
- Mechanical design for relative movement of parts under the tension of a string (axle and edge-mounted string fixture)

- The challenge of avoiding a raised push-latch-plucker, for the case where the player might want to attain another note without playing raised note pluckers the string has to cross on the way there.
- The immediate pitch bend that would be generated as the string moves past a plucker, as movement along the perimeter of the circular instrument continuously changes the tension of the string. One way to alleviate this would be to change the instrument shape to a polygon, raising related design challenges such as ensuring smooth movement of the string fixture.

In contrast to this, Concept A relies on a simple working principle that be prototyped quickly, allowing for multiple iterations within the time frame of this project.

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### *Prototypes V2 - V4*

#### **Prototype V2:**

Prototype V2, shown in Fig. 35, was built as a proof-of-concept and basis for improvement of the “dynamic bridge” instrument concept. Its main purpose was to test its playability and expressive range with a self-test to evaluate its potential before implementing all features.

Prototype V2 was built rapidly, using soft plywood that, while offering mediocre sound quality, was available, affordable, and easy to work with. The prototype included the necessary elements for the core working principle of the concept: A body, a string, a bridge, and a tuning peg to tighten the string.



FIG. 35 PROTOTYPE V2 HAS A DYNAMICALLY MOVEABLE BRIDGE TO CHANGE THE PITCH OF THE NOTE WHILE PLAYING

At either end of the instrument, a rectangular nut made from wood was glued on the face of the body for the string to rest on. No stopper system was integrated into this prototype, as the stoppers' functionality could be emulated by one of these end nuts, or by adding clamps or placing a finger at a desired location on the face of the instrument.

In Prototype V1, the bridge had been relatively tough to adjust. To reduce static friction and enable easy changing of the note, the bridge was made lower, resulting in a flatter angle of the string. Due to the success of the rounded-top bridge on prototype V1, this bridge was made rounded as well, creating a sitar-like sound.

To enhance sound projection, a sound hole was added to the side of the instrument, since the top surface was dedicated to experimenting with movement of the bridge.

The bass guitar string initially installed on the instrument was quickly replaced by a nylon guitar string, as the thicker, higher tension metal-wound bass string was sawing through the wooden bridge.

### **Personal test**

Playing Prototype V1 above a musical backing track by plucking the string and moving the bridge, I immediately felt that I had enough creative space to contribute to the music, despite the simplicity of the instrument.

While playing this fretless instrument was fairly intuitive to me as a violin player, it was quite difficult to hit desired notes precisely. However, I found that fixed stopping points were extremely useful and gave a sense of security: After setting the base tuning (with the bridge all the way against the lower nut, I knew I could always fall back to this note by placing the bridge against the nut. The same



goes for a finger placed such that the instrument emitted a specific note when I brought the bridge against it.

**Prototype V3:**

Prototype V3, shown in Fig. 36, was built to include all functionalities of the concept including the soundhole-bound stopper elements. It was built more carefully, with a wider body, harder plywood and rounded corners to make it sound better and look more like an instrument.

The stopper elements, shown in Fig. 37, are held in with a spring and can be moved by



FIG. 37 A CLOSER LOOK AT THE STOPPER ELEMENTS

compressing the spring with one's fingers. The stoppers feature felt cushions for a snug and rattle-free fit. They are conceived to be docking locations for the bridge that serve the same purpose as frets on a guitar; once a player has identified a note they might want to come back to, the stopper can be placed there as a reference.

While the bridge can still be moved freely, allowing the player to play any note, these stoppers allow for the addition of information, forming a basis by which an advanced musician might prepare the instrument for a novice.

The prototype in this form still retains pain points: its small body does not allow it to play bass notes without amplification. Moreover, it already is considerably larger than shakers and as such, might be viewed as too noticeable, increasing barriers for novices. Lastly, its playing position remains ill-defined and would need to be elaborated with the help of user tests and further iterations.



FIG. 36 PROTOTYPE V3 HAS (RE)MOVABLE REFERENCE POINTS

**Prototype V4:**

Prototype V4, shown in Fig. 38, was built with care as it is the last iteration made specifically for testing the design in a jam session setting. It includes new developments in the concept and provides an answer to the remaining issues outlined previously: By enlarging the instrument's body such that the player can sit on it, the resonating volume is maximized such that it can play audible bass notes acoustically. Simultaneously, this means that the instrument is placed out of the spotlight and does not bring unwanted attention to a music novice who is playing it for the first time.

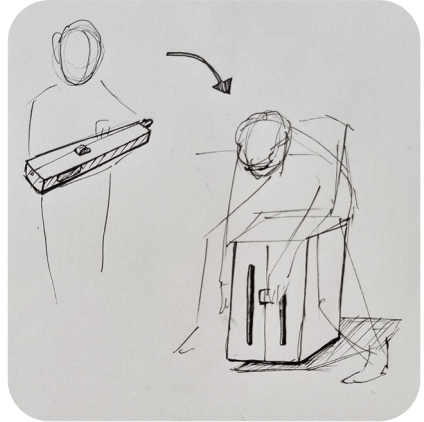


FIG. 39 SKETCH DEPICTING FORMAT CHANGE OF THE INSTRUMENT



FIG. 38 PROTOTYPE V4

The playing position and ergonomics can be considered as tried and tested, as this is envisioned as being the same as on a cajón, a widely used percussive instrument in acoustic jam sessions. For this reason, the approximate measurements of a standard cajón were used.

For strings, bass ukulele strings were mounted. These are made of a dense elastic-plastic blend which is a proprietary formula of the maker. Comparable strings are commonly made of polyurethane or silicon rubber. Tests with paracord, as used on the homemade “bucket bass” (see Catalogue of Artefacts) were disappointing, as this lightweight rope apparently works well for translating longitudinal vibrations, but not transverse vibrations that are crucial for sound generation in this design, as illustrated in Fig. 40. In contrast to these, elastic ukulele strings proved to create a warm and audible sound. Further material tests exceed the scope of this report, but may enable further improvements in the sound and volume of the instrument.

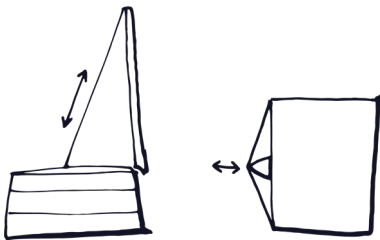


FIG. 40 LONGITUDINAL VIBRATIONS IN THE BUCKET BASS AND TRANSVERSE VIBRATIONS IN PROTOTYPE V4

## Commentary

### Filling a Gap in Acoustic Jam sessions

*Making an instrument that can provide audible acoustic bass notes is desirable because it addresses an existing pain point in acoustic jam sessions. It is common for social jam sessions to lack a bass instrument: If there is no electric bass amp available (in chapter 1.5 I discussed that social jam sessions are often mostly or completely unamplified), there is a lack of options that are relatively portable and affordable. Low notes require larger resonating bodies to produce loud acoustic sound. The double bass is extremely large and expensive, while acoustic bass guitars produce insufficient volume due to the small size of their resonating bodies.*



FIG. 41 DOUBLE BASS AND ACOUSTIC BASS GUITAR

The Prototype includes a tuning peg which is placed in a recessed hole in the top of the instrument to avoid this vulnerable element from being exposed and in the way, as shown in Fig. 42.

The string is installed with a plastic washer and a knot maintaining it from the inside of



the lower hole, and then threaded through the top hole and wound up with the tuning peg on a 3D printed spool element, also shown in Fig. 42.

Prototype V4 was made out of hardwood veneer plywood, using 3.6 mm thick boards for the front and back, and 9 mm on the sides, loosely based on the constitution of commercial cajóns. Because the placement

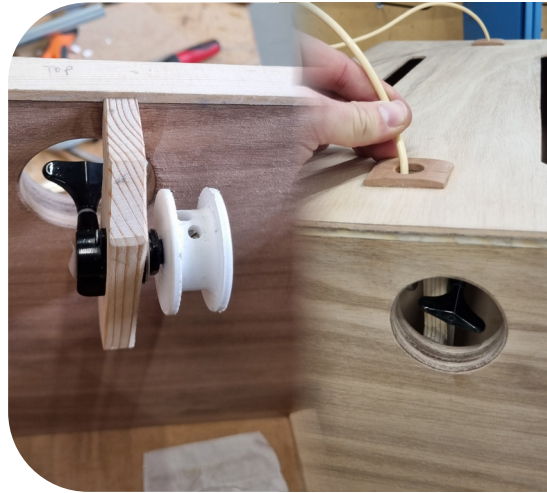


FIG. 42 TUNING PEG AND SPOOL

## Input from Research

### The Bass Bar

*In instruments of the violin family, a so-called “bass bar” is placed in a similar manner to keep the top from collapsing and to distribute vibrations along the length of the instrument (McKean, 2016) While the bar is most certainly not needed to avoid collapse in this case due to material properties of the top plate and the low tensions present in the plastic string, its utility in reducing flex may be paired with significant effects on the distribution of the sound throughout the instrument, another route for further experimentation that exceeds the scope of this project.*



FIG. 43 PROTOTYPE V4'S "BASS BAR"

of the soundholes led to a narrower slab where the tension of the string presses the bridge against the face of the instrument, a thin strip of sprucewood was added to the inside of the front face to give it additional rigidity and reduce the flexing felt when applying pressure to the piece. This so-called “bass bar” is visible in Fig. 43.

The working principle is the same as in prototype V3: The instrument is played by plucking the string on the portion above the bridge, and the note is changed by moving the bridge along the length of the string. “Stoppers” can be added at any location along the elongated sound holes as reference points on which the bridge can be docked.

## Final User Test

A final user test was conducted to gain an indication of whether the instrument design effectively addresses the intended design goals.

Additionally, the test sought to evaluate the expected advantages of the larger-format bass instrument by means of a within-subject experimental method (Charness et al., 2012) in which each test participant interacted with two different prototype instruments. Letting music novices compare the two instruments themselves allows for effective collection of user preference, and is expected to mitigate social desirability bias by catering to more comparative and informed feedback.

In the user test, five music novices each tested two different instruments - prototypes V3 and V4 - under observation by myself as the investigator. A social jam session environment was created with the help of five experienced jam session musicians, in a bookable living room area of the university recreation center. The study protocol can be found in Appendix 11 on page 200

The novices joined the jam session at pre-assigned timeslots in which they were asked to play both prototype instruments for ten minutes each, with their playing order randomized to reduce order effects. After this, each participant filled out a questionnaire targeted at obtaining user

assessments of the effectiveness of the prototypes in tackling the design challenges defined in chapter 2.3 (page 39). The questionnaire questions and responses can be found in Appendices 12 on page 202 and 14 on page 206. Going through the guiding challenges:

- *How do we make participating in a social jam session seem worthwhile to music novices?* - Question about the user's feelings around taking part in the jam session with the instrument.
- *How do we eliminate the (perceived) disturbance caused by a music novice in a social jam session?* - Question about the extent to which the user could blend into the jam session.
- *How do we allow for musical self-expression, even in the user's first social jam session?* - Question about the user's capacity to express themselves with the instrument.
- *How do we enable the sharing of knowledge/skill between experienced and inexperienced participants of the jam session?* - Question about the user's experiences receiving guidance during the user test.

### Results:

In terms of my observations during the test, I perceived the **bass notes generated by music novices to be appealing rather than**





**irritating**, even if they were not in the right key. In cases where the notes were off, the low frequencies and tonal quality resulted in a more drum-like rather than dissonant effect.

Both instruments suffered from lacking volume, to a large extent due to the playing technique and restraint exhibited by the music novices. One more confident music novice played prototype V4 at a level that was comfortably audible for me as a listener. In the higher pitched prototype V3, the low volume issue was exacerbated due to the materials used to make the resonating body. This mainly means that on average, advanced musicians were less likely to hear and react to the novice's contributions than if the instruments had been louder.

All music novices reported Prototype V4 to feel intuitive to play or to be more intuitive than Prototype V3.

In terms of **feelings while participating in the jam session**, with the higher-pitched Prototype V3, the music novices expressed *frustration, nervousness, struggling and difficulty to play what they wanted*. In contrast, participating with Prototype V4 yielded the adjectives *relaxing, nice, fun and harmonious*. The music novices expressed *"not being too self-conscious"* and being *"interested in exploring"*.

#### Answers regarding **musical self-expression**

were mixed with both instruments, generally tending towards more negative answers, some mentioning that they did not feel they had enough time to develop self-expression capabilities on the instruments.

#### Regarding **blending in to the jam session**,

the answers were mixed, but in favor of prototype V4 with its lower notes, aligning with my perspective as an observer/listener.

#### **Guidance** via the preset notes was not used

very much. However, the stopper elements were frequently used as self-set references by the music novices to remember the placement of a nice note found through experimentation. Based on observations and a post-test discussion, it was brought to light that the advanced musicians, in particular guitarists, had some limitations in helping the novices: On the one hand, **the guitarists present relied more on music theory knowledge and did not feel confident themselves in the harmonic skill of finding a note by ear**. On the other hand, since it is common for guitarists lie down the basis for a musical piece by selecting and playing chords, **they had usually set the music in movement at the moment that the novices needed guidance**. Since the ongoing music was being carried by the guitar, the guitarists had no easy way to assist the novices in this moment.

Additionally, three technical flaws of the prototypes should be mentioned that had not been identified and resolved before the user test:

1. The bridge on instrument V3 was made too high, which resulted in a relatively limited portion in which the change in pitch was linear to the movement of the bridge. Going outside of this range leads to increases in pitch as the overall tension of the string sees a sudden increase, as sketched in Fig. 44. A straightforward solution is a bridge that is less high.

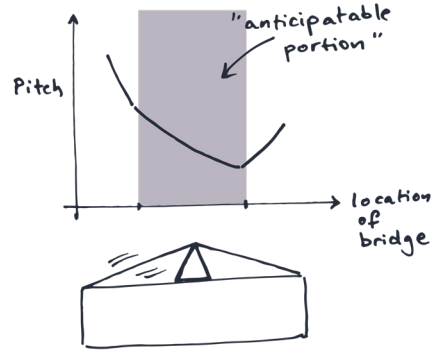


FIG. 44 GRAPH OF THE PITCH RELATIVE TO THE LOCATION OF THE BRIDGE

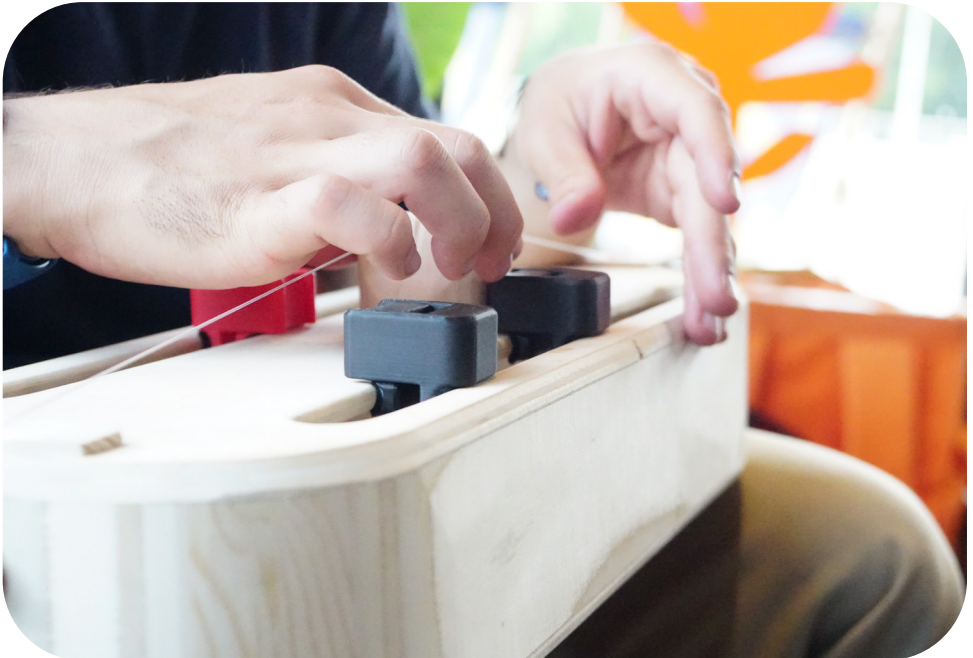


FIG. 45 A TEST PARTICIPANT PLAYING PROTOTYPE V3

“

*I liked the low sounds. It also helped that they mixed well, so I did not get too self conscious. I also could make some fun sounds with the sliding of the wooden parts, which inspired others!*

”

2. The elastic string on prototype V4 has a relatively high static friction, which means that the position of the bridge is not absolute for a given note. Depending on the direction from which a stopper element is approached, the location of the note may deviate. Solutions for this could include using another material for the string or bridge, or including a wheel element where the string rests.
3. The dimensions of a commercial cajón were rounded up when building. The resulting 8% increase in size was significant, making it uncomfortably big for smaller people. This was a mistake. As a standard size, it makes sense to stick to the dimensions of standard cajóns.

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### Discussion

The test results were promising, but also revealed clear flaws in the design:

The design isn't adapted for guidance through advanced musicians who do not feel confident in their harmonic improvisation skills (for instance, a guitarist who relies heavily on music theory knowledge to play chords). Additionally, the act of giving guidance can be disruptive, especially for jam sessions with a smaller number of participants: It is difficult for other musicians playing foundational chords to offer guidance efficiently or from a distance. Considering a guitarist might want to offer support from across the room as those photographed in Fig. X, it is difficult to offer assistance without getting closer or hands-on.



FIG. 46 GUITARISTS AND A PERCUSSIONIST AT THE USER TEST

Additionally, plucking the string at an audible volume is an additional layer of technique that music novices need to master, increasing the complexity involved in playing the instrument and leading to contributions that are inaudible by other musicians. Based on the learnings obtained in the bass guitar test setup in Design Sprint 1, it can be assumed that reducing the focus required to correctly pluck the string will also enhance novices' ability to integrate into ongoing music and express themselves more effectively with the instrument.

Thus, three additional requirements are set:

1. The instrument enables effective remote support (for instance, from across the room)
2. The instrument can facilitate support that leverages music theory knowledge
3. The instrument enables novice musicians to pluck the string audibly without difficulty.

## Progress Update 3

The Design process within the scope of this project as shown in Fig. 47 is complete, with the exception of a final update of the list of requirements and a proposed final design. Design Sprint 3 yielded 3 additional, iteratively improved prototypes. They were self-evaluated to assess their appeal as musical instruments from the point of view of myself as an experienced jam musician, and the last two prototypes were tested with

target users - music novices - in a realistic jam session environment.

This final user test brought forth flaws in the product that were translated to requirements in the updated list of requirements shown in Fig. 48, to subsequently be addressed in the final design. The effectiveness of these design choices remains to be evaluated beyond the scope of this graduation project.

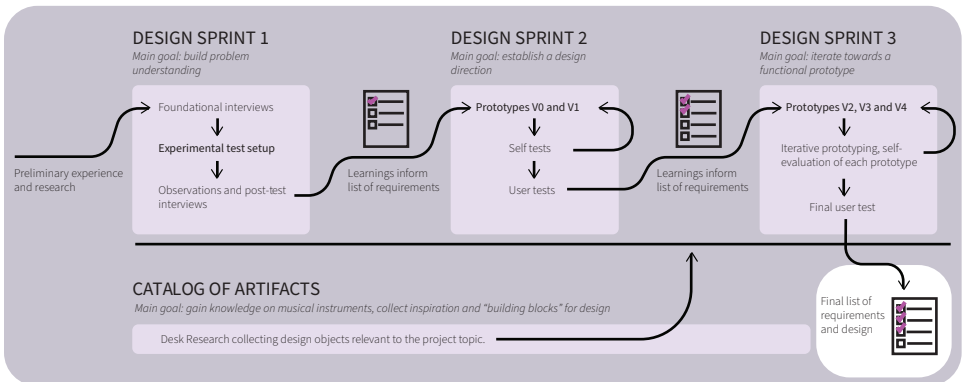


FIG. 47 DESIGN PROCESS



## List of Requirements

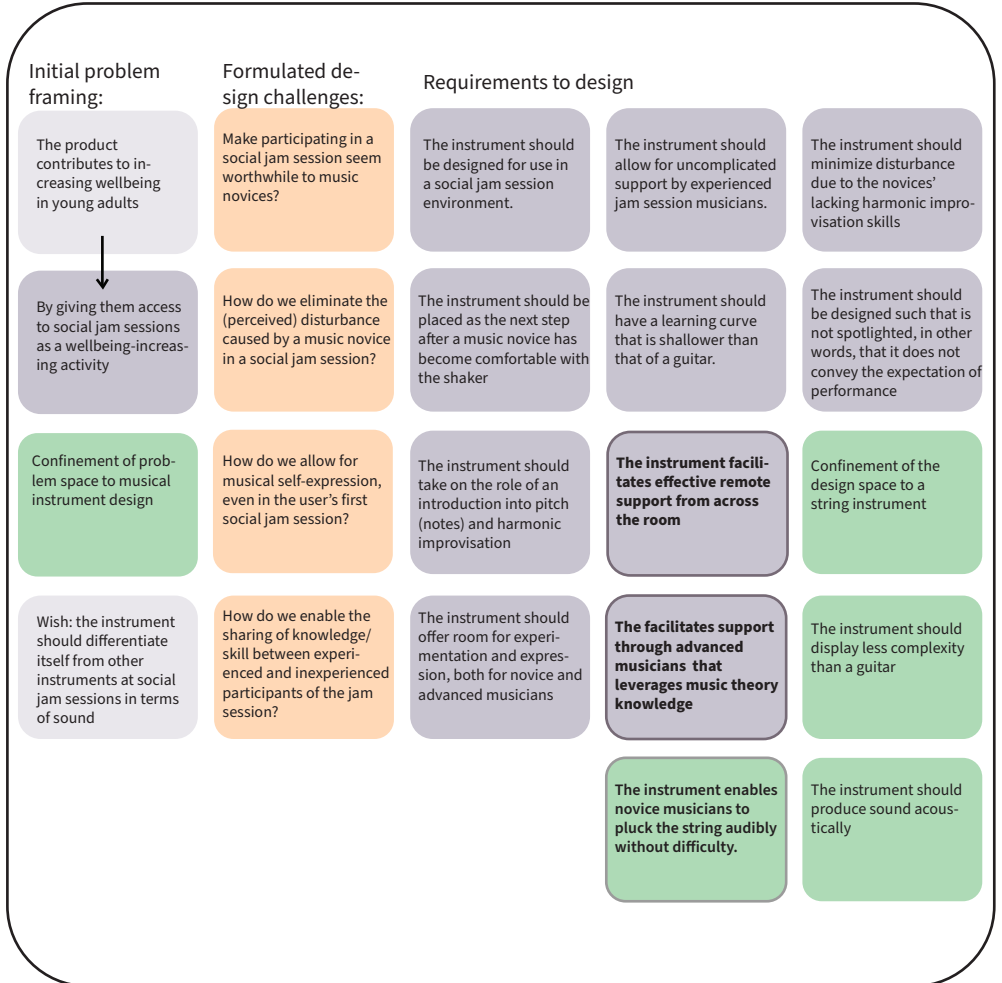


FIG. 48 LIST OF REQUIREMENTS AFTER DESIGN SPRINT 3

## Final Design

*The final design of the instrument is visualized here with the help of pictures of prototype V4. It is an acoustic bass instrument comprising one string. Its design is catered to enable and inspire experimentation with pitch, rhythm and dynamics within social jam sessions.*





*The envisioned way to play is for the player to sit atop the instrument. A bridge is placed between the tensioned string and the front plate. Adjusting its vertical position alters the pitch produced by the instrument.*



*The player can opt for a bridge with a built-in pick, which enables one-handed playing of the instrument through a slight rotation of the bridge. This further reduces the technique needed for a first-time player to produce satisfying sounds.*

*“Note markers” serve as removable frets. They are easy to remove, add or move along the elongated soundholes that serve as rails. Setting them provides the player with a selection of defined notes as a navigational aid while playing music.*

*These guides can be employed to provide novices with a solid basis for musical accompaniment, even without prior musical knowledge, by having an advanced musician place them.*



*A built-in tuner on the top of the instrument displays the notes being played, facilitating both verbal and music theory-based guidance. This allows a novice to set specific notes, such as 'A' or 'F sharp,' as suggested by an advanced musician.*



*The base tuning of the instrument (the lowest note that can be played) can be altered by means of a tuning knob in a recessed hole on the top face of the instrument.*

See the showcase video here:  
<https://youtu.be/Sz9k3FqA8jo>

# 3 - DISCUSSION

## Discussion and Outlook

*The product emanating from this graduation project is a relatively simple acoustic musical instrument. Its genesis emanates from the recognition that musical jam sessions represent a healthy activity that, if made more accessible, may increase mental wellbeing in young adults, in a day and age where this wellbeing seeing a decline in the Netherlands (Ministerie van Volksgezondheid, Welzijn en Sport, 2023)*

The design of a musical instrument was argued to be an effective means to combat this decline in wellbeing through its significance as a **vessel for musical expression, allowing young adults to partake in social jam sessions**, active social environments that have been shown to enhance emotional wellbeing (Cunha & Lorenzino, 2012; Van der Kolk, 2014). Social jam sessions proposed as a desirable activity that counters the increased passive consumption of media and social media addiction (Centraal Bureau voor de Statistiek, 2018; Oosterveer, 2023) by fostering active creative expression and social engagement.

Initial research, which included questionnaires, user interviews, and observations of jam sessions, revealed that music novices encounter significant barriers when trying to participate in social jam sessions. These barriers primarily stem from the steep learning curve associated with acquiring harmonic improvisation skills. Although rhythmic instruments like shakers allow novices to join in, they often abandon social jam sessions because there is no clear progression to more advanced instruments that include pitch, one of the main tools for musical expression.

**A user-centered, research through design approach** was chosen, each design cycle involving testing new **exploratory prototypes that were iteratively built** based on their predecessors' assessed performance in previous user tests. This approach proved to be well suited due to the nature of social jam sessions as a highly dynamic social environment which cannot easily be simplified to concrete variables; **research through design effectively fostered the growth of contextual understanding**, each design cycle revealing new or more nuanced insights that impacted the design space. Furthermore, having access to a pre-existing social jam session

“

*Hey, I heard about your project.  
Once you have an instrument  
that allows me to play in a jam  
session right off the bat, I would  
love to join a jam session!*

”

community and the proximity to large numbers of target users (among TU Delft students) meant that test sessions needed for research through design could efficiently be put in place.

**An emerging requirement necessitated that the musical instrument design also be engaging for advanced musicians as secondary users.**

This criterion emphasizes the product's role as a musical instrument rather than solely a learning tool and ensures space for novice musicians to further their musical expression skills on the instrument.

**This justifies the adequacy of self-tests by myself as an advanced jam session musician, permitting me to perform a critical validation test before presenting the design to target users.**

Validating the instrument for both ends of the spectrum, from music novice to advanced musicians is sensible, as the goal is for the design to cater for an evolution from the former to the latter.

**Of course, as an individual person, I do not reflect the profile of all advanced jam session musicians.**

My preferences and skills deviate from other advanced musicians, and I have infused my biases into the project due to the knowledge that my assessments of prototypes inevitably would influence the following step of the project. A good example of deviating profiles among advanced musicians is the differing levels of harmonic sensitivity ("having a good ear") and of music theory knowledge. While I play music primarily by ear and argue in this

report for the importance of the development in this skill, many advanced jam session musicians rely more heavily on music theory. They surely would have an entirely different lens when assessing the degree of engagement felt when playing a prototype instrument. Ultimately, I believe that these advanced musicians may also profit from developing their musical ear by using the instrument designed in this project, in the same way I may profit from broadening my musical expression repertoire by acquiring more music theory knowledge.

In relation to self-testing, one could boil down the task to finding a balance between simplicity – as defined in relation with tests with novice musicians – and the level at which felt I can produce satisfying musical expression with the instrument. Thus, where the design was assessed by an "advanced musician", it is really my very specific, subordinate profile that is infused into the design. The resulting product emanates from this lens, balanced with my interpretations of observations of the principal target group, novice musicians, and of their feedback.

Therefore, it remains to be seen, through further use of the Bass Box in social jam session environments, whether the musical preferences infused into this instrument design project will be shared by the musicians of varying levels present, from beginners to advanced. The promising



results from the final user test with prototype V4 provide solid grounds to continue the project, and the insights generated through research through design remain valuable for any instrument design project that seeks to cater for the integration of music novices.

As it is, prototype V4 is a playable instrument that can be used in jam sessions and approaches the final design in its functioning. However, some technical issues remain to be solved and implemented

successfully, as discussed in chapter 2.7 (page 83). **Beyond the scope of this graduation project, the next iteration will feature improved sound and actuation by means of an updated bridge topology, as well as a built-in tuner.** In the long term, I am confident the Bass Box will contribute to making social jam sessions a more approachable space for music novices, contributing to more social jam sessions, and consequently, higher mental wellbeing in young adults in the Netherlands.





# 4 - CONCLUSION

## **A box with a string on it to improve the world - is this justifiable?**

Music shapes our world in many ways, is deeply engrained in our culture and is one of the most powerful means we humans possess to convey emotion. Leveraged in advertisement, played for entertainment on the radio, a hobby to many, we are unlikely to come across someone who does not come in contact with music on a daily basis. If it was bad for us, we might call it an addiction. But the evidence presented in this report indicates otherwise.

Gaining musical fluency means accessing a new language that isn't limited by a finite selection of words and expressions. In social jam sessions, one practices the use of music as a means of communication. At a small

scale, this improves individuals' mental wellbeing as well as their social capabilities such as empathy and teamwork. So just imagine what widespread music making could do to improve cohesion among us!

In this project, I showed that the impact of social jam sessions is non-negligible and that the wish to partake in this activity is present in those who do not have access to it.

**If making music changes the world, then musical instruments are enablers for change.** Boxes with strings have carried musical expression for thousands of years. A new box with a new string on it, the Bass Box embodies measures to provide a path towards musical fluency for those who are mute.

*So that anyone who needs to, may speak without words.*

# 5 - CATALOGUE OF ARTIFACTS

*The following design artifacts were collected during research throughout the duration of the project. They served as a tool for reflection on the topic of this graduation project and, as an arsenal of inspirations and working principles that might be adapted for use in my product design.*

## *Artifact 1: Handmade Shakers*



*These are some handmade shakers from a larger collection that I keep in a basket for use at jam sessions. Generally, music novice-attendees who overcome the barrier to participation do it with one of these. While at first they may be seen as a toy, this perspective usually does not linger: Experienced “jammers” can be seen using them in the jam session as well, and they can have a significant effect on the musical output.*

*Through their simple “DIY” construction and the variety of individual sounds each one makes, the user is invited to make a deliberate choice, to fine-tune the instrument to their taste. This can be seen as a first exercise of self-monitoring that is crucial to collaboration in jam sessions.*

## Artifact 2: Kyma



*A bachelor project made by a friend, “Kyma” was designed as a way to include deaf people in music-related activities by making the music visual. Sebastian told me that when he exhibited this product, it had the side effect of being widely engaging, inspiring people to experiment with the connected instruments or just enjoy the visuals produced. It is an example of drawing people in to the activity of music making via another point of focus.*

<https://www.caropacheco.work/kyma>

### Artifact 3: Maschine +



*I received a recommendation to check out Native Instruments' "Maschine +" after mentioning to an amateur music producer that my graduation is about social musical jam sessions. Native instruments makes this electronic instrument for music production and performance to edit, play back and loop sampled sounds, and even has another unit called the "Maschine Jam". However, these are not designed for social jamming, or playing music with others. In the contrary, I could almost exclusively find videos of it being used alone. This invites to think about the widely differing associations that people may have with the term "jam session", and also brings forth the category of instruments that is electronic music-making hardware.*

## Artifact 4: The Frog



*Known to me and my friends as “the frog” up until I looked it up this week, this instrument, which I own, has some particularities that differentiate it from other basic percussive instruments and it may have some value with respect to considerations on jam “accessibility”. The instrument, called a “güiro”, is played by stroking the ribbed part with a stick. It can be played in a way that it sounds like the croak of a frog.*

*On the one hand, the güiro is interesting because its pitch becomes more noticeable than on a single-hit percussive instrument. This, of course, also occurs in other resonating percussive instruments like the triangle.*

*On the other hand, the güiro has been very popular in my jam sessions, so much so that it became somewhat of a mascot. Advanced and beginner musicians are keen to figure out how best to play it during an ongoing jam session. I think it is due to the inhabitual movement and coordination needed to play it; playing it in time is more difficult than it looks. Through this, it is attractive to “jammers” of all levels.*

## Artifact 5: The Real Book

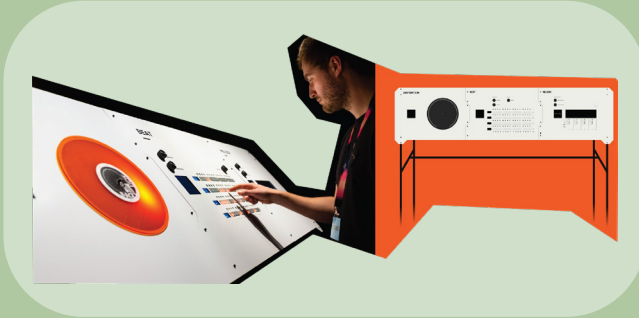


*During foundational interviews, the question arose on how to frame the activity in question. Jam sessions are organized, held and facilitated in many different ways. The Real Book as a jam artefact contributes to shaping a definition for “jam sessions”. It is a collection of “lead sheets” (musical scores) for famous jazz standards (common repertoire of jazz songs).*

*Due to copyright issues, the Real Book has the interesting history of a “black-market bestseller”. As a design artefact for my project, it relates to the topic of basic frameworks used to facilitate jam sessions. Jazz, at the origin of the term “jam session”, is commonly played using such a jazz standard, playing the song’s melody at the beginning and the end, and improvising in between, on top of pre-defined chord progressions.*



## Artifact 6: “Anima” by Bureau Moeilijke Dingen

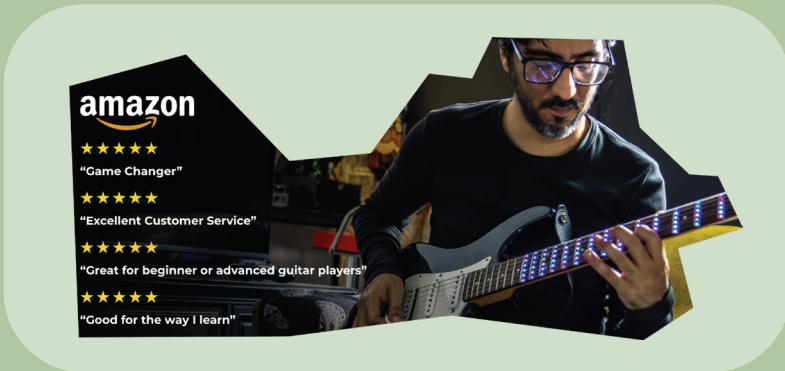


*“Anima” is a synthesizer designed by Bureau Moeilijke Dingen which, in their words, “facilitates a musical jam session between humans and machines”. Users interact with the synthesizer by providing guiding/constraining inputs, and a machine learning algorithm generates musical segments based on the constraints set. This product was recently exhibited in Delft at the Highlight Delft festival.*

*There are two main themes I reflected on about this product:*

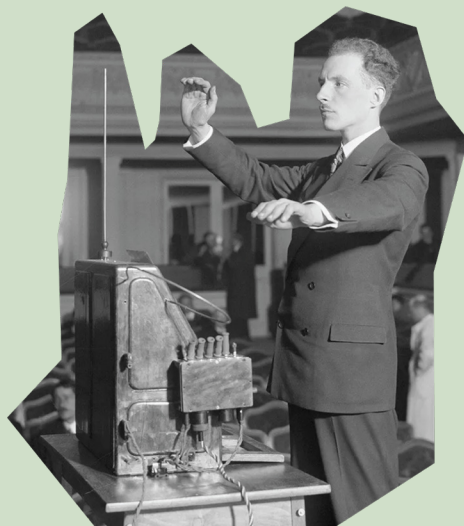
- One of them is catering to accessibility by limiting the complexity of the user’s input actions; through this, anyone can create music with the product. On the flip side, by delegating tasks to an AI, the user forfeits some control over the melodies created when compared to more traditional instruments - at least in terms of real-time music creation.*
- The other theme, is linked to the mentioned “jam session with a machine”. In many ways, this use of the term jam sessions aligns with the general definition I established for “jam sessions”: interacting with “Anima” can be non-rehearsed, draw on the user’s experience as well as intuition, and has for goal experimentation and musical expression. However, despite the AI being a participant, I would suggest that the communicative aspect is skewed with respect to the social jam sessions I’m focussing on, as the user’s intended musical expression/communication is most likely not directed towards “Anima” as a jam partner.*

## Artifact 7: The Fret Zealot



*While ideating, an early idea was mapping the location of the notes played on an instrument, in order to help novices mimic experienced jam session participants (Imagine a guitar that displays the notes played by another musician on its fretboard). In researching existing “fretboard mapping” products, I came across the “Fret Zealot”, a product that helps users learn music, albeit individually, by mapping chords and notes to play on the fretboard with colorful LEDs. It relies on a database of teaching videos, made specifically to be used in combination with the app.*

## Artifact 8: The Theremin



*In my user tests, music novices displayed and complained about the difficulty of coordinating both hands and about the inability to develop a logic about which note to press on which string. The theremin, invented in 1920, is said to be one of the first electronic instruments. Controlled through the movement of the player's hand in the air, it allows the player to modulate the pitch by moving one's hand in the air in proximity to an antenna. It is still used by renowned musicians to this day, for instance by French live electronic musician Mezerg, who uses it in combination with a keyboard and drumset.*

*It is an example of a musical instrument that uses a different type of input than in conventional instruments, opening reflection on intuitive control methods for music novices.*

## Artifact 9: The Otamatone



*While it is described online as a toy or as digital art, the Otamatone is also very much considered to be an electronic instrument. To play it, one must press its “cheeks” together - this controls the volume of the built-in speaker - and move one’s finger along its stem to change the note.*

*While the sound is atrocious in my opinion, and the dynamic control is limited, making it a loud, obnoxious thing, it is its own instrument with its own distinct sound, setting it apart - in category - by a multitude of other electronic music-making devices which can be used to play sounds from a library of available sounds stored onboard or on a computer. The latter are handy for music producers, but rarely used in social jam sessions, and considered as controllers, not instruments. The Otamatone shows that a deliberate choice of a sound can give an electronic musical instrument its own identity.*

## *Artifact 10: Boomwhackers*



*Another toy-like instrument, but with some good features that are in line with my research and conceiving direction: “Boomwhackers” are plastic tubes of different lengths that each produce a respective note when struck. The product is marketed for music classes in schools and care centers. Use cases often involve multiple musicians, each sitting, armed with two of these tubes which they hit against their upper legs. This product highlights the idea that the transition from rhythmic patterns to musical notes can be achieved with smaller steps and using fewer notes*

## *Artifact 11: The Handpan*



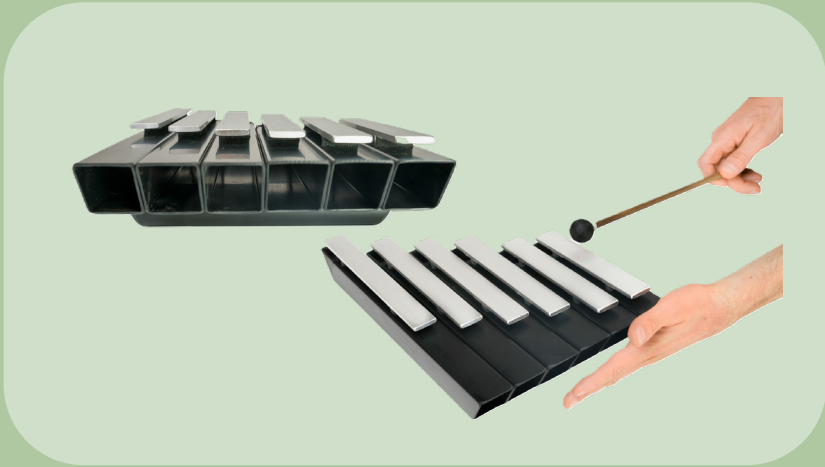
*The handpan is a metal instrument with tuned surfaces that can be struck to play a selection of notes. Commonly found with eight or nine notes allowing to play a scale within a particular key, it is easy to pick up as a beginner (it sounds good no matter what you do), but it doesn't allow for much freedom in the choice of notes. It can't be played in different keys, meaning it is not always possible to adapt to others in a jam session.*

## *Artifact 12: The Vibraphone*



*The vibraphone is a classic example of “too many visible notes”, as discussed in this project in relation to information overload for music novices. It is made out of a collection of metal bars. It incorporates a sustain/dampening pedal with which long or short notes can be played, and it even has a vibrato function, made possible by motor-driven rotating disks in its resonator tubes, which gives it a wider range of expression. This instrument’s inspiring functionalities prompted a search for similar features in a more minimal design.*

### *Artifact 13: The Mallet Harp Mini*



*The “Mallet Harp Mini” is not a particularly aesthetically pleasing product, but it is an example of a (crudely) reduced vibraphone. What is interesting about this one is that it is advertised as having a “wah effect”. This is obtained by moving one’s hand in front of the tube openings, a simple solution resembling the motor-activated vibrato on the vibraphone.*



## *Artifact 14: The Koto*



*The Koto is a traditional Japanese string instrument that deviates from common European string instruments in its approach to tuning/setting notes (and modulating them). Notes are easily set before playing a particular song, with sturdy bridges that can be shifted individually along the lengths of the strings. The notes are played through picking, and can be modulated by pressing down on the string on the opposite side of the bridge (this is what the hand in the background is doing on the picture below)*

## Artifact 15: The Hurdy-Gurdy



*An instrument I knew from my French heritage as the “vielle à roue”, popular in France in the middle ages, called the hurdy-gurdy in English. The sound is created by a crank-activated, rotating wooden wheel, which acts like a violin bow, making a constant sound instead of a percussive, fading sound like most plucked instruments. The instrument includes strings on which a melody can be played (by means of a keyboard), drone strings, which play one constant note, as well as a string with a little bridge (le chien) that buzzes with impulses from the crank hand. A lot of inspiring sound-making techniques in one instrument!*

## Artifact 16: The Glissotar



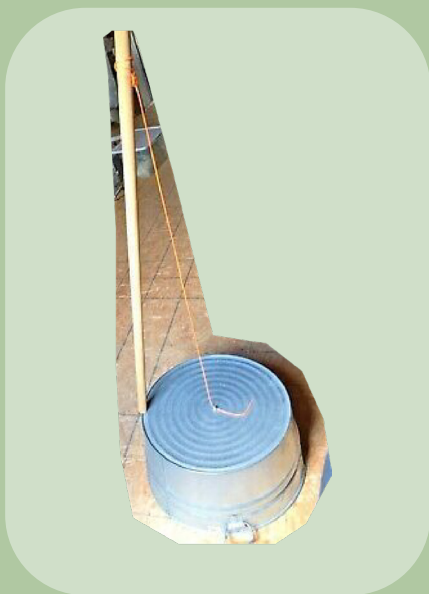
*The “Glissotar” is a recent instrument that has a questionable name in my opinion, but stands out through an unprecedented twist on classical wind instruments. It resembles the clarinet, but innovates in the foundational way the notes are altered (not holes, but a long groove topped with a magnetic band), opening new creative possibilities.*

## Artifact 17: E-Bow



*When exploring different methods to activate a guitar string, I discovered the 'E-Bow,' a handheld device that provides infinite sustain. This means the string vibrates continuously when near the E-Bow. The device creates a feedback loop by means of two integrated electromagnetic transducers comprising of a magnets and a coil: one acts as a pickup to register vibrations from the string, while the other emits a magnetic field to amplify these vibrations. The E-Bow only works with magnetic materials, such as the steel strings of an electric guitar.*

## *Artifact 18: Gut Bucket/Washtub Bass*



*The so-called “gut bucket” or “washtub bass” is a DIY bass that sounds surprisingly good. It is made with a stick, a tub and a string. Plucking the string under tension makes the top surface of the tub vibrate, amplifying the sound of the string. The note is changed by changing the angle of the stick.*

## Artifact 19: Cajón



*This is a percussive instrument that is extremely common in social jam sessions in the Netherlands. To play it, one sits on it and slaps the front surface with one's palms. Many cajóns include some form of snare, metal springs or strings inside the cajón that vibrate against the surface when the cajón is struck in a specific place, giving the instrument a range of different sounds depending on the location it is struck. This gives the instrument a drumset-like quality, while remaining relatively transportable. Its format is such that it is multifunctional, acting both as a chair and an instrument.*



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# 7 - APPENDIX

## Appendix 1: Project Brief



### IDE Master Graduation Project

#### Project team, procedural checks and Personal Project Brief

In this document the agreements made between student and supervisory team about the student's IDE Master Graduation Project are set out. This document may also include involvement of an external client, however does not cover any legal matters student and client (might) agree upon. Next to that, this document facilitates the required procedural checks:

- Student defines the team, what the student is going to do/deliver and how that will come about
- Chair of the supervisory team signs, to formally approve the project's setup / Project brief
- SSC E&SA (Shared Service Centre, Education & Student Affairs) report on the student's registration and study progress
- IDE's Board of Examiners confirms the proposed supervisory team on their eligibility, and whether the student is allowed to start the Graduation Project

#### STUDENT DATA & MASTER PROGRAMME

Complete all fields and indicate which master(s) you are in

Family name	Collins	6967	IDE master(s)	IPD <input checked="" type="checkbox"/>	Dft <input type="checkbox"/>	SPD <input type="checkbox"/>
Initials	A.W.J.		2 <sup>nd</sup> non-IDE master	<input type="text"/>		
Given name	Arthur		Individual programme (date of approval)	<input type="text"/>		
Student number	5677769		Medisign	<input type="checkbox"/>		
			HPM	<input type="checkbox"/>		

#### SUPERVISORY TEAM

Fill in the required information of supervisory team members. If applicable, company mentor is added as 2<sup>nd</sup> mentor

Chair	Dr. Ozcan Vieira, E.	dept./section	Human-Centered Design (HCD)	<p>! Ensure a heterogeneous team. In case you wish to include team members from the same section, explain why.</p> <p>! Chair should request the IDE Board of Examiners for approval when a non-IDE mentor is proposed. Include CV and motivation letter.</p> <p>! 2<sup>nd</sup> mentor only applies when a client is involved.</p>
mentor	Ir. Mulder, S.S.	dept./section	Design, Organisation and Strategy	
2 <sup>nd</sup> mentor	<input type="text"/>			
client:	<input type="text"/>			
city:		country:	NL	
optional comments	<input type="text"/>			

APPROVAL OF CHAIR on PROJECT PROPOSAL / PROJECT BRIEF -> to be filled in by the Chair of the supervisory team

Sign for approval (Chair)

Digitally signed by Elif Ozcan Vieira  
- IO  
Date: 2024.01.15 12:27:34 +01'00'

Name \_\_\_\_\_

Date \_\_\_\_\_

Signature \_\_\_\_\_

### CHECK ON STUDY PROGRESS

To be filled in by **SSC E&SA** (Shared Service Centre, Education & Student Affairs), after approval of the project brief by the chair. The study progress will be checked for a 2<sup>nd</sup> time just before the green light meeting.

Master electives no. of EC accumulated in total \_\_\_\_\_ EC

Of which, taking conditional requirements into account, can be part of the exam programme \_\_\_\_\_ EC

★	YES	all 1 <sup>st</sup> year master courses passed
	NO	missing 1 <sup>st</sup> year courses

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Sign for approval (SSC E&SA)

**Kristin Veldman**  
 Digitally signed by Kristin Veldman  
 Date: 2024.01.30 13:26:35 +01'00'

Name K. Veldman Date 30 Jan 2024 Signature \_\_\_\_\_

### APPROVAL OF BOARD OF EXAMINERS IDE on SUPERVISORY TEAM -> to be checked and filled in by IDE's Board of Examiners

Does the composition of the Supervisory Team comply with regulations?

YES	★	Supervisory Team approved
NO		Supervisory Team not approved

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Based on study progress, students is ...

★	ALLOWED to start the graduation project
	NOT allowed to start the graduation project

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Sign for approval (BoEx)

**Monique von Morgen**  
 Digitally signed by Monique von Morgen  
 Date: 2024.01.31 10:32:33 +01'00'

Name Monique von Morgen Date 31 Jan 2024 Signature \_\_\_\_\_



## Personal Project Brief – IDE Master Graduation Project

Name student Arthur Collins

Student number 5,677,769

### PROJECT TITLE, INTRODUCTION, PROBLEM DEFINITION and ASSIGNMENT

Complete all fields, keep information clear, specific and concise

Project title Empowering Music Novices in Jam Sessions through the Lens of Instrument Design

*Please state the title of your graduation project (above). Keep the title compact and simple. Do not use abbreviations. The remainder of this document allows you to define and clarify your graduation project.*

#### Introduction

*Describe the context of your project here; What is the domain in which your project takes place? Who are the main stakeholders and what interests are at stake? Describe the opportunities (and limitations) in this domain to better serve the stakeholder interests. (max 250 words)*

In recent years in the Netherlands, the happiness and satisfaction of young adults has been decreasing and cases of loneliness have gone up (Ministerie van Volksgezondheid, Welzijn en Sport, 2023). Simultaneously, their time spent on social media has been growing steadily (Centraal Bureau voor de Statistiek, 2018), (; Oosterveer, 2023)., with over 25 percent of young adults aged 18 to 24 feeling addicted to social media. (Centraal Bureau voor de Statistiek, 2018).

Musical jam sessions - social gatherings in the name of playing improvised music together - represent a promising vehicle for increasing wellbeing in young adults, a position supported by research suggesting that activities of communication through expressive arts are beneficial for wellbeing (Van Der Kolk, 2014, Cunha & Lorenzino, 2012), as well as by testimonials of participants of my self-organized jam sessions.

Numerous young adults in my surroundings express interest in actively participating in jam sessions, but also inhibition and fear to do so due to the association of jam sessions to the act of demonstrating musical skill on an instrument. Figure 1 shows an unfulfilled desire among the majority of respondents to actively participate in jam sessions, hindered by various reasons. This opens an opportunity to design for a lower threshold of entry to musical jam sessions for music novices. By empowering them to participate in jam sessions despite their lack of musical training, more young adults may engage in this activity, benefiting their mental health.

Primary stakeholders include young adults in the Netherlands seeking active participation in musical jam sessions, governmental institutions focused on preventive measures for public health, and industries related to the production and sale of musical instruments.

→ space available for images / figures on next page



introduction (continued): space for images

- 76 respondents, ages 19-31 , mostly students at IO

What is your relation to musical jam sessions? \*

- I play music in jam sessions occasionally/regularly
- I WOULD BE INTERESTED in participating in a jam session, but I don't because... (insert a reason below)
- I'm NOT INTERESTED in participating in a jam session because... (insert a reason below)
- Other: \_\_\_\_\_

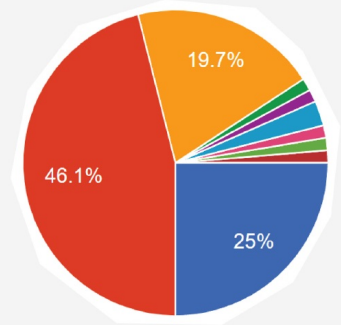


image / figure 1 Poll held at IO faculty showing a high percentage of users with unfulfilled interest in joining jam sessions.

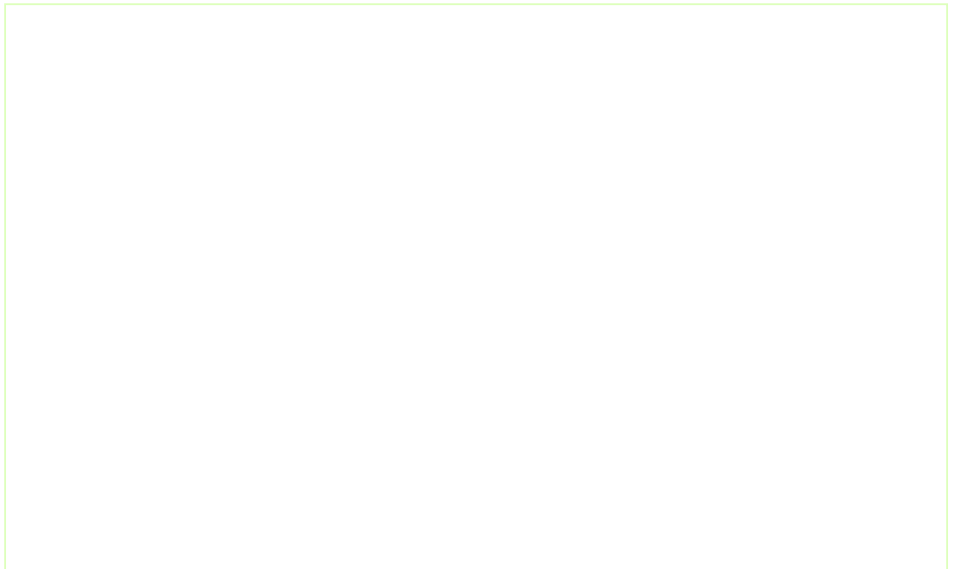


image / figure 2

## Personal Project Brief – IDE Master Graduation Project

### Problem Definition

*What problem do you want to solve in the context described in the introduction, and within the available time frame of 100 working days? (= Master Graduation Project of 30 EC). What opportunities do you see to create added value for the described stakeholders? Substantiate your choice.  
(max 200 words)*

The concept of a musical jam session is currently associated with the requirement that participants have a certain level of skill with an instrument to participate. This inhibits many adults from participating in jam sessions, even though jam sessions may be the ideal environment for them to acquire musical skills as well as social wellbeing and resilience. Instead, these individuals opt for more accessible, more passive (social) activities that may not have the mental health benefits linked with participating in a jam session.

In this graduation project, I examine the phenomenology of musical instruments in musical jam sessions, particularly focusing on the perspective of musical novices. The goal is to design or redesign instruments for these users to lower the bar for participation, improve interplay between novices and experienced players, and induce a learning-by-doing mindset that is a crucial part of mixed-level musical jam sessions.

### Assignment

*This is the most important part of the project brief because it will give a clear direction of what you are heading for. Formulate an assignment to yourself regarding what you expect to deliver as result at the end of your project. (1 sentence) As you graduate as an industrial design engineer, your assignment will start with a verb (Design/Investigate/Validate/Create), and you may use the green text format:*

*Design/Investigate/Validate/Create a (what will be the deliverable -> prototype/ roadmap/process/ intervention/approach/ guideline/strategy/...) to (what should it do -> create/ understand/evaluate/validate/improve/execute/analyse/...)  
(the objective -> experience/ value/process/product/...) for (whom -> target group/ client/...) in (what context).*

*Then explain your project approach to carrying out your graduation project and what research and design methods you plan to use to generate your design solution (max 150 words)*

Design a product or product-service system to empower and motivate music novices to actively participate in mixed-level musical jam sessions.

In this graduation project, I want to focus on instrument design based on the needs of music novices and test the design output as a bridge into the world of jam sessions. To this end, I will work with a small number (2-3) of music novices (who wish to learn to play musical instruments and participate in jam sessions) and iteratively design an instrument based on needs interpreted from their initial perspectives and based on observations of the participants' use of prototype instruments in real jam sessions.

The result is expected to be a concept for a marketable product or product-service system based on my findings.

## Project planning and key moments

To make visible how you plan to spend your time, you must make a planning for the full project. You are advised to use a Gantt chart format to show the different phases of your project, deliverables you have in mind, meetings and in-between deadlines. Keep in mind that all activities should fit within the given run time of 100 working days. Your planning should include a **kick-off meeting**, **mid-term evaluation meeting**, **green light meeting** and **graduation ceremony**. Please indicate periods of part-time activities and/or periods of not spending time on your graduation project, if any (for instance because of holidays or parallel course activities).

Make sure to attach the full plan to this project brief.  
The four key moment dates must be filled in below

Kick off meeting 4 Dec 2023

Mid-term evaluation 7 Mar 2024

Green light meeting 23 May 2024

Graduation ceremony 4 Jul 2024

In exceptional cases (part of) the Graduation Project may need to be scheduled part-time. Indicate here if such applies to your project

Part of project scheduled part-time	<input checked="" type="checkbox"/>
For how many project weeks	25
Number of project days per week	4,0

Comments:

Planning deviates slightly due to courses followed in the first weeks (see Gantt chart)

## Motivation and personal ambitions

Explain why you wish to start this project, what competencies you want to prove or develop (e.g. competencies acquired in your MSc programme, electives, extra-curricular activities or other).

Optionally, describe whether you have some personal learning ambitions which you explicitly want to address in this project, on top of the learning objectives of the Graduation Project itself. You might think of e.g. acquiring in depth knowledge on a specific subject, broadening your competencies or experimenting with a specific tool or methodology. Personal learning ambitions are limited to a maximum number of five.  
(200 words max)

The topic of this graduation project emanates from a personal passion for musical jam sessions. It is an attempt to utilize my design capabilities within close proximity of my core interests. I want to develop competencies in working as a designer in this topical field.

In the last two years, I have spent much of my energy organizing small jam sessions and have come to believe that specific jam formats can improve mental wellbeing and social cohesion, regardless of musical level. By designing in relation to this activity, I hope to utilize my learnings from the course "social venturing", i.e., create an economically viable product/service that also has a positive social impact.

Additionally, it seems that in recent years I have been avoiding the workshop, taking on more strategic tasks within my team projects, or developing solutions that involved little or no physical prototyping. Thus, a personal ambition for this project involves getting my hands dirty and gaining more prototyping experience, and working on the development and embodiment of a physical product in an iterative fashion.

## Approach

I propose a descriptive approach that will include a research part consisting of observation, analysis and documentation of existing products/artefacts and the use thereof, combined with an explorative, user-centered design approach, in which product prototypes are iteratively tested with target users. These two processes will run in parallel.

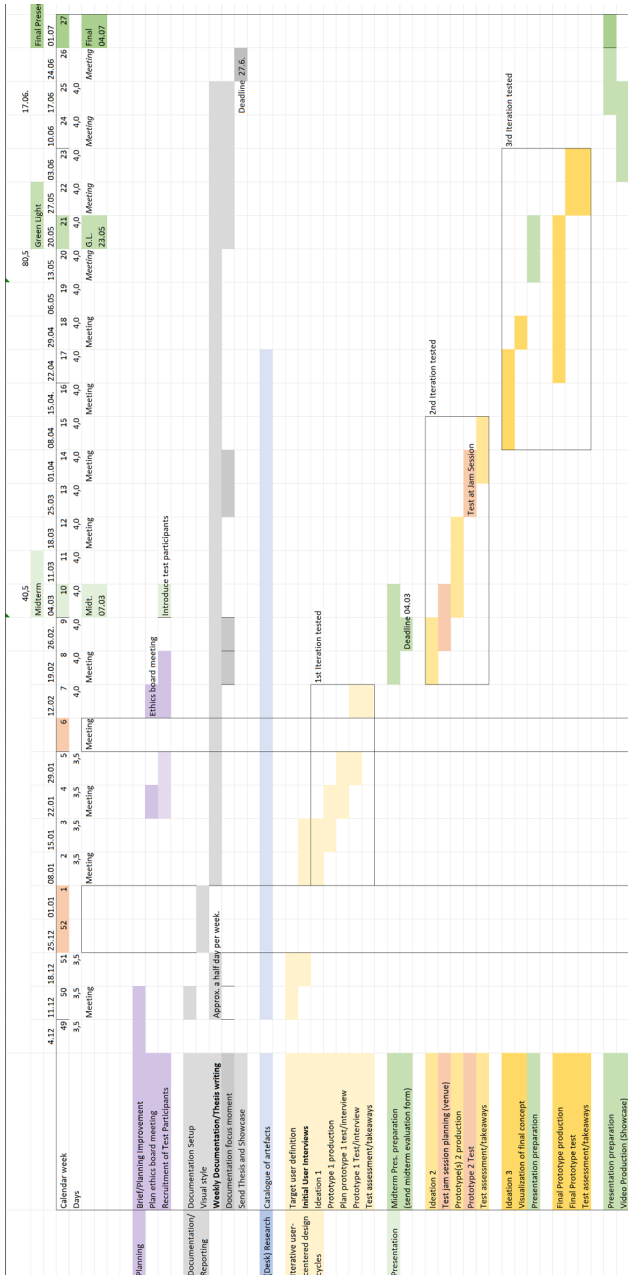
The desk research part is dedicated to exploring and understanding the current state of design in the context of accessibility to (social) music-making, and at seeking out objects with related functions. Its output is a documentation characterizing the current state of design of musical instruments – and related or analogous objects – with respect to their value in relation to the project assignment.

The explorative prototyping part is aimed at creating and refining a product for the target user, through a user-centered and research-through-design approach.

Having been educated in playing instruments early on and having years of experience, there is quite a gap between me and the users, “music novices” that I want to design for. For this reason, I propose a largely user-centered approach, with recurring user tests throughout the project.

A second measure to improve the product-user fit is an iterative approach to developing the product, starting physical prototyping early and performing tests in multiple consecutive design loops, consisting of the production of a prototype, a test with a target user, an assessment of the test, and an ideation based on the test results, leading to a new prototype concept.

# Planning



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# Appendix 2: Initial Questionnaire and Answers

Screenshots from Questionnaire. Personal Data (contact info) has been removed for confidentiality reasons.

The screenshot shows a questionnaire interface with a top navigation bar containing 'Questions', 'Responses' (with a '76' indicator), and 'Settings'. A close button (X) is visible above the navigation. The main content area consists of several white panels on a light beige background. The first panel asks 'DO YOU JAM?' and defines a musical jam session. The second panel asks 'What is your relation to musical jam sessions?' with four radio button options. The third panel asks for the 'reason' for the answer above. The fourth panel asks for 'Your age'. The fifth panel asks for 'Your gender' with four radio button options. The sixth panel asks for 'Your (main) occupation' with three radio button options. The final panel is a thank-you message and asks for contact data (email/whatsapp) with a text input field. A vertical toolbar on the right side of the questionnaire contains icons for adding, deleting, translating, and other functions.

Questions Responses 76 Settings

**DO YOU JAM?**

A musical jam session is defined here as a social activity in which you play/sing improvised music with others.

What is your relation to musical jam sessions? \*

- I play music in jam sessions occasionally/regularly
- I WOULD BE INTERESTED in participating in a jam session, but I don't because... (insert a reason below)
- I'm NOT INTERESTED in participating in a jam session because... (insert a reason below)
- Other...

What is the **reason** for your answer above?

Short answer text

Your age \*

Short answer text

Your gender \*

- male
- female
- other/non-binary
- I'd prefer not to say

Your (main) occupation \*

- Student
- Working
- Other...

Thank you for participating in my first project survey! This is a graduation project **about reducing the barrier to jam sessions for music novices through instrument design.**

If you are interested in hearing more, leave me your email and/or phone number below! Throughout the next half year, I will be sending a **few fun updates** on my progress (and selecting a small number of music novices to involve more closely!)

Contact data (email/whatsapp):

Short answer text

76 responses

[Link to Sheets](#)

Accepting responses

Summary

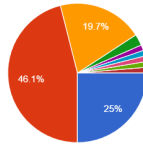
Question

Individual

What is your relation to musical jam sessions?

[Copy](#)

76 responses



- I play music in jam sessions occasionally/regularly
- I WOULD BE INTERESTED in particip...
- I'm NOT INTERESTED in participat...
- I don't play any instrument
- It's been a long time since I played an...
- I don't play a musical instrument
- Not close to people I want to jam with
- Yes - Irish music sessions, which I gu...
- I don't play any instruments myself.

What is the **reason** for your answer above?

73 responses

i play the flute and i mostly just played classical music and never really 'improvised', so it feels a bit scary and i feel unsure about whether my instrument is a good fit for it (compared to guitar, piano, etc)

I'm in a band and all my available music time goes to that

I don't know many people who organize jams.

I used to jam a bit with the same band, we already knew each other before jamming and also played covers. I find jamming with people I don't know too intimidating, especially when there are also spectators

I've never been interesting in doing it and i feel like i'm not good at it

I'm not good enough with instruments and get intimidated by the talented people

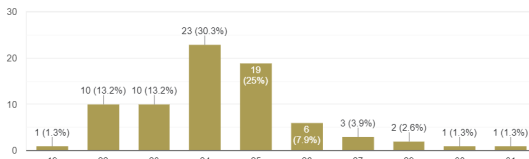
Mostly just don't find the time to

I grew up playing piano in a music school with a lot of pressure on exams... I loved playing the music but didn't like to practice under pressure so it kinda caused me to freak out whenever someone was watching.

Your age

[Copy](#)

76 responses



The following written answers are from a mix of profiles as defined in the first question. They could be attributed to the right profile using the individual answer section.



What is the **reason** for your answer above?

73 responses

I love playing but my instrument is back in my country and its expensive to buy a new one here in europe

Inspiration usually strikes from Jam sessions. Also, its a nice way of connecting with other people and actually learning something about them from their playing style.

It has been long time since I played an instrument. But I like to attend jam sessions

I don't because I do not have my piano at home anymore because it broke and I still need to find the money to buy a second. Then there is the issue of time. I feel like I am doing 10000 things already so that would be too much. The few times I did do a jam session, it was a fk vibe tho. They always happened spontaneously with the right people at the right time

Sometimes olay, only once or twice a year

I don't play anything

I enjoy playing around in a group of people. It's cool when you are caught in an immersive spiral in the middle of a song.

What is the **reason** for your answer above?

73 responses

Not confident enough in my playing

I like playing guitar and it motivates me to practice more. Also a good way to meet likeminded people :)

Im not so good, I dont play an instrument and sing a bit but not well controlled, i join when it is in my home

I dont know how to find a good jam group in my playing style

My instrument (harp) doesn't fit in with most others

I'm not good at creating music

I am not playing an instrument well enough

I feel like I am not good enough and my instruments (accordeon) isn't standard in these kinds of sessions

I'm a bit scared and my English language is not that good to communicate and personal time management is a hinder for me

What is the **reason** for your answer above?

73 responses

Not good enough at playing an instrument or singing

I am not that musical

Music unites people and parties aren't really my thing so I go to jams because I like the atmosphere and playing music is fun

i view it as kind of childish, didnt grow up in an environment where that was practiced by my peers

Love for music and singing

I can't play any instrument

I don't play a musical instrument

I play music in jam sessions as it's a stress buster...I don't feel judged and it's a perfect harmony

I dont know lot of people doing it

What is the **reason** for your answer above?

73 responses

I have been playing the drums myself in various bands

I produce music on my computer, but I am not skilled in playing an instrument.

I do it sometimes, but i havent played as much of my instrument and don't have the space money or people around me to do so

I am not confident enough with my skills

I am member of the jazz society groover in delft, which hosts weekly jam sessions.

Having a good time with friends by making music! It's also a nice way to meet other people (especially for introverts)

I'm afraid my skills are not good enough

I don't play any instruments (anymore), also I don't know any people that do and have jam sessions regularly

What is the **reason** for your answer above?

73 responses

Bcse I participate in jam sessions once in a while, when the opportunity is there I love to take it!

I don't play or think to play any instrument

Feel quite unmusical but I would like to get better at it

Because I don't have a group that is interested in musical jams

I dont sing or play

I love making music with others. I often sing and sometimes even play a bit of guitar.

There's not many people I know who do jam sessions

Don't play any instrument or know how to sing

I don't play an instrument and I don't know people well that go to jam sessions

What is the **reason** for your answer above?

73 responses

I don't really play an instrument that well + I have other hobbies I would want to spend that time to

People have a repertoire of "tunes", however the order in which they are played, variations, chords etc are all improvised

i play instruments but i'm classically trained and afraid to let go of structures i know - because i am afraid to fail and be vulnerabe

Don't play an instrument

Don't know of many taking place around me, not very musically gifted/ talented, self conscious to participate.

I just friggin' love it!!!!

I don't have the skills to do improv

Whenever I feel a bit too exhausted, I turn on a or join into a jam session in various Discord communities

What is the **reason** for your answer above?

73 responses

Whenever I feel a bit too exhausted, I turn on a or join into a jam session in various Discord communities and vibe with people and explore different genre! I have been into vibe sessions & JAM sessions where I dont even know the language but just enjoy music as it is! Its exciting to hear new style of music other than the known native music favourite.

Cuz I don't play any instruments myself. However, I wouldn't mind watching.

I don't play an instrument and I don't sing.

I dont play an instrument

I like making music and I like improvising a melody, but whenever I make music with people we play existing songs. The reason for not jamming is mainly preference of the group. (I do improvise second or third voice when singing though, not sure if that counts as jamming)

Can't play an instrument, not too comfortable improvising singing, plus I'm more of a dance type :D

I don't play an instrument but I used to go to seisiúns when I was growing up.

What is the **reason** for your answer above?

73 responses

I don't play any instruments

I don't like singing

I enjoy making music with friends

I don't play any musical instrument

I do not have friends that can play

my skills are not good enough

Loud music overwhelms me, especially in closed locations

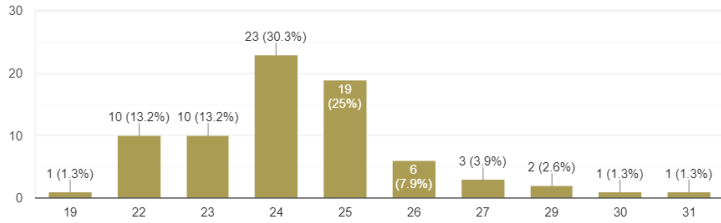
I don't have a group to jam with (in the NL). But I would love to because it's like this subconscious dialogue that you're having with the jam group and I love that feeling :)

I'm a vocalist and parttime keyboard player myself

### Your age

 Copy

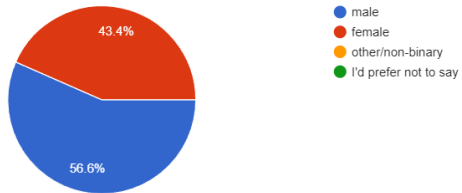
76 responses



### Your gender

 Copy

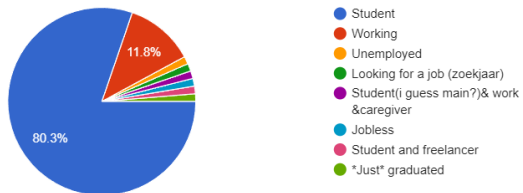
76 responses



### Your (main) occupation

 Copy

76 responses



# Appendix 3: Interview Guide

## Interview guide/question catalogue

Main interviewee type: Music novice

### *Introduction/Profile*

Tell me about yourself.

What are your main pastimes/hobbies?

What would you say you are very good at?

How do you usually learn these things? (e.g. self-directed, guided, group activities, etc.)

Describe/characterize your social life.

### *Relationship to music*

Are you “musical”? Why/what does that mean to you?

How do you consume music?

Have you played music? When/where/how?

What genres of music do you like?

### *Perceptions/experiences around jam sessions*

What does the term “jam session” evoke in you? Define it, share examples...

Tell me about situations in which you have experienced/come in contact with a jam session. What did you do there?

What do you like about jam sessions?

What do you find attractive about jam sessions?

What don't you like about jam sessions?

What inhibits you from participating?

What barriers do you experience?

What are you doing to overcome these barriers?

### *Role of instrument and associated needs (optimally, following inputs from the interviewee regarding instruments)*

Tell me about a musical instrument that you admire

What instrument would you like to play? Why?

Are you learning it? Are you planning to? What steps have you been taking?

(What kind of music-making technologies have you used?)

# Appendix 4: Foundational Interview Transcripts

## Interview guide/question catalogue

Main interviewee type: Music novice

### *Introduction/Profile*

#### **Tell me about yourself**

I'm generally an extrovert, but I'm afraid of performing, past school experience. Makes me feel uncomfortable. We had mandatory performances with content that I didn't like that much. I'm traumatized by performing.

#### **What are your main pastimes/hobbies?**

I used to play musical instruments when I was a teenager, I used to like it a lot until it became mandatory

I am also into Photography and Hiking.

#### **What would you say you are very good at?**

I like solving problems for others. Most enjoying

No matter whether it is design related or not. I like discussing people's challenges.

I feel that I am good at suggesting a strategy to solve their problem.

For example, here on campus people ask about a course, talk about their problem. Even though I don't take the course myself, I listen to their problem sets and constraints and try to help them.

And then, I am always delighted if my ideas are adopted in some form.

#### **How do you usually learn these things? (e.g. self-directed, guided, group activities, etc.)**

Practice practice practice

I talk to people a lot. We just talk about

In general, I'm an extrovert, so the biggest part of my life is talking with people. This translates to practice [in skill of helping people solve their problems].

#### **Describe/characterize your social life.**

I usually get to know people in depth by having deep conversations

My friend constellations are mostly built up of one-on-one connections. I do go to parties and interact with groups, but most of my ties are one-on-one.

### *Relationship to music*

#### **Are you "musical"? Why/what does that mean to you?**

I was, ten years ago. I knew how to play musical instruments. The gujong, a traditional Chinese instrument. I even had regular performances with the music school. I was also a singer. Now I don't do that anymore, and people criticize me, they say I'm out of pitch.

When I was a teenager, being musical was a mandatory thing. Because I can do it and I have time.

As I grow older, I enjoy music more and more, but I feel like I've lost the skills. I become embarrassed to come back to the music creation process.

### **(What does it mean to be musical?)**

Someone who creates music for other people to enjoy. Composer, player

### **How do you consume music?**

Well, this is a very subjective answer. My music listening apps, Spotify might give you different answers. Most of the time, I listen to music when I'm working. When I do things that are not mentally intense, like 3D modelling. When I am working on developing a design concept, I don't listen to music.

So I would call that "Music as company".

Only about once in a month I put on music just to listen. In my room, with headphones or speakers.

My preference for music is indie rock. I go to concerts, it's been the same preference in China and in the Netherlands (Indie Rock concerts)

I'm a huge fan of karaoke. I'm a bad singer, but I like singing.

I would find it very strange to go sing karaoke alone. I guess it's not only about consumption, it's about sharing with friends. But it's not so serious I would say. Sharing music. You're telling your friends; look how deeply I love this song!

### **Have you played music? When/where/how?**

I have tried several instruments!

Learning a new instrument is a huge commitment. I don't know if I have time, money, yeah and just commitment level.

X Delft provides musical courses and instrument jams where you can try it ("X Jam") They provide instruments to try out in one big room, and there are teachers present to show you and to tell you about their courses.

I went there and tested piano, guitar, African drums.

I almost had a deal with the electric guitar teacher, that I would come to their course. But I retreated.

A friend of mine is taking singing course with a teacher at X.



Recently I started just singing in the street when I'm walking around.

What genres of music do you like?

(Indie rock, see above)

*Perceptions/experiences around jam sessions*

What does the term "jam session" evoke in you? Define it, share examples...

I previously have watched dance jams. In the dance session they also do music jam as well. Dancers are triggered by the music and dance together. They trigger each other, together.

China and exchange in Germany, contemporary dance. I tried once, I got so awkward. They are not all professional. I was incapable of expressing myself freely. I don't like other's gazes even though they are doing their own thing.

Maybe not only gaze of others, but I'm afraid of thinking of the others.

I think if the others didn't dance that good it would help.

I listened podcast about why happy birthday song is good. No one knows the right pitch, so everyone is awkward.

How about music jams?

I just mainly connect that to jazz music.

Tell me about situations in which you have experienced/come in contact with a jam session. What did you do there?

(See above)

What do you like about jam sessions?/What do you find attractive about jam sessions?

**Even as a person without music talent, we still have the desire to express ourselves through body, voice and music. We still want to create something.** The dance jam is an opportunity to try and express though our bodies. But I am just too afraid.

What don't you like about jam sessions?

What inhibits you from participating?

The other people are part of the audience, but also participants. The way they act is very important, can make you very self-conscious or can make you feel safe.

Because really, how can you evaluate if you are doing good or not? There is no right or wrong if it's about self-expression.

What barriers do you experience?

What are you doing to overcome these barriers?

*Role of instrument and associated needs (optimally, following inputs from the interviewee regarding instruments)*

Tell me about a musical instrument that you admire

The electrical guitar, and the... (can't find the name, describes it) [cello]

The electric guitar is so fun, there are so many different sounds you can make out of it. People who play it have the engineering mindset, so I can really relate to them/that. Acts out the use of synthesizer/pedals

The cello just has a beautiful sound, sounds like human voice.

What instrument would you like to play? Why?

I would like to play the electric guitar, because I think there is a lot of potential to not only play it well, but also to create, innovate, make my own signature music/sounds.

Are you learning it? Are you planning to? What steps have you been taking?

I have one [electric guitar] and was learning it when I was in China. But I couldn't get the instrument here.

Also, I was going to figure out how to bring my guitar here and start playing (my deal with the music teacher), but I abandoned that.

(What kind of music-making technologies have you used?)

I've used Garageband, Cubase. I just find it fun. Of course for studies I have made my own videos – sound effects, editing. I like doing sound effects. But that's not making music

## Interview notes 1.2

Main interviewee type: Music novice

User 2 has been partaking in social jam sessions I organize since the summer. He started with little to no experience playing music, but has been enthusiastically participating and has been practicing playing percussive instruments (shakers) during the jam sessions.

### *Introduction/Profile*

Tell me about yourself

From Mumbai india, studies strategic product design in delft. Coming to the Netherlands was a big cultural change, finding new friends and common interests helps a lot.

What are your main pastimes/hobbies?

Travelling a lot and biking because of the country and the country's demands

I journal a lot. So I carry a notepad and pen, I believe in physical documentation of the process.

I read a lot of English literature. Nowadays I'll be starting a new book, Norwegian Woods by Haruki Murakama

I listen to podcasts. "Connan o brian needs a friend" podcast

I used to listen to a lot of Late night shows to improve my English vocabulary and when to pause and emphasize a word.

I don't have a dedicated time for passtimes – it goes along with the process

### **What would you say you are very good at?**

I feel like I'm very good at observing, putting that in words

I took the course critical automotive and saw that I'm pretty good at sketching and it's become somewhat of an addiction.

My mom is a good embroidery artist, she traces out and then stitches. I used to watch her, that's why I think sketching is tacit. I have good relations to art and music from my family in India

Eastern part of India: a lot of music, art

### **How do you usually learn these things? (e.g. self-directed, guided, group activities, etc.)**

#### **Describe/characterize your social life.**

When I was growing up I used to see groups of cool kids. I didn't fit in either. I was sometimes sort of good at studies, sometimes sort of cool. I interacted with many. Even when I organize a birthday

party, you will find lots and lots of friends. I don't belong to a specific group. I tend to make different groups/clusters. I get information and all.

Because I believe I attract intelligence. For example, if I find a person, be it a man or a woman, and they are very good at dismantling engines. And I don't know about it. Then hang around and I'll treat that person as a friend. I'm getting something out of it, it's not superficial. Maybe nowadays it has become very intellectual knowledge-oriented. It's not always someone who agrees with you, but someone who challenges you as well. These are my social interactions.

I'm getting something out of it, not superficial.

Usually smaller groups. Even in jam nights.

To find my own cluster, I interact with everyone.

### *Relationship to music*

#### **Are you "musical"? Why/what does that mean to you?**

I guess yes, because everyone in my family. in the eastern part of India normally known as the West Bengal or the Talkata and everything.

The entire culture is very much marinated in Indian classical music. It's a very instrumental with all the sitars and the tablas and everything.

So my parents, when they grew up in those villages and the small towns before coming to Mumbai for a job. They were in those cultures. My dad knows how to play an instrument. My mom knows how to play an instrument, so everyone knows something or the other.

and me as I am born in a metropolitan city. I was always busy, and you know studies and the city life, and I never got time for these things, and when I used to go back home in the vacation

in the summers, and as to meet my cousins, everyone knew how to not sing, but to play an instrument to understand the how do you say we in India we call it the Thal. So Thal is basically a rhythm

So they know these things that they have the years developed at the childhood. And for me it was always like. this is this is, and this is a skill.

Also because I believe that no one is born with intelligence. You make your own intelligence. Same with music. You're not born with music, some, maybe with prodigies, but you develop your ear, you train your ear, you break your own voice to make a beautiful voice something like that, and it was always my thing - you know, it's something you look at. **You don't know it. But do you know that you can play along, and if you can give it like 10,000 times, you can maybe try to get one percent of it.**

my upbringing of music was very much classical, always Indian classical. So it was always very instrumental. And then, lyrical

#### **[So you're saying you have it in you?]**

**Yeah, so if I put my heart and soul into it. maybe I can do it. It was same with sketching. I come from computer science, never held a pen or paper or something like that. But what I had in my memory**

was my mother's sketching, and my mother tracing, and me observing it for hours when I was a young child, and those things coming back.

[Can you then summarize what musicality/being musical means to you?]

Maybe finding my lost self. Maybe, something in me that I haven't discovered, being musical. It's like finding yourself.

### **How do you consume music?**

The phone that I use has a jack issue, so I can't use the headphones. I've observed that whenever I'm cooking and listening to music, it could be the newest hits, or beatles. But what gives me a very good focus is instrumental Hindustani classical music. On the sitar and the tabala, with no lyrics. You can light some incense sticks in the room which gives a very good ambience of spirituality, and then you can do your work in a very quick fashion.

Sometimes when you do your work and you listen to lyrics or jams, or Eminem for two hours, it gets on your nerves. With the Hindustani instrumental music, I can put it on loop and it goes in a smooth flow. I never have to pause it because my concentration is disrupted

So speaking of the jam nights, I have written the numbers, [timestamps of the jam livestreams] at this point, the jam has very good music tones, and I go and play exactly that point. I wrote them on a post-it.

One of the other things that I do is since I normally listen to music from my laptop, it helps me because I play the music in my laptop. I make it in a very semi-fold. I fold it down because I'm not looking at the screen, and then I do my notes or reading the paper or highlighting. Otherwise I keep looking at the screen.

And this is one of the observations that I observed when I met [common friend]. I went to his room once. He has a playlist in a very low tone on his ipad, with a very dim brightness setting. And he's talking with you like we are talking, and the music is constantly playing in the background. I've observed this at your place as well. this is one of the things that gives me a sense of nostalgia, because when I was growing up in the 1990s India, this used to happen with radios. The radio is playing music, and everyone is doing the Sunday chores and having the dinner or sorry, their lunch, and afternoon. And this never happens anymore.

### **Have you played music? When/where/how?**

Yeah, the first time of course, I played at your jam. But also before that in India, my friend was learning guitar. I tried strumming. And then he taught me maybe something like A, C minor, F. It became very confusing.

Because he was every time he was like, no, you're not doing it right. You're not doing it wrong. And then it feels like. Hey, man, I'm trying to get the basics correct. Maybe I'm not getting the basics

correct, and there is no tutor or something or the other like that. And whatever I'm trying to do that was not been perfect, and he's a very good friend of mine.

But when I came at your jam - and that was maybe a **blocker** – I was very hesitant. Because I watched the jam session livestream. And I saw everyone with bass guitars and electric guitars, and I was like, damn Bro, this is, this is going to be a life challenge.

And then I went there, and what I observed is, you don't need to produce music with a very big instrument or a very complex instrument. Music can be created with tapping of your feet. or even shaking with the Shakers with coffee beans inside. It's the rhythm that keeps on going in the background, it's like a cement. And then all the bricks are being built on it, and stuff like that, the foundation.

And then for the first time I played with the shakers. It was not even the Shakers at Casper, it was different. Handmade ones. And then I experimented with when I shake it with the glass and shake it with the middle end on the camps, and if I do it at the top and do it on the left, and how the pitch changes, and how I can project my sound if I hit it at the top and the sound dissipates.

And then I met Casper, who had, like these egg-shaped Shakers with different coarseness of sand inside like medium.

And I experimented that when I was in your jam I stopped shaking the Shaker once, for a few moments. And Stijn or Floris were like "hey man, don't stop. We're following your lead". And then I started back again. And what I felt inside is, hey man, this is foundation, this is base.

So it is like a harmony. It's like every piece comes together to make music. You can't take off something because that's not cool or not fancy. You know what I'm trying to say. because whenever you say music, people give illustration of guitar or piano or violin.

So everyone thinks, Hey, I want to learn music. I want to go with the keyboard or something. but no one talks about .. maybe something or the very basic. These are so few similar, very simple instruments, maybe, which was designed by the olden age, or golden age, or whatever you say. these have been lost, I believe. but these are very easy medium to get into music. which teach you the basics. The Abcs.

What genres of music do you like?

I don't have a specific genre genre. Hindustani classical when I'm in the mood, then when I get bored, beatles, bob dylan, venture into eagles and all those things. November rain, guitar segment by slash. If I'm bored and want to listen to something fresh, I'll listen to pink floyd's echos.

Even though I love instrumental, I'm very big on lyrics. How creatively expressive/ how creatively the singer observes. The way Mauro improvises at the jam sessions is an art.

You're not taking a pause in the entire music section in the entire piece, or we sang this line. Now next, what? What's next?

It flows. It comes along like you're telling a story. You know, where the first line ends, and you know what the second line starts.

With some music out there, there are lyrics, especially Indian Bollywood things, there's this very forced way of saying things, it's not fluid

Yesterday by Beatles more fluid

Coldplay is fluid

Contemporary/real life, not forcefully

You're not forcefully creating a story. It comes to you naturally, you're not... saying something.

### *Perceptions/experiences around jam sessions*

What does the term "jam session" evoke in you? Define it, share examples...

I have used this example so many times in the courts introspective design. **It's basically harmony.** If you tell me it is harmony in different sense.

**Even if a person is sitting in your jam session and not playing any instrument. Just observe it and consuming any form of music. It is harmony.** It's a very big stressbuster. and that is one of the reasons I always come to the jam night. and I've observed this because what I do is so Arthur has a jam night. **I should wrap up my work! I should make my rooms spick and span, so I go to the jam night. and then, the moment I come back on Friday evening or late night when I'm too tired, and I wake up on Saturday. My room is magically fresh.**

and what happened when I was having migraines and stuff, and I couldn't attend for jam stations for 2 days. My room was in a mess for 2 days, 2 weeks. and that I observed, because I never went outside of the room. and it was like I was in a matrix, and I couldn't break that. And that's the reason, even like

**for a very long amount of time I felt that living in a studio solitude is a major thing. I will be very productive. But no, that's not the case. You have to get out of the solitude, and go to these sessions, or meet up with your friends it has to be back and forth. It has to be in a balance.**

So jam sessions, I believe, are very crucial, crucial in as an icebreaker to anyone was in a stressful journey.

You talk about jam session being a "harmony", but How would you describe it to someone who's never seen it?

**Where people come together and express their feelings and views through music.**

**If someone is feeling very sad. Maybe he or she starts strumming an instrument in a melancholic manner. and everyone joins him or her. and we share the stuff.**

**And if someone is too happy and starts playing very poppy and jazzy, and we also join again. So that's the place.**

(regulation)

Tell me about situations in which you have experienced/come in contact with a jam session. What did you do there?

**What do you like about jam sessions? What do you find attractive about jam sessions?**

So I had this very big misconception that if I don't know how to play, then how can I be part of the jam session, which was like a very big mythbuster.

The thing is like everyone who invited me, Anjay, you, they're all like. Let's put it out. All are musical maestros.

like, especially Anjay. And then, when he or she's inviting me, and I feel like, Hey, man, maybe you have a misconception about me. I don't know how to play. So I cannot be of any assistance whatsoever, what can I do? I mean, I can cook.

And then, I guess Anjay also said the same thing. No, Arthur doesn't organize these sessions so that you know something, you just play along.

and that was very important for me, because that gave me an assurance that, hey, man, if I go there I'll be just having a good time.

no judgments. Even if I don't know how to play, people won't be looking as an inferior or superior to me, or something like that. I won't be like a guy sitting in the corner for 2 h and then saying, Hey, Arthur, I have to go.

[Back to the question, what do you find attractive?] So that yeah, it was like, it's very accepting. It's not judgment.

What don't you like about jam sessions?

A few jam sessions ago, there were many clusters of groups of people having talks within themselves. It felt like a band performing in the corner of a fine dining restaurant. Not necessary that people only play music maybe.. PERFORMING

I stopped playing the shaker a couple times. Am I of value to the jam. I took a step back and observed. Hey it really feels like a fine dine restaurant.

I don't know, what I observed is, maybe that's part of the jam session as well, It's not necessary that people come there only to play music or to observe. It's also people come there to have a talk to have a talk session,

because I still remember, after 2 sessions later, the latest jam session, people were playing, and then you were sitting on the table, and then we were having a talk on our own, about that I want to start. Something in New Years after, during my thesis, or something



And in that moment I feel, oh, hey? I'm the guy who is talking, not playing. and others are playing. So I was part of both of the clusters,

[about performance vs. inclusive social activity]

I did 2 experiments where I stopped paying the shaker for a moment, and then I observed. "Am I? Valuable in this entire piece?" I took a step back. I literally took my chair to step back more to the washroom of yours. Yeah. And then, I observed in, because that's a very panoramic view. You get sure. And then I observe. Hey, man, it really feels like a fine dine restaurant. And then there's this specific band which is playing just in front of me. But later on, when I experienced going to other clusters, it was a different.

What inhibits you from participating?

What barriers do you experience?

I didn't know how to play a single instrument, not even the shakers. I knew somehow that I had a chance at learning shakers.

Guitar has a different learning curve than shakers. If I'm strumming guitar and I'm not in sync with the othersm I will be lagging behind a few steps, and they would be ahead a few steps. But at a certain point of time I believe they would say, hey man, you should have done this. And those new learnings, if I foresee a future where I play a guitar, It would be lots of ups and downs. But if you tell me about the downs, That would be a good challenge. But that challenge would be a very good learning purpose

Now, if there's a new person coming in and starting with the coffee shakers, It's not pressure pressure. because he or she may start shaking the coffee Shakers or the rice Shakers and get it, very soon, in one or two jam sesskons. But that's not the case for guitar. because there's a different learning curve. There will be different challenge. yeah, it will take time

What are you doing to overcome these barriers?

Now I'm the only shaker sometimes

A new person comes in, coffee shakers. They make it very soon. That's not the case

**Fail more. You try, and people tell you this is not the correct way. People will show you.**

I believe that comes from cultural shock as but because back in India people won't do that. people will rather say to you. "Hey, man, you're not doing correct. And I guess you should pick up something else."

Here it's not the same. An analogy: I worked in Indian restaurant as well. I guess after 2 weeks I did not work anymore. If you mess up someday serving a food in certain manner, or taking orders, or certain, you know. Stuff like that. They take you at the back door, and then they yell at you, and then they shout at you and stuff like that.

But in the Dutch restaurant [new workplace] that I work, what the guy said to me - we are all working as a team - he said to me, even if I see someday that there are lots of guests, customers, I will also jump on the bandwagon and start serving, making drinks, or even serving drinks or something. And that felt very comfortable that I'm not alone.

And he said to me, You are okay to break glasses. And that was a very big thing. like, if I'm taking a bottle of Spa blue or Spa road. And then there are 6 glasses because it's a family, and then I break all the tray. He's not going to yell at me. And that thing, Arthur, that changed the psychology and the Psyche and the mentality so much that I never, ever have broken a glass to date.

That's the thing, because like, and that's the thing that I find here as well, like learning an instrument in the jam. For example, if I pick up a guitar, and then I just strum, which I've observed. I've tried failing because I don't know anything about guitar, and I strum while a major piece is going on or something. And no one says anything, no one. And for a moment oh, that's nice. The environment is accepting. The product is accessible, beautiful. Now it's time to learn it. And then I learn it. And then maybe Stijn or someone observes. "Hey man, you're doing good, but maybe on the third time you shouldn't do it like that".

Then that's learning. We have to be accepting. But to a certain degree when you get serious about learning when you are beyond the comfort, zone of accessibility and stuff. There has to be like a very caring mentor or a friend saying: "Hey, man, I guess you did that piece very nice, but you should have done... now it sounds better... Now do it."

A person should fail AND someone should say it. Feedback

Support.

You're ok to break glasses.

*Role of instrument and associated needs (optimally, following inputs from the interviewee regarding instruments)*

Tell me about a musical instrument that you admire

What instrument would you like to play? Why?

I really want to learn the guitar. [What is it about the guitar that inspires you to learn?]

So I listen to this, podcast as I said, it's Conan O'brien needs a friend. And every summer he has a podcast with his friends in the back yard in California in Pasadena. And then there is crickets in the background. And he is playing country music on the guitar while the crickets are chirping. And he calls it "Summer Smores". It's a really nice vibe.

And that is the kind of thing, like you're playing an instrument with things that are happening in nature and your conversation. So if you tell me like, why do I want to learn guitar? Yeah, I want to learn guitar, because this is one of the reasons. This is because I want to blend it. Yeah, blend in with the situation. Like I said, music is going in the background, and we are having a conversation. I want

to be in the environment, in the music. So I'm playing, strumming, and then we are talking at the same time.

[What is it about the guitar that you admire?]

The guitar... it always felt to me -even the mandolin, like a string instrument - they always feel like they are very accessible. Accessibility in the sense that if I just if you just keep a guitar here like this, and I could play some guitar strums randomly, like a novice user. Some music would come out. and that would sound at least melodious, you know, and in that sense guitar seems very welcoming, very accessible. Very friendly in that sense. But yeah.

Are you learning it? Are you planning to?

No. To be honest, I, yes, to I am not learning it full fledged. but maybe in the jam nights I sometimes pick up a guitar and try to strum, and that's the farthest I've got to.

So the instrument is very welcoming and the environment is non-judgmental. So accessibility and non-judgment environment comes together to give me confidence, to lift up the instrument and go crazy with it.

even if the if the product is accessible. But the environment is not friendly, then the experience is bad

What steps have you been taking?

Yeah. So I watched Youtube videos, but just watching it. But I know that this is not like sketching, you know. You just observe, and then... you have to pick up an instrument. But yeah, to be to be honest, let's rip the Band-aid off, this was some videos, but I haven't played according to the videos.

[Why is it "not like sketching"?)

Because when my mom was sketching, it was real time it wasn't in a video.

But nowadays, maybe if I see someone playing guitar real time in a bright light, only that person playing it, for example, if you're playing the guitar, and I'm just observing your fingers, for hours and hours, which I did as a child, which is not possible of course.

Then I may be like, Okay. Arthur puts on the second column, third row, like a matrix. I can figure things out because like an image memory, you know, I can think, Okay, this was the first images for the second. Oh, so this first image is known as the G scale, or a scale. But then I learned something like that.

but because because when I was growing up, I saw my mom's trace and sketch in front of me in real time. not in a Youtube, because when I was born there was no Youtube and that fit into my memory a lot. So it was more than digital.

that that's the reason. So today, what I'm doing right now is watching is thinking that okay? Someday I'll buy a guitar when I save some money working in restaurants or studying or something or the

other, and then I buy a guitar. And then the moment I pick it up, I'm going to recall all the Youtube videos. But that's not going to happen.

Maybe in the jam sessions I need to pick up the guitar.

The instrument is accessible, environment s non-judgmental

I'

When my mom was sketching, it was real-time, not video

Observing for hours and hours.

Someday I'll buy a guitar save money, won't recall all the yout.

(What kind of music-making technologies have you used?)

# Interview Notes 1.3

Main interviewee type: Music novice

*Introduction/Profile*

## **Tell me about yourself**

Name is Anya, grew up in Russia, eastern Europe, perdue, mech engineering

Make with my hands

Made sense uncle in delft

What are your main pastimes/hobbies?

A lot of sports. Expected to get super good. Train 2 hours every day.

Artsy stuff, drawing, hanging out, concerts, festivals, good food/drinks. Normal human stuff

## **What would you say you are very good at?**

Design drawing/normal drawing

Organization/time management . I end up being the project manager

Wouldn't say I'm good at engineering because there are people who are much better than me

Really care about doing good work.

How do you usually learn these things? (e.g. self-directed, guided, group activities, etc.)

Time management comes naturally/born

I like taking a proper class, LinkedIn learning, having a strong base to rely on. Either taking a class to practice or setting an own structure. I believe in having a strong foundation.

A lot of design skills I had to teach myself. Keyshot class, etc.

I would trust something like linkedin learning because it is a professional platform.

On youtube, you might watch a video for a half an hour before you think like: "I'm not getting anything out of this"

## **Describe/characterize your social life.**

Grew up far away from the majority of friends, the people I went to school with or went to volleyball with

Limited social/overloaded with people. Social life in waves (festival/hike, then me time)

Not really big friend groups, few people that I'm close with. We pull each other into different things.

## **Relationship to music**

### **Are you “musical”? Why/what does that mean to you?**

(Laughs) It depends how you define it. Or should I define it by myself?

Let's say I really enjoy going to music events. Came from when I was living in Spain and they have cool clubs really cool DJs and locations playing really good stuff. But it just feels so surreal, it's such a vibe when everyone is up on the same frequency.

Everyone is on the same frequency, it's a vibe. I

Maybe in the more strict theoretical sense, When I was in also Spain when I had a lot of time I tried to pick up guitar. That died out because I had other things.

But I don't really understand music, so if you say like “this is a note” or “this is a rhyme”, I really don't know what you're talking about. And in all the strings and “octaves” I think they're called, I really don't know music terminology, so sometimes it's hard to communicate with people who really know what they're talking about because you don't speak that language

So I would say I am musical in the sense that I appreciate good music, music that is interesting or that I like, but I don't speak that language.

### **How do you consume music?**

I'm a weirdo who uses Apple Music, so through that. I try to follow Cercle. Usually I go to DJs I know. Discover music on Apple Music,

Musicians that come before the DJs I know

When I really need to focus, I would never use electronic music. Recently when you

**Soundbath spa playlists**. I live in a pretty loud place, I need sound in addition to noise cancelling

Not really on street. I don't really listen to it in planes/buses/trains. I like to know what's going on in my surroundings

### **Have you played music? When/where/how?**

I think in Spain, my sensitivity increased so much. It really felt like another medium to express yourself, like you know express how you feel. It just felt really powerful. I still think, it's just you know, the feeling you have inside. Whether you're expressing yourself through your music or if you're a listener trying to guess what the creator might have been going through, like I think it's a very powerful communication means.

Most recently a lot of electronic stuff. House, Disclosure, electronic, Clooney, had a period where I listened to a lot of Ben Böhrer

For more chill stuff, lo-fi beats

And the sound baths, love them. Ever since I discovered them, it changed my life. When I discovered I was hooked. They have those copper bowls.

There are these events where they like make it for you live, I've never been to those but I kind of wanted to go, just didn't make it.

*Perceptions/experiences around jam sessions*

**What does the term "jam session" evoke in you? Define it, share examples...**

I think something very energetic and lively. It sounds kind of funny and feels like it must be something energetic and active, but once you know what it actually means, it kind of affects your perception. [...] It feels like it has to be something very active, but at the same time, most of people are actually seated, playing their thing. But for the people who are around, you can have fun and dance and whatever.

I'm always an observer so for me it's, well it can be, active and I still feel like I'm somewhat left out because I can never participate.

*Define jam sessions:*

From my non-musical knowledge it's When people get together, everyone brings in, you know, your instrument, I guess someone starts and you try to continue it and add on your piece to the bigger picture. But I don't actually know how it technically works. I usually see people, everyone is playing, and they're like, doing their little thing here, and then kind of like listening, so it's almost like when they play live jazz maybe, when sometimes the pianist would be doing something, always guessing kind-of-thing. I don't know if there is a parallel between live jazz and jam sessions.

I think the only time was pretty much when you guys used to do them outside at Kafé. Because I think if you see musicians on the street, usually it's all rehearsed, I don't think it qualifies as a jam session

Actually no, a group of friends were also doing them. In their house, they just had one guy, he... The guy played everything Basically they would have a piano/guitars, one of those boxes you sit on and hit on, shakers, how do you call the group of instruments you inhale ? [wind instruments].

They would invite my boyfriend and myself and we were like, we're good. Because none of us are confident enough

[What were they inviting you for?] Just kind of join and do whatever you can.

Join and do whatever you can – Usually that group, we would play sports and then they would go back to the house with instruments, but at that point we just kind of wanted to do our own thing.

Tell me about situations in which you have experienced/come in contact with a jam session. What did you do there?

What do you like about jam sessions?

What do you find attractive about jam sessions?

It's always cool, to, I mean one thing is to witness something live, but you know it is rehearsed and people have practiced it, but it's something else to then know that it's happening, like jazz, it's never

been done before, it's something brand new being done in front of you, the spontaneous nature of it.

And also, seeing people who are really good at what they're doing is always sexy

One thing is to witness something live, but something else to know that it's like jazz, never been done before. Spontaneous nature of it. And seeing people who are good at what they do is always sexy

What don't you like about jam sessions?

Those groups give off a vibe, that protected vibe. Closed circle, only friends can join, only people they select can join. Maybe it's just what a lot of us have in our minds, if I'm not good I shouldn't be doing it. Not shame, but that feeling that holds you back, you think "you shouldn't mess up

Just because they are making something beautiful and I don't want to ruin what they are making. The closest analogy I can think of, I'd say I'm pretty decent at Beach volleyball, and then someone asks to join, but they don't know what they are doing, so you're not enjoying it anymore, but you always try to be nice and inclusive. You don't want to like ruin it for them as well. When someone joins in sports, you smile and try to cheer them up, but you're really just like "just leave"

guitar

What inhibits you from participating?

What barriers do you experience?

When you were playing outside. Stuff is always happening, even if you want to jump in, I don't know if I have to wait for a pause, since you don't really understand what is happening, will I ruin it, should I introduce myself

Sometimes maybe not having an instrument.

If I was confident I would introduce myself, blabla, and then ask if they have a spare instrument, but when you're a novice, there's just a lot of internal doubt

What are you doing to overcome these barriers?

I don't have plans, but if someone asks me, do you want to come, I would probably say yes. Not being proactive about it.

*Role of instrument and associated needs (optimally, following inputs from the interviewee regarding instruments)*

Tell me about a musical instrument that you admire

Guitar I like the sound, I like how collective, easier to pick up than the piano, summons the image of a campfire, I like that it's transportable

Why do you say easier to pick up than the piano?

Something I've been told (piano). I feel like my brain just can't. it's probably trainable, but the piano just seems very difficult.



I think the box (what do you call it?) [cajón] and the shakers feel approachable. But I remember trying the cajón once and thinking, this is not as easy as it looks, because it depends where you hit it, but those feel pretty approachable to me

What instrument would you like to play? Why?

Guitar - I've always liked it, growing up I had family friends and relatives who played it so I had an introduction to it.

Living in Spain, flamenco, so many people play it

Are you learning it? Are you planning to? What steps have you been taking?

Once I graduate and settle somewhere I'd like to find lessons again. Because I think it's important to keep using your brain.

**(What kind of music-making technologies have you used?)**

Never mixed/recorded anything. Sounds intimidating. Recorded music in the sense that you take a video at a concert, voice

Intimidating? When you see images/videos of people making it, the software looks intense, so much happening.

Gain confidence, might look intimidating. Nothing you can't get past if you study design because we learn to use a lot of software

In my mind, it's first learn to play music, then create something.

When I'm working, whether it's studying or working-working, because you sit so much, I feel like in my free time, more often than not I tend to choose something active. And I associate jam sessions with just sitting, and that's not something very attractive.

Also, you have to plan for it, have an instrument on you. Maybe you often know that you'll be at a jam session, but I feel like there is a certain degree of spontaneity to the activity...

## Interview Notes 1.4

Music novice

### ***Introduction/Profile***

#### **Tell me about yourself**

#### **What are your main pastimes/hobbies?**

So I am, Sam. I'm Dutch, Italian, but no one recognizes a quarter, so it's useless.

I come from a town close to Rotterdam. So a town where everyone knows everyone which is nice I always used to I when growing up, I always used to play football, and I still do play quite seriously. So I like being ambitious. And like being serious about it. So that gives me pleasure. And that's also the hobby that took all my time when I was younger, except for maybe gaming sometimes with friends. And then I came to study in Delft. I've been there since 2018

I also was. Well, I am still in DROP[skate/surf student association], but I never do anything there. I always forget to do stuff there. So but I actually do like to snowboard still, and I also do wakeboarding quite often. But then behind the boat.

I haven't been into industrial design all my life, like some people have. But I have been since I'm studying here. Yeah. And now I'm getting also more and more into into that world of more design, and also a little bit of art.

[Do you still play football?] Yeah, yeah, I used to play here and now, I play close to my parents, where my parents live, to play also with friends, but also at a higher level. Yeah, it's like 30 min drive. I've got a car. So that out really helps a lot.

#### **What would you say you are very good at?**

I'm not amazing at playing football, but it's a skill that I have practiced very often in my life, so I guess I am good at it.

I would say good at empathy empathising with people, I guess.

Well. I always think it's nice when people feel nice in a room full of others. so I think I care about people.

And I think I'm okay with also adapting to different types of groups like, when I'm with the guys from my football, that's like with the guys. And when you're here with people, maybe it's a little more. Yeah. Sophisticated,

#### **How do you usually learn these things? (e.g. self-directed, guided, group activities, etc.)**

[in terms of learning to empathize]

I think I have. 2 older brothers and their friends are were always around, and then in that way you have, like these different types of people where you have to relate to and like, speak their language a little bit to fit in so I think that's as early as where it started. And then, also studying involved also

came like a whole different group, because all of sudden, here everyone is like higher educated. And there's also people from way different towns. So then you notice that, like people from Rotterdam are maybe way more strict, like straightforward and a little bit harsher yeah, than other areas.

I have done some traveling now also went to Ghana, of course. So then you all have, like again, another perspective of some people, and how to talk to them.

So yeah, I guess just different groups where you want to. Also want to feel nice with yourself, like I would want to be friends with people from Ghana as well as people from here. So maybe in that way, yeah.

[How about for more technical skills, e..g. some you might learn in relation with football, ore here on campus]

when it comes to learning skills, I guess I am a little bit shy most of the time in the beginning, like I wouldn't just walk up to a new machine, or a person who is very good at something and like, ask them, Hey, can you help me? I think that's the first step is mostly quite off my like little bit scary. But I do. My style of learning is through looking at other people

Like when I play football, I look at the guy, and there's a couple of guys in my team who I really look up to. And if I see them doing stuff, I try to practice it myself as well, yeah, and that's the same thing with design and the same thing in the workshop or something. If the first step to asking advice is mostly quite scary to me, but when I got over that first step, then I constantly try to ask and ask and ask to get that advice.

Like, when I went into the PMB [faculty workshop space] first, it was quite like, Okay, yeah, right? Like, these guys are – well they're not Grumps, but they seem a little bit grumpy every now and then. But then a lot of, and then, like a couple of times I was there and then I was there on my own.

And then I started talking to the guys. And then they started interacting with you more more and more, and then they give you tips, tips, tips, tips. And then I noticed that like when with this project, we went into the into the PMB. And then I did it with with the other girls, and I noticed that they went there less so I could explain them stuff. And then I thought, Hey. you know what? I actually learned quite a lot from those guys by just listening to them. And yeah, I think, like people who are just doing something every day - They know so much about it. So it's it's way easier to just ask them. But asking them is often a little bit scary, I guess.

[In this specific situation, what do you think is the scary part about it?]

When you ask for help, you of course show that you don't know something. maybe that's in my case my brothers making fun of each other when you're when you're like kind of stupid

But I guess you're you're showing someone that you don't know something, you know, so that could give someone the kind of power to laugh at you and say, You don't know how to use this machine? It's super easy But most of the times when you ask, you notice that they don't do that. And they just say, Oh, yeah, I could show you, sure. And then you just get the advice that you actually want.

Describe/characterize your social life.

House, live with 7 other guys. Daily talking to people. That's why I wouldn't have to link up with people every evening. Because either my roommates are there or on Tuesdays and Thursdays I have my football practice.

So then I also don't have to make any appointments with people. I think that's the biggest biggest part like I don't often make appointments with people.

and then sometimes, after a while, I think, wait! I haven't even talked to you or you or you like one on one in ages, and then I start to make appointments, and then and then it becomes very Dutch, where you say, Okay, when shall we meet up? I have time in 3 weeks. Me! And 5 and a half months. So let's meet up there.

A lot of it is very fluid, a small part of it is arranged, so like meeting up with some person.

Clusters of friends

Groups I've known long: Take on Cliché: guy who wants to decide stuff, who thinks at least that he is a leader in some way, in the other one I'm the funny guy. Now in Delft I wouldn't necessarily know a role for myself

### ***Relationship to music***

#### **Are you "musical"? Why/what does that mean to you?**

I would not say so. No, I do like it. But I'm not good at making music.

being musical to me always feels like I can play. You can play 5 different instruments. And when you give me a new one, I would say, Oh, let me just try this, and sounds like a like Mozart or something.

So in that way. I wouldn't say so. But I also do really feel like it's a skill I just haven't practiced any time for like steady period.

there have been moments where we had like in our middle school. we had a music lessons, and then at some point,

I think, a couple of weeks of the course, and there we were, like a Samba band together, and then we just all had like our own drum. And we walked through town once, as like our graduation for that course with like 10 guys or something. And we all walked in a line and made some music and like, then you notice, okay, if I just do it quite often, I could become quite musical. But I'm yeah. At this moment. I'm not.

#### **[Does musicality have to do with musical instruments?]**

It feels to me the first thing I would think about is that yes, like singing could also be. But Sing feels more like a a gift that some people have, and some people don't and being musical, feels to me like, yeah. Feels like musical instruments, for sure.

It could also be like tapping on a table like anything could be a mute musical instrument. But yeah, I would say, instruments.

Although dancing. Maybe. Also. like dancing is also. of course. very rhythmic. Maybe that also has something to do with it. With musicality

### How do you consume music?

Mostly just listening to music when you're studying

Or when you're I don't know in the car. so, but I like music while showering, but that's always a good one.

[Do you have a good setup for that?]

No, just the phone and put it into sync. So it has, like a natural speaker, that's it.

So is listening to music something you do regularly?

Sometimes I forget about it, but then I study with music again and I'm like, this is way better.

You have people walking around, constantly with headphones, I would not say that's me

Have you played music? When/where/how?

Yeah no, I did have some roommates, couple of years ago, like one played guitar and one had a keyboard at some point.

[Well, you did mention the school rhythmic project]

Yeah. I didn't even know what [instrument] I had. I don't know

I don't even know if I had like sticks or wasn't like. I think it was in my hands, but I didn't even know. It was fun, though.

What genres of music do you like?

Discovered couple years ago, soul jazz music. Used to be a fan of dutch rap. Now I do like it more musical, more jazzy hiphop stuff

Techno, would n't

### *Perceptions/experiences around jam sessions*

What does the term "jam session" evoke in you? Define it, share examples...

I would say a jam session, at least everyone is in a circle and a space, everyone has an instrument that they make sounds with. Very "unprofessional" – that sounds negative, I mean it in a positive way – casual. There doesn't have to be a drum set, could just be a single hand percussion item.

I would say at least everyone is in a circle or a space or something. Everyone has a certain instrument or something that they make sounds with

unprofessional. Seems like negative, but I mean it in a positive sense, and it's like very low key, very casual.

so it doesn't have to be like a big electrical guitar or a big drum set, but it could should be like single and percussion. Yeah, item.

and then well, so I we did have music class in in middle school. And then you just had, like the teacher who said, Okay, you do a little bit of this, and then you do a little that

and also once when I went on travel in Sri Lanka there was a guy there who was also like a Dj. Used to be a Dj. And stuff, and then he just handed out also all these percussion items, and then he also said, Okay, you play this, you do pappati papa poo, you do ti ta ti.. And then together. And then it sounded amazing. Of course.

Yeah, there was someone leading. also, when I think about it more, it seems like almost weird if there wouldn't be someone leading a jam session.

or maybe when there's no leader, it would mean that, like the rest, is also natural at making music

like to me, I would kind of need someone to say, Hold up, pull up! Wait, wait, wait! Let someone play this, and then you add something to it.

but like you also see those like youtube videos of people just playing random stuff. And then someone just adds something to it on their own, like, very natural. But I think that's more for people who have mastered a certain instrument or something. Yeah.

**Tell me about situations in which you have experienced/come in contact with a jam session. What did you do there?**

I think I saw you guys once, at Delftse Hout.

We were just, I think, I was with my girlfriend. So we were just hanging out somewhere else. But yeah, it seemed good. It seemed nice.

**[Would you want to partake in a jam session?]**

I think if I could play an instrument, I would be [interested in joining a jam session]

But especially as you don't know the people yet. So when you come there and you don't know anything. Yeah, it gets kinda to me. It gets kinda scary like, okay. I come there, and maybe I can learn a few things. But how much can I learn? And while I'm like borrowing someone else's guitar or something?

**What do you like about jam sessions? What do you find attractive about jam sessions?**

Super nice how simple music can be. how simple I can play, and then, if I play something very simple and 10 others play very simple, it gets very cool and very complicated.

When people work together and it adds to each other and becomes better because people are working together, that's kind of cool

It's also cool to see - normally, when you hear a song, you just hear the end product. But now you hear like how a certain sound is like put together through all these simple lines.

So I think that's like, like, when you have, like the the digital making of a song, you have all these like tracks. And then you see the different tracks sitting there. I think that's super sick videos when people compose music like make beats or something live on a digital platform.

What don't you like about jam sessions?

What inhibits you from participating?

I think - people who are very good at playing instrument. It can also become like a bit of a bragging, I guess, showing off. Or at least that's what it could feel like.

Like if someone would want to take over a jam session, or be too actively involved - like there's when when I did the jam session. There was like this one guy who orchestrated it. He sometimes did like more crazy stuff, more radical parts of, or sometimes he said, like, Okay, now you do something crazy. Now you do something crazy. But then the others, like I have to stay kind of like in their calm sort of rhythm

[Would you say he was showing off?]

No, because he knew that we weren't like very good at playing something, and he also gave us opportunities to like do our own part.

*[but in but in a sense - he knows that if even you have an opportunity to do your own part, you're not as good/you can't do the crazy stuff he's doing]*

yeah, true. But I guess in this, yeah, I guess in this moment, because he also like he orchestrated everything. So without him we wouldn't even be playing, or it would sound like crap.

So I guess, like he was more in the role of a mentor. So you kind of more look up to it. Yeah. compared to if you're in a gem session, you're all like the same.

I don't know. There's always a fine line between bragging or showing off and actually being super cool. Right? also depends on the person and the day...

What barriers do you experience?

What are you doing to overcome these barriers?

*Role of instrument and associated needs (optimally, following inputs from the interviewee regarding instruments)*

Tell me about a musical instrument that you admire

I like percussion instruments, things that are very simple. Things you can play with your hand like the bongos and stuff like that. I don't know other names, but instruments like that. I think that's very cool. [...] It feels kind of natural, indigenous, compared to an electric guitar, which is cool, but doesn't seem organic

I think a banjo, is something very cool. very, because it's also kind of niche, kind of rarer to see.

maybe something like a bass guitar. But that's also because it's more like underrated or something makes it very cool.

I think musical instruments like the violin. And just because it's extremely cool if you can play it. I think that's that's also amazing.

When I grew up. I always said I wanted to play piano, but I never did.

What instrument would you like to play? Why?

I'm now always saying that when I'm when I'm 40, and I'm like a grumpy man working 9 to 5. That's when I'm getting a drum set. So when I get home I can just get a bit of their rage out and also make some nice music.

okay, it's also kind of a joke. But also it seems very cool to me like I'm a big fan of Lord of the rings, so there's like an instrument where they play the the hobbit tunes with like it's a tin flute, okay? And just like it's very simple flute. And I wouldn't want to play any other songs on that flute. But just to play that song.

But I wouldn't know what to choose right now, to be honest. because I'm also considering how long it would take you to be kind of good at it. Like if I if I wouldn't take that into account, I would say, like, saxophone, yeah, because that's amazing, that's super sick.

People just say that. My roommate plays, I've never asked him.

There was a period when I was a kid, I always said to people I was gonna play the violin. And they said, Oh, that's that's quite difficult. Right? I said, Yeah, no. But I'm gonna learn

there's just notions of certain instruments that are difficult. And I take them without actually thinking about it myself.

back in the days, or I guess that's at least in the Netherlands. Every guy play either guitar or drums. When you see With more niche or different use of instruments, you see the beauty of it.

everyone when they were a kid, had something ... percussion. Ish. But no one had like a saxophone when they were younger.



there's so many people who say, I wish my parents had forced me to play an instrument [Learn a language also]. Yeah, such a classic. But then it doesn't make any sense right? It does, but it also doesn't like, why not start now? If if every time you would say, Oh, I wish I would have learned this language, you start actually learning that language?

For some reason having an adult life and learning something new is also not very normal, like, maybe having Duolingo in your phone is, but... something that everyone could see or when you're,... yeah.

But I do think a gem session would be very could be very helpful in that.

Maybe if you would play it on your own. Then it's very boring, like what you would play in a gem session, I guess, would be kind of boring if you would play, because you're just playing a loop. Right? So it's yeah. You wouldn't do that at home, maybe. But if you're doing it in a gym session, it's fine. If you just play....

Are you learning it? Are you planning to? What steps have you been taking?

Learning

(What kind of music-making technologies have you used?)

I've done some of the Garage band very bad music using presets.

there was this AI thing at highlight festival last year where you would play with some dials, and then the AI would make the music according to your dials, like, Hey, I want the tempo to be this. I want the energy to be this I want. It was also like making music for everyone.

## Interview Notes 1.5

*interviewee type: It turned out that user 5 **was not a music novice** due to a misunderstanding. The interview became a discussion with someone who, in fact, has been regularly frequenting jam sessions and can be considered an expert user. This is a useful discussion because the user has been trying jam sessions and reflecting on the different formats, offering another source to compare with my own experience.*

The following is my translation of notes taken in Dutch during the discussion.

[Woman, 27, former IDE student. Lives in Breda]

I have always been occupied with music in one form or another

It seems natural, it is in my system. I always sing but I've never had classes. I would like to take singing classes, though. I've been playing guitar since I was 10, but I don't read sheet music. I don't know if it exists, but I would say I have sheet music dyslexia. I just can't understand it.

I also sing in a choir and play piano since I was 16. I had a year of piano classes. Unlike the guitar though, I can't improvise at all on the piano.

I like singing and scatting a lot, especially in the context of jams.

I am now also a singer in a band, and currently I often go to jam sessions in Breda.

**A friend of mine did a DFI project about improvising!**

### **[Tell me about the jam sessions you go to/have been to]**

There are 4 jam sessions in Breda that I know of. Two of them are good, two are less good. I have been to 3 of them. I mean really, 2 of them aren't jamming.

My favorite one [Sound Dog] has a very relaxed atmosphere, everyone is welcome. There aren't many singers, which means I'm all the more welcome. The second time I went, they recognized me and announced my arrival. This jam session is "uncontrolled", there is no mediator. Often there will be some basic blues structure or something, and you can just improvise. Or sometimes someone has a song they want to cover, but anything is ok. Also, a lot of the people just come to enjoy the atmosphere, not to play. The average age is higher, there are some older people, it's very mixed.

Then I've been to the phoenix. That has a younger target audience, and there is a clear jam lead. They say, ok we're playing this song! Often something from the blue book **[she means real book]**. So they play jazz standards, but it's not that flexible.

In Sound Dog, the jam lead happens more naturally, like sometimes an experienced participant who is on stage gives a suggestion or notices that someone has been waiting to play, and invites people to trade spots. But it's not a predefined leader.

The last one I've been to is the "Liefsetse Café". I mentioned it's not really a jam, although they call it that. They have a fixed band. You have to write what you play on a card. So an instrument and a song request. And then you can perform it with the band. But you don't really have the chance to get into it within one song! **Basically, this place is like a live karaoke bar.**

[How did you start playing music with others? (Band, jam session)]

**I posted on a "Muziekantenbank" page on facebook. Posting about wanting to make music is kind of daunting (spannend) the first time you do it.** There's a lot of pressure linked with it to perform well. But I trust in my good musical experience, especially for singing.

With the guitar, it still is high pressure; I play, but singer-songwriter style. But that doesn't translate well to jams. So the few times I was given the guitar at a jam session, it didn't go that well. I'm just trying to figure out: "what is jammable music?"

## Interview Notes 1.6

Music novice

*Introduction/Profile*

Tell me about yourself

What are your main pastimes/hobbies?

Video games, gym, difficult books, different types of crimes

### **What would you say you are very good at?**

I'm really good at organizing my time and the tasks that I have to do. I really like planning what the structure of the task is going to be. See how it moves forward

Cooking is a good skill that I have. Dishes, recipes I learn from my family, online recipes

### **How do you usually learn these things? (e.g. self-directed, guided, group activities, etc.)**

Now I like to learn myself a lot more. Comparing my experiences with what I see online

### **Describe/characterize your social life.**

I sometimes have difficulties meeting new people because I'm naturally more reserved and not quick to open up. A few friends, we go to maybe the cinema or practice (boxing session) Mostly, I have deeper connections with fewer people

### ***Relationship to music***

#### **Are you "musical"? Why/what does that mean to you?**

Well I like listening to music, I like especially listening to music that I enjoy. I listen to whatever I find enjoyable or what matches my mood

People use musicality to say that someone is talented with music.

How do you consume music?

Sometimes during my studies, I like to put on background music to set the mood, sometimes it helps me be more concentrated during the task.

Have you played music? When/where/how?

In my primary school I used to play the synthesizer. I used to go to my class music teacher, she also taught people to play synth on the side, a little group of 3 or 4.

Then we played in an "Orchestra" for the school play.

My mom bought a guitar, I tried to learn once but I didn't have the patience

**What genres of music do you like?**

Depends on mood. Rock, ambient music, also rap music sometimes, hip-hop, sometimes classical pieces like Mozart or pachelbel

***Perceptions/experiences around jam sessions***

What does the term "jam session" evoke in you? Define it, share examples...

I've heard about them, but I don't know exactly what they mean. I've never been to one. I suppose people get together with different instruments, play and socialize.

**Tell me about situations in which you have experienced/come in contact with a jam session. What did you do there?**

I've heard people use the term, and I've probably browsed it online.

**What do you like about jam sessions?**

**What do you find attractive about jam sessions?**

If I knew the people well and felt comfortable with them

I see it as a social activity where you have fun, bond with people, create stronger relationships

Playing music, poking each other, having fun

I see it as playing a game where you build upon it and end up with something at the end

**What don't you like about jam sessions?**

**What inhibits you from participating?**

If there are people I don't know that well, I wouldn't want to make a fool out of myself.

The people. If you're all having fun, then it's good

What barriers do you experience?

What are you doing to overcome these barriers?

*Role of instrument and associated needs (optimally, following inputs from the interviewee regarding instruments)*

Tell me about a musical instrument that you admire

I admire the guitar because I saw some really talented guitarists that blew me away

<https://www.youtube.com/watch?v=7gphiFVVtUI>

Also I would like to learn how to play drums, because they are the most stress-freeing instrument there is

What instrument would you like to play? Why?

Are you learning it? Are you planning to? What steps have you been taking?

Right now, I'm focusing on thesis, finding a job. After that I probably would go to some classes, see if I like it, consider buying one myself

When I come

(What kind of music-making technologies have you used?)

If they develop AI music in the future, I would consider making music with AI

Yeah there was a video of a guy who goes in the forest with a really long beard has a bowl he taps on (Handpan)









# Appendix 7: Post Bass Guitar Test Interview Transcripts

## Test Participant 1

### Post Bass Guitar Test Interview Notes

I feel for the first time I wanted to try for myself, experiment it alone, didn't feel like bothering others

Paying attention to the environment and try out by myself

I felt I was part physically, didn't contribute.

I was enjoying it. I could try it out just on my own.

Basically I went along the whole fretboard. I checked everything, I checked playing all the strings, I tried some melodies, some combination

I know where the high and low notes were

I wouldn't say I learned in terms of music. Maybe I learned to embrace the unknown. Trying without worrying.

My fingers were hurting. Was a fun way of spending time.

Overall positive for me

Help from [test participant 2]: we were trying to find how to follow the jam together. Find the right notes and follow the jam

Was sitting next to me and also not playing

We were trying to mimick stijn's hands to know what he was doing. Although it's a different instrument

I would use the headphone setup again until a point where I can actually play/I feel confident.

How would you join a jam session if you don't know the basics (in music)?

[What basics?] to know which notes to play when. To have, not perfect pitch, but something like that, know how to improvise

Bass instrument

It's heavy, the strings are super hard. That's it

Not the instrument I would choose

Why would I play the bass when there is a guitar.

I didn't know there was a big difference between guitar and bass guitar

Beginner: I don't know if they would know how to hold it, I have held a guitar before

The electronics are complicated, if they need to do it on their own. There are accessories involved, not only the instrument.

I feel like the guitar is easier to learn. More people play it, it's more accessible, you don't need to plug it in, easier to carry around, easier in general.

It's more versatile

What instrument would you like to play

Every instrument

Piano, percussion in general, sax

I admire the harp. It's wonderful. The design/aesthetic

It's like a queen. Size and shape. Also because not really common.

[Headphone setup, sharing with other novice:] I think you feel understood.

I would read stuff on the side. Watch videos...

I was trying to reproduce songs that I knew

## Test Participant 2

### Post Bass Guitar Test Interview Notes

**Q Which of the three setups did you choose and why?**

I started with one headphone, but I would choose having 2 headphones, because I feel it is nice to show what you are doing.

It's nicer to start showing it to one person who has the same level as you so you have fun with it. So I would go for sharing it, but not starting with sharing it with everyone.

To be honest, in the end I don't think we managed to join the jam vibes, I tried to listen with just one earcup from the headphones, but I couldn't really follow it

If my goal was just to learn the bass, it would have worked with just [test user 1], but if my goal was to just make music randomly and experiment with it, then I think it was nice to have people also playing, although I didn't interact with them.

**Q What were you playing?**

I was playing random notes. I was trying to figure out sounds. What sounds can I make? I wouldn't say it was a melody. At the very end I managed to make a melody with 3 notes that I played it again and again.

I was generally looking for something that sounded nice.

Q Did this 3-note melody fit into the music around you?

I wouldn't say it was specifically made for the melody that was playing in the background, but I do think that if I had played it in the speaker, maybe the jam would have welcomed it somehow. I think it happened before with another instrument that I was trying and I realized how people also changed. But also there might be a weird transition between that.

**Q What barriers did you encounter?**

The bass has strong strings. For example, with the ukulele you don't need to make any effort.

The sound was nice, I could hear everything ok.

It was a bit difficult to hear the jam and yourself at the same time with the headphones, but it's possible.

The instrument itself, I find it more difficult. I don't think it doesn't sound nice or anything, but it's lower and maybe I'm less familiarized with the melodies it creates, because if you are not touching any chords and just do this [strumming the open strings], for example, I do that with the ukulele and I think it sounds nicer than with the bass

So it's harder to feel like you're making nice sounds.

It is big, but I don't think that was a very big problem.

Sometimes I prefer it big. I don't have to worry about holding it, it just holds itself.

**Q What did you get out of the experience?**

It was nice that in the end I was able to do the three strings melody

Tougher fingers

I think I really enjoyed the interaction with [Test user 1]. I had fun with it, you know? Because she was also so lost. Not someone teaching me, but someone also wondering, laughing about it.

I think the interaction was fun.

**Q Did you receive any guidance?**

My only guidance was Seeing [test user 1] play before me.

So I could see how was she holding it, what was she doing. But not really any instruction.

I touched her strings while she was playing to see if that made any difference. That's when I noticed the strings were really hard. And then we just switched, me trying to make sounds.

In the end, when I managed to make the melody. I also saw her approval. In her face, like "this sounds nice"

**Q After having played the bass guitar, what do you think of it as an instrument?**

I don't think it's an instrument that I would play. I like something that I can take with me easily. It doesn't look like something I can take wherever I go. I don't think it's for me in that sense.

I think you need to play it in a band, with someone. It's not something I think you play alone. Like with the guitar you can sing with it. I think the bass is just for accompaniment/ to support other instruments.

Not for me because I sometimes like practicing some songs alone. Not having to choose a specific spot and a speaker to connect it to.

To start with In terms of strings, I don't know which category is this, but I think ukulele is very easy. So I wouldn't start to play music with the bass. I didn't, I already chose the ukulele.

But in general, I wouldn't start with a string instrument, but a piano or something like that. Because I feel like it is very intuitive, it's a button, a button is this sound and this button is this sound and

With strings you have to put fingers in a weird position, and it's not very intuitive

A xylophone is also very intuitive. To accompany your voice while singing, in the guitar it's difficult to play with both hands and your voice. With the piano, it can sound nice if you do everything all at once [shows playing a chord with both hands on the piano]

Q Did anything surprise you/ differ from your expectations?

I didn't know it was going to be so low. Such a low instrument.

I was surprised when I saw someone else playing it that they could make it sound stronger than when I was playing. I don't know if it was how they played or the settings, but for me it was a weak sound

I like how it felt. It was consistent [massive] **The shape felt nice to hold. Maybe with a violin I would struggle with how to hold it.**

## Test Participant 3

### Post Bass Guitar Test Interview Notes

#### *Commentary on this Test:*

*There were two music novices (target users) present who had little experience with any instrument and had never played the electric bass guitar, as well as 4 experienced musicians playing and improvising on simple chord progressions.*

*Again, the first user's instinct was to hand the second pair of headphones to the other music novice (the music novices did not know each other beforehand)*

#### **Q Which of the three setups did you choose and why?**

OK, I guess I tried all of those, but what I felt is these three uh, choices that was that I was provided, which was listening on the speaker and then listening while another person is playing and then.

What was the other one playing when none of the person is listening or playing like that?

I really found confidence or felt like there is a place to grow when another person was listening and providing me feedbacks.

So I was playing and [Test participant 4] was listening to it. And then she was like, hey, you could try this. Yeah. Now you're doing good. You hit the spot. Yeah, this is really nice.

And on the other case, because there were two cases when Mark [experienced participant] was teaching me - before Mark was teaching me, I was just freestyling. Like the way [Test Participant 4] was doing it.

So initially it was like a sensitizing thing, you know, like I got comfortable with the strings and what amount of pressure that I should place on the strings and stuff like that.

And once I, I don't know if it was intentional or not intentional, but after a few breaks and everything, Mark started teaching me which was really nice because I could play a quite confidently.

And while [Test Participant 4], listening to it, initially gave me the boost like, hey, yeah, she was also giving me feedback like, hey, regarding to doing really nice, you're doing really nice.

And later there was no headphones. It was all on the speaker, and then it also gave me the confidence.

So yeah, so initially I got sensitized, then I got comfortable with someone hearing and then it was, uh, blasted on the speaker.

So it was a good hierarchy that went or the process.

#### **Q How did it feel to take part in the jam in these headphone configurations?**

So normally yeah, if you see like I'm normally with the Shakers or the maracas and all those things and the rhythm, and I still remember it was very synonymous when I started playing that instrument

initially at the jam night, I felt like maybe I was not a part of a bigger picture? Or the entire jam music that's going on.

But I kept on playing, you know, like being resilient and persistent and keep doing the shakings and different things and the thing is like at that moment, Anjay guided me.

Like, because he was listening and then he is like: "you can do this and different hand gestures and hand movements and stuff like that and then slowly, slowly I developed the entire cluster of my skill.

That was the Shakers and the markers and all those things, the rhythm and a very similar thing happened also with the bass guitar, which was for the instrument on that evening [User Test], but it happened on a very faster scale and maybe it was because the jam was a very short, it comprised a very **less musicians or instrument players**, you know, so you have **more of an intimate setting** where a person can actually see you or listen to you the way you're playing, playing and stuff like that.

**Rather than in a jam where you have 20 to 30 kids playing around or 10 to 15 kids playing around.**

At that moment it becomes like a social setting, but the learning was very beautiful in the small section because I really felt confident then.

Uh, so it was like a one to one setting.

Like maybe in in the bigger picture, when I when we used to have, like bigger jams. If Anjay looks at me and my hand gestures, **then I'm the lucky one to get corrected.**

**Yeah, but here it was like I have a dedicated person**

**She volunteered to listen and make suggestions or give feedback.**

That's the correct word, and it was really nice **because I knew that whatever I'm playing, that person is listening.**

And then similarly, and that gave me a good amount of confidence as well.

**Q [Test Participant 4] was also a beginner and had never played a bass before.**

**Yeah, yeah.**

**Q But you still see value in her listening?**

**Yeah, because sometimes what happens is when you're playing, you're so in so, so much in the zone of playing that you don't know whether you are you playing good or bad!**

**OK, because you're playing and you're not listening to yourself.**

**So you of course you need a peer to give you feedback saying that, "yeah, I don't think so". Or "It's coming out perfect", and that can be from an amateur - I believe that everyone has an ear for music. That's my thinking. That's what my ideology is.**

**So even if you're normal or a layman person who is just walking down the road and sees, uh, the tones are not coming good, he or she can just say I guess something is not right. You should try in a different way. They may or may not give a very technical answer, but they can give you a generalized answer.**

**Q One more thing about learning: Would you have preferred to prepare beforehand?**



No, I really don't feel that because The thing is, but also maybe because, uh, it's it's not only about music, it's also about personality.

So my personality, maybe if you would have asked me this question a year ago when I was skeptical to even attend those jam sessions, I would have been like, I'll learn something and then attend so that I don't make a fool out of myself.

But maybe in recent years there were various professional developments that happened to me. Like professionally, I became a different person because of courses like BPC and professors like Gert Hans, Who was my coach. They used to say, like, go freestyling! Go pitch, go pitch your ideas.

There is no good idea and bad idea. They always created a safe zone, so I started looking at the world with that mindset.

And jam happened simultaneously as well. Like, hey man, just pick up an instrument and start playing.

So for me, if there was a formal training given to me, I would have been more, uh, under the pressure to perform better, because now everyone knows that, yeah, he knows how to play. He started learning. Then I would be under the pressure like "I have to perform".

Maybe like sign or mark or you know, something like that, but since here I was a newbie fresher for example and also it comes from the mindset that because I worked for so many years in the corporate industry and initially when I joined the corporate back in 2016, my seniors used to say to me as a fresher, you're allowed to fail for the next two years.

No one will tell you anything. It all comes into the responsibility of the team leader that he should he or she should guide you properly so that you become a good designer or a researcher.

So I went with the same mindset. Like OK, I trust fully into Mark's guidance and the jams and the process, and let's delve into it.

So for me, no, I wouldn't have.

Now if you ask me like I don't want a training for the first time, OK, for the first time coming to the gym, I don't want to go through a tutorial or training beforehand at my house or sensitizing.

I just want to go right into it.

Make mistakes.

Learn on the flow, but the biggest thing after the jam.

What I realized was now I need to revise those skills, man, you know then. So what I learn is the jam. If a person doesn't revise and recall, then the learning is not that valuable. You know?

So Mark taught me, that was really nice and I was pretty confident. But today, if I come at your place and I try to replicate it, it's in my memory. I can remember my finger movements at that moment and everything like an image, but to replicate it would take a time.

Even just after Mark pointed at the places, I sometimes hit the wrong spots, the orientation is not easy at first

I would take time like I would try the first time and it would fail and then maybe you can guide me or maybe someone else can guide me and then I'll try again.

Then I'll fail, and after 10 to 12 times, you know, failing, failing, failing. Then I'll get into the flow. **It will require a warm up and that warm up can be avoided if I bought a bass guitar the next day.**

And then I tried the entire thing.

What Mark taught me so it's like an incremental process and I do the same thing and I go back to the gym every weekend or like 2 weeks and then I perform and then Mark teaches me something new and then so it's like give and take.

**But the first time as a newbie? No, now that you asked me this question as a newbie, if I entered the jam, I would come with zero experience with an open mind.**

Because for very long amount of time I was like, I mean even you have a different schedule and life and everything, but even the next day I was like Ohh Mark taught me something.

Maybe I should ask a Arthur to can I play the same chords again and again, you know?

But again, we have each our schedules, so affordability is one thing, but accessibility is fun.

You know, so even if you're creating a setting or a service or a product.

Ohh, a person might have all the money, but if the if it's not accessible then.

Then yeah, he or she don't get doesn't get the time or anything to practice.

And then, yeah, and then you come back to the square one because next time at jam, if you give me the same said feeling.

I'll be learning the thing to square one, so there has to be an incremental thing, which I also felt like, yeah, because after coming home, I.

**Or or we just or we just need more jams.**

Yeah, exactly.

That could be that could be one thing.

But yeah, yes, yes, definitely, because after I still remember after coming home two to three days later, for for constantly two to three days.

I was checking the price of a base guitar and looking at YouTube tutorials, even ask Mark what was the scale that he taught me.

He said me like CC sharp and G and all those things.

At a certain point of time, the search ends OK, and then what's next?

So at that moment also like it it's a period of four to five days.

If a person gets an access to the instrument within the four to five days because the graph goes high, and then the enthusiasm goes low, I felt that and then, yeah, and then it.

Yeah, that's the thing.

**Q After having played the bass guitar, what do you think of it as an instrument?**

I initially thought the guitars were like the most challenging ones, especially the base.

It may be because it looks the look and feel is very modern.

It's very classy.

It's very stylish.

Let's put it out there.

But the moment I started playing uh. I think that the acoustic guitar or the other guitar said I tried they require more challenge to their bit challenging as compared to the base.

Even Google stuffs like is it OK to Start learning base and stuff like that?

Yeah.

And then I I also found confidence like, yeah, I guess this is the thing.

And the other thing was when I was learning the base, I got, how do you say like at the tip of your fingers, they become a bit numb. [Callus]

**Well, over time you build what they call callus, which means just thicker skin.**

Yeah. And but the beautiful thing is I found. I really liked it.

It was like, hey man, it's like a it's like a medal that you wear on your shirt like, yes, I I have.

I have something I have a skill, something like that.

You said that the base is modern and classy, or that the guitar as a category is kind of modern and classy. Why do you place those in that way?

Firstly, because of the movies and the media and the everything that has a bigger influence on me as well, but also the edges are very.

It's not sharp, it's it's smooth, it's it's a bit fleek.

OK, it's very shiny.

And yeah, I mean also the sound, the sound has a bit of an electrifying and the deep effect like yeah and and and and the thing.

For me, that was the thing.

Also, the way musicians hold it and play and it looks cool.

And yeah, that's that, that that's major thing.

Also, for me the thing was, uh, as as an electric guitar on other guitar or ukulele.

Sounds very string.

Your melodious you know something like that and base gives you like the deep top top voice like how do I say the like, the snares and you know something like that.

And then I was.

I googled like what is the importance of Bayes music with Bayes and without bass and then I see oh it gives like effect and for me yeah then it it adds the bit of a rock and the sexiness and why?

Also, the overall look you know also the overall look, it's uh, it's pretty nice also what I see is I I guess it's maybe a different thing, but your basic guitar is black in color and black.

Or else like if you look at guitars, it's like it.

It's almost all all the time.

It's like a similar wooden color all all through.

It's a uniform color, but yeah, the base catches the eye, yeah.

Yeah, because for a long amount of time, it's like for me learning how to play a guitar was the Mount Olympus.

You know, if you get there then like, yeah, you know, something like that.

And overall in the due course of time, it was of course, piano and other music and instruments.

And then when I attended the jam, I felt that everything is harmonious.

There is no Mount Olympus.

Everyone is equal, but to learn the guitar, for very long amount of time, I felt that one should start with the ukulele.

You know a smaller version and then go for it.

But when I played the bass, I felt that, yeah, I can also start with the base and go to the guitar, you know, something like that.

So in that way, uh, initially my presumptions are, uh, misconceptions or preconceptions, where or basis for the Pro Pro guys, you know used learn the ukulele.

Then you go to the acoustic, then you go to the electric and then you go to the base and then when I started playing the bass, I felt like it's more approachable.

It's more easy.

It's like uh, because and when I I I started playing, I looked at Mark playing and then mark guiding me.

I wasn't even looking at the uh Fretboard.

You know, I was just strumming and then because it was such a cognitive thing that I was just.

I didn't even look at that.

I was confident that that my fingers were stopping and sliding at the correct gap and that gave me confidence because I guess it was also because of the four strings that my brain didn't have to process so much.

Was it four or five?

I guess it's five.

**On this one, there's five, the usual base has four, but this one has five.**

0:40:17.760 --> 0:40:18.40

Arthur Collins

Mine.

That also plays a huge role because you kilele has four.

They're always saying that, OK, it's very easy to move around your fingers and stuff like that.

And even in the base, I felt like, yes, it's it's not that complex because the finger movements is a bit complex.

I feel, but I guess what Mark taught me was yeah, it I I didn't feel I didn't have to.

I mean, think more about how my finger positions or something should be.

It was more natural.

Back at your housing, the base was all all always mounted on the wall and it felt like a very museum piece, like a very special thing that comes off, you know, that was also a thing.

But yeah, and then maybe I never tried it at the bigger jams, but here in this sentiment setting, when I tried it, it was.

Yeah, it felt very approachable.

If I put it that way, it was not.

**I guess in a sense it was reserved for you in this in this setting.**

**Like it was, it was yours on that evening.**

Exactly.

### **It was your instrument and Jackie's**

Maybe because also that I was switching roles that I was listening and then I was observing Mark play since I got those breathing spaces, I was not getting saturated, you know.

So one like when Jackie playing, I was observing and those breathing spaces helped me to.

It's like the balance of theory and practical, you know.

So I learned in theory I observed in theory I listened.

Someone play and then observed the theory, and because I was, it's also the position because I was exactly the center.

Jackie was on my right and Mark was on my left.

So he was trying his level best to take his hand and put, you know, place his fingers on the stuff.

And then I it, it was happening just in front of me like few centimeters away.

So I could see those things.

And I mean, I observe everything like image you know, and then when I started playing I could because at a certain point of time what I observed was while I was playing and I, I was just looking at the strumming sites and I wasn't looking at the finger placement on the Fred Fred board and stuff like that.

What I tried was I closed my eyes and I tried doing that and that gives a lot more confidence and I'll try doing that as well in the more in the future.

So when I'll be maybe if I get more confident with the base, I'll close my eyes while I'm playing.

So that gives me like you go in the zone.

It's like, yes, you go in the zone.

### **Why does that help you get in the zone?**

It it's like I can imagine myself, my fingers and the strings.

Nothing is coming in between because when I'm playing I'm just looking at the top view of the strings and when I close my eyes, that's the last image that's ready listed in my mind, you know, so I'm just imagining like, where should I do the hit points and stuff like that?

And then and that's it, maybe it's different for everyone, but yes, that that was the thing.

But but a major impact happened when I was playing and listening to myself when I was like the freewheeling or freestyling after my taught me, and I could go to do it on my own.

There was one moment where I closed my eyes.

I was playing and I trusted my instincts and guts, and I was playing.

I felt that, yeah, it's a good progress and I could listen to myself as well.

I could see the difference.

Ohh man, now I can hear like yeah this this is good stuff.

This is like I got a smile on my face and it was really nice when it was it.

It was one of the best evenings, I believe, in learning.

**Or maybe you have something to add, but I might mention that Mark is amazing because not many people can do what he does.**

Yeah.

**Because if you think about it, he was not hearing what you were playing.**

Yeah.

But he was still telling you where the cords were.

What happened to me on that day was Mark never said to me this is see minor or G minor or something like that.

C sharp, G#.

He just said to me like try this strong and and and the smack go up from and the smack and then initially I was just following, you know, like a God's testament, you know, like, I was just following what he said and I was not actually listening to the notes.

So that was like step step one.

I tried that.

I tried on a few cases I was playing, playing, playing, Jackie was listening, she said to me.

Yeah, yeah, this looks this sounds so good.

This sounds good.

And Mark gave me an expression like. Yeah, yeah, something like this.

I started listening and the guitar was given to Jackie and and what happened in that case was I observed.

I listened to Jackie again and Mark was saying, like you have to strum it more faster in the sound is not coming in stuff like.

So when he said that the sound is not coming, I became a bit conscious and next time when I started playing I put on the headphones I was wearing these headphones and then I listened.

Then everything everything made sense.

But to me it was like I was never.

I never knew like the theory part, you know, like he called or like all those alphabets.

I never knew those things.

It was just like a press your finger here and strum and smack.

And that's how I learned.

So those actions and then the, yeah, I listen to the music and then the next day and next day I asked him like, can you give me the cards, which were one day and then I listen back them again in YouTube.

And then I was like, ohh yes, I was playing it.

Yes, I could play it correctly.

[Something about a quiet moment, since Mark is one of the guitarists who carries the jam...] ...I started playing and then he started playing and then it was joined by everyone.

**He was accompanying with a guitar.**

Like I it never fell to me that he's saying to me like, hey, play this so that you get us on this.

So even if I was playing something \*\*\*\*, everyone accompanied me with the thing, and that was like real bonding.

I felt that was the real thing.

And that way of knowledge exchange was a real cool.

Last question, is there anything that surprised you? Or in some sense that it deferred from your expectations when you first saw you were going to play the bass?

Yeah, I never thought that the base would sound like a deep, deep voice, you know, like, I always thought the base would sound more like maybe it's because of all the wires and everything that's connected the way it portrays.

I I thought that it would be more sharp and shrill and like an electric guitar.

Then I got to know, I mean, as a layman, I never knew these things.

So I got to know later on I got to know.

So it gives you a bit of a springy voice like a like like bouncy voice, like a deep metallic voice.

And yeah, like always deep tones.

And yeah, that was the thing.

That that was a misconception which broke when I started playing and listening.

That is one thing.

Yeah, because because I was like, even even at that moment, it was the same thing when it was like a very similar experience that when I started playing the Shakers at the initial start and I was like, man, I'm playing \*\*\*\*.



Do I even exist in the puzzle piece?

You know, at the very first initial days and but uh, returning back home and I was like, I guess, Mark and Stein and everyone were playing pretty melodious and with everything, what was the base doing and then you know and I was like, OK, I don't know maybe I was blasting some stupid cords out in the speaker because it's connected to a speaker and then yeah, slowly, slowly I Google stuff.

And I was like, OK, music with bass and without bass and yeah.

Yeah, that's what I wanted to say, but I forgot because as I was in the Shakers like it's you and Cass mentioned how you are in the rhythm section now and stuff like that.

And I got to know while searching like this also comes in the rhythm section.

I and and and and I was like ohh.

So should I master all the rhythm section?

And I was like and then I was like, this is nice.

So there's a genre that I am exploring in the band, you know, like he's rhythm with the vocal.

## Test Participant 4

### Post Bass Guitar Test Interview Notes

**Q Which of the three setups did you choose and why?**

I think I started with just listening to myself.

I mean, I tried all of them actually, but I first started just listening to myself because I wanted to see how I heard because I didn't feel comfortable putting myself on the speaker if I didn't know how I would hear myself.

And then also for me personally it adds pressure if someone else listens to me, although like, uh, would you super nice about it and everything.

But I was like at first wanted to hear myself.

Umm, it would, yeah, but yeah, and I chose.

Yeah, that's why I chose it because I wanted to hear myself, like, sort of judgment free.

Because no one else can hear you except yourself.

So then you don't want to, at least for me, I didn't want to disturb the jam.

So then I was like, OK, I want to listen to how I'm doing it and if it's syncing with the jam.

So then I would also put like one one in one out you know.

So I can like hear the jam, but also hear myself and see if I was, like actually measuring up to it.

But yeah, I was just a bit difficult since like sound was a bit different on each ear.

But yeah, I chose it because I didn't want to disturb the jam.

I wanted it just to flow and I just wanted to see how I fit in the jam myself and how I listened to myself.

And then that's when like some you put the headphones on and he had like, OK, I sort of hear it, but he also can't hear that while I think so most of the time he added off.

And then when I felt confidence like after I forget his name [Mark] The one who is to my left.

Like when he taught us, umm some some chords or something and I sort of felt more confident about it.

I wanted to hear myself, so I was like, OK guys, I'm ready to send that when I like, wanted to hear myself to see if it was actually and I was actually quite nice, but it was only until after I went through this, like sort of iteration, I would say because I wouldn't have done it straight up.

**Q In the parts where you had headphones on, how did it feel to take part in the jam like that? Maybe in terms of your interaction with the rest of the people who are playing music.**

I think it was.

I felt more, I think, for me at least, if I'm more disconnected than I expected because like.

I wanted to be part of the jam, but I couldn't because it just wasn't In Sync.

Since I'm also a novice player, I was like, OK, how can I be In Sync with these guys?

But it was just two completely different things.

But what I would do at least, is that I would listen to the jam a bit and then try to fit myself in there and then just sort of be on my own.

It was really hard to mix both at the same time.

I would say, at least for me, I mean, as the time went on, I think I tried it more.

Like for me to be In Sync with the jam like it would be like, OK, they're doing this.

Let's see if this string calls. Let's see.

Like this little bit I'm trying to do goes with the jam, but yeah, it felt more disconnected than expected because no one can hear me either, right?

So then you can be completely off, but since no one can hear you and you don't... Really, you're not like, super musical expert. So you can be completely off and do whatever you like.

But yeah, I felt more disconnected than I expected it was.

But at the same time, it felt nice to just listen to myself because I felt very separated from the group.

But it wasn't.

I wouldn't say it was bad.

It was just like I think I needed that so that I knew what I was doing in a sense.

Umm.

And if I rephrase to check that I understood correctly, you listened, and then there was moments where you were kind of experimenting, but then you at those moments, you weren't necessarily listening to the others.

Yeah. Exactly, like I would listen to the jam and then I was like, OK, and then I tried to do it, but then it was like maybe too much for me to do both.

So then I was just like on my own.

So I wouldn't listen to the jam I'd stop listening for a while.

Like sometimes I was completely disconnected, yeah.

**Q What were you doing on the bass? Because I didn't hear it, of course.**

Yeah, I I was mostly playing with the cause

I don't know how to do.

I don't know the difference.

I don't know how to place your hands on the thing.

So then I was mostly just trying doing like different some bits with the cord, just with the cords, like I wasn't doing much with my left hand.

I would try but then it just wouldn't make sense for me, so I would just.

I would mostly do like pick one string and try to go to the beat or I would like do all of the strings to see how it would sound, but mostly it was just picking individual strings and then trying to get like a little bit out of that cause for me pressing them like it wasn't it was it wasn't worse when I would press them.

So then I would just like pick each string and sort of go with it.

I go with the beat.

Maybe at like stream stream it and then hit it like so that they all stopped the same time, but it was mostly with the cords but not a lot of with the.

I know what you have with the stick I guess.

Q What would you say that you got out of this experience?

I think the best thing was that I did learn.

I mean, I learned because Mark taught us some stuff.

And then when he taught us, I was like, wow.

Like I can maybe play an instrument, you know, like in the future.

But and I think it it encouraged me to try to keep playing doesn't make sense like because I mean in the jams since I don't play any instruments, I only do the shaker.

You just because I love listening to music.

I love live music, but like being part of it is completely different and I it's really give me a taste of that.

So then I was like ohh this would be really cool if I actually knew how to play.

You know, with like, I can feel what it's like to be part of the jam, like with an actual instrument, you know, like with the shaker.

Like that's really I guess you could say easy, but with an actual instrument it's hard because you have to sort of go and sync with the rest.

So for me, I think that's the experience I got out of it.

And for me, the jams are really relaxing too.

So it was really nice.

***Q Do you have an idea why you experience the jam sessions as relaxing?***

I'm looking, I think, for me, since I love life for me it's I love to see how people play instruments.

Like, I love to see how good they are at their art, I guess.

And then I love live music.

So I go and it's like the only thing you're thinking about is the the music and how people are playing.

And like I just like observing how people move their hands and like how I guess how connected they are with their instrument.

And it's just amazing because, I mean, it's really, really hard to do what you guys do like, uh, what all you guys play, I would say for me, since I don't know an instrument, but I think it's really hard to do.

And then also the singing and everything.

It's like I love the the visual and the hearing you get from it.

Like it's just and I love.

I mean, I love like music, so I hear it and then I see how everyone just sort of comes together and it's all improv, right?

So and it's not like, you know, the song and you go for it like everyone.

And I love that.

I think that's what's relaxing.

It's like art sort of taking place real time, you know? Yeah.

***Q Would you use this setup again, and why or why not?***

Like you mean like for example with the headphones or like works.

No, I would.

I would want to do it again.

I think maybe if I knew if I knew stuff like for example, if I remembered what Mark taught me, I would like to listen to it by myself and then try to be part of the gym.

But I don't know.

I don't think I would.

I don't think I would change much because I like the difference because the difference between like listening to yourself, having someone listen to you and then being part of the jam like I don't think I would.

I don't, I don't know.

Experimentally, I don't think I would change anything.

I mean the only thing is that I didn't.

I don't know anything.

So then when someone taught me something, it was like, OK, I can.

Then I feel confident to listen to it out loud, but I mean, I think that's, but I mean that's the whole purpose of this.

So I don't think that counts, but yeah, I think that's it the, I mean, the headphones are just a little low, but that's just technical issue.

No, I because I couldn't listen to myself.

But like I think they were at the Max or something.

So then I was like, OK, but I could still listen to myself quite well, so yeah.

**Q After having played this instrument (bass guitar), what do you think about it?**

I think it's, uh, really hard to play.

Well, not really hard.

Well, it's not.

I know it's because I once tried the base addicts like I went to one lesson and like I was taught like a really basic cord or from a song?

I think from 7 Nation army I don't know but this one I just I couldn't press hard enough for it to sound well, like my finger still like I can still feel the string like even weeks later.

So for me it's just like it's a harder instrument to press like because the strings are thicker.

So I think that was the hardest part.

And then.

But other than that I mean because like then you have the knobs where you want to like amplify it or not.

But that's like just a different thing, but I don't know.

I think it's the this one was was did confuse me a bit more because I had done a test class with four strings and doesn't have five strings, so I think maybe that confused me.

Personally a bit more or made it a bit difficult because it was fine.

But yeah, we'll see.

Like it's it's hard with press.

For me, it's hard like with the pressing like you have to press and I don't know how to place these fingers.

So then it's hard for me to know, hard for me to not like.

How do you say rub against other strings and then create like a sound?

I don't want so that the hardest part for me was the fret bar for sure.

And then but I I don't know, it was.

It felt it just.

It feels nice because like you can put it on your lap and you hold it yourself and you can sort of like easily adjust how you wanna hold it and.

Yeah, but I think for me the hardest was like pressing it correctly because I would press it like pretty badly as on my hands are gonna be tiny so.

**Q What surprised you or like how did it differ from your expectations?**

Like I thought.

What I don't, I don't know.

I think I didn't know what to expect, so that's why when I got there, I was like what?

But umm, I don't know.

I thought it was really cool the whole setup that you had, I think like I got there and I was like, what am I just gonna play an instrument?

But it was like, no, you're gonna listen to yourself.

And was gonna listen to you also have, like, the amp devil the speaker there so that you can listen to yourself.

So it was really cool to walk in there and then you have like a very like you have a variation of options.

So that was a nice surprise for me because I was like, I wonder, I wonder what it's gonna be.

And I had no idea that I would like.

That the gem would still be going on like I thought it would be, like me playing and like, OK, like, what do I do?

But it was like the jam going on and these three different options, which was really cool for me.

Like I didn't really expect it.

I didn't know what to expect, but the expectation what?

What was it?

There was really like high expectation if I had any expectations, you know.

**Yeah, if I if I did it again and I just invited you in this time, there weren't the three options.**

Umm.

**And I told you to just to just play the bass.**

**With what would you like feel about that if it was really just you?**

**Were you had the instrument amplified from the get go and you didn't have the other options, what do you think about that like?**

Ohh, I think it would be really scared to play cause even when I got there I was.

I was like, I was scared.

I think I needed to like leave in the not scared of like you guys, but because all you guys know how to play and I was like, OK, we're gonna walk in there and play the bass, which is a which is sometimes used as a like the core.

How do you say like it?

I don't know how to explain what I mean.

yeah.

Yeah, with rhythm.

Yeah, it's like, uh, you says.

Yeah.

Yeah, it is just like what is the the what I know.

Like it's like the core rhythm.

What, at least from what I understand from bands and stuff like why it's there or like how they use it and I was like this instrument is super, I would say it's really deep.

So it's not like it's not like if I had a ukulele I could sort of get away with it because it's really soft.

It's like, no, it's a base.

So if I would just walk in there and play bass, I feel like a little intimidated because it's really low instrument or like low sound and it's pretty strong and it sounds out, you know.

And so I would have been like, oh, I don't know about that because I know nothing.

So then I wouldn't.

I wouldn't have wanted to disrupt the jam, per se. Yeah.



# Appendix 8: Post Bass Guitar Test Quote Selection

## APPENDIX 8: POST TEST INTERVIEW

### Test 2

**To be honest, I do regret it. I don't think we managed to get the guitars, I need to listen with just one earbud from the headphones, but couldn't really follow it.**

**I wouldn't say it was specifically made for the melody that was playing in the background, but I do think that if I had played in the speaker, maybe the jam would have sounded a bit better. I think I topped before with another instrument that was trying and I wished how people did change.**

**I think I really enjoyed the interaction with [test user 1], but fun with it, you know? Because the way you go to see, was someone teaching me, but someone you wondering, laughing about it.**

**In the end, when I managed to make the melody, I also saw her approval, in her face, like "this sounds nice!"**

### Test 1

**I did it was just already, didn't observe.**

**I usually went along with the whole feedback, I checked everything, I checked playing all the strings, I used some melodies, some combinations.**

**Because you learned in terms of music, maybe I learned without knowing the instrument, trying to make learning.**

**That thing from last participant 2, we were going to find how to follow the jam, I figured out the right notes and followed the jam.**

**Would you use the headphones setup again until a point where I can actually play feel confident?**

**How would you join a jam session if you don't know the basics in music?**

**What leads you to know which notes to play when? To have, not perfect notes, but something like that, how to improvise.**

**Just that they had pointed in the guitar, commented on the wrong spots, the mistakes, it kind of set in.**

**About performing beforehand.**

**So for me, if there was a formal training, you know, I would have been more, uh, under the pressure to perform better, because my own knowledge that, yeah, he knows how to play, he's not teaching, then, would be under the pressure like, "there's no perfect."**

**Security of instruments.**

**Security is a good, but to learn the guitar, for a very long amount of time, I feel that one should start with the ukulele. It's much a smaller version and they got it in. But when I played the bass, I felt that, yeah, I can also start with the bass and go to the guitar, you know, something like that.**

**And the other thing was when I was learning the bass, I got, how do you say like at the tip of your fingers, they become a bit numb, [Callus].**

**Yeah, and that's the beautiful thing is I found, I really liked it. It was like, hey man, it's like a medal that you wear on your shirt like, yes, I have - I have something, I have a skill, something like that.**

### Test 4

**Managed to be part of the jam, but I couldn't because I just wasn't in sync. Since I'm not a rock star, I was like, OK, how can I be in sync with these guys? But it was just too completely different things. It was really hard to mix both at the same time.**

**Like this little bit I'm trying to do guys with the jam, but yeah, it felt more disconnected than expected because you can have the other right?**

**But yeah, I feel more disconnected than I expected it was. But for the same ones, it felt more to just listen to myself because I felt very separated from the group. But, wasn't... wasn't my day it was bad. I mean just that I think I needed that so that I knew what was coming in a sense.**

**I mean, I learned because Mark taught us some stuff, and then when he taught us, I was like, wow, I like to make like an instrument, you know, like the the bass.**

**But and then, it encouraged me to try to keep playing doesn't make sense but because I'm in the jam since I don't play any instruments, I only do the guitar.**

**Now the music, but that being part of it is completely different and it's really give me a taste of that. So then, me like with the whole idea of actually know how to play. So then, with the, I can feel what it like to be part of the jam, like with an actual instrument, you know, like with the whole idea that, really, I guess you could say, but with an actual instrument it's hard because you have to sort of go and sync with the rest.**

**And then also for the personality it adds pressure if someone else listens to me, through this, they would be super nice about it and everything. But sees that at first wanted to hear myself.**

### Test 3

**It's really was like a something thing, you know, like I got comfortable with the strings and that removal of pressure that should pass on the third and last time.**

**And once I don't know if it was understood or not mentioned, but after a few times and everything, that, I wasn't learning on which was really nice because I could play a whole instrument.**

**It's more in the finger position, which when we used to have, like finger jams, if I play look at me and my hand gestures, then I'm the lucky one to get corrected.**

**Yeah, but here it was like that a dedicated person.**

**The returned to listen and make suggestions or give feedback.**

**And it was really nice because I know that whenever I'm playing, that person is listening.**

**That Participant it was also a beginner and had never played a bass before, right, yeah.**

**So for you will see value in her listening? Yeah, because sometimes what happens when you're playing, you're so in it, so much in the zone of playing that you don't know whether you're you're doing good or bad. OK, because you're playing and you're not listening to yourself.**

**So you of course you need a peer to give you feedback saying that, "yeah, I don't think that's it," it's coming not perfect, and that can be from an amateur - I believe that everyone has an eye for music, that's my thinking, that's what I thought.**

**So even if you're normal or a beginner person who is just walking down the road and sees, like the lines are not coming past, he or she can just say, "you're something is not right, he should try in a different way. They may or may not give a very technical answer, but they are like you a general answer."**

**I don't regret it, this was really fun and was pretty different. But if I come to your class and I try to replicate it, it's in my memory, I can remember my finger movements, the chords and everything like that, but, but replicating would take a bit.**

**And playing like you said it would take time, you're trying to do the things, and it would fall and then maybe you can guide me or maybe someone can guide me and walk me through.**

**From 10 and after 10 to 12 times, you know, feeling, feeling, feeling, then I'll get into the bass, I can figure it worth up and that would be good if I thought I was guitar the best.**

# Appendix 9: Prototype V1 Post-Test Discussion Notes

## Prototype V1 Test Notes

### Test participant 1

Profile: 25, IDE master student, has not frequented jam sessions.

Observation: seeking low notes. Asks me to set a starting note.

“Well, if I play higher, you hear me better. Lower notes are like a more invisible addition”

“I don’t want to attract attention to myself”

“I find rhythm difficult, I would rather just add nice frequencies.

“I don’t know if I managed to play anything that really fit”

“Honestly, I would just like not to have to think. I want to be shown what I need to play. At least at first. “

“I can’t deal with the risk that the notes could be false. “

“I feel like this instrument is very static. I would kind of like movement. Like with the shakers. I have no skill, so I can contribute energy!”

“Although, on second thought, I don’t want to draw attention to myself..”

“I think this instrument is still a lot. There’s the note, but also a strumming pattern.”

“My favorite thing is this effect” [bends the note]

“I like that the bridge feels stable, not like I could snap it”

### Test participant 2

Profile: 30, IDE master student, has recently participated in jam sessions with shakers.

Observations: Doesn’t try different notes that much, experiments with modulation technique a lot. Initially more on the plucking rhythm. Impressive vibrato results for a beginner.

“I am orienting myself on how I play the shakers, I think in rhythms.”

“I think it feels pretty easy because it has one string. Pretty soon I am ready for more strings”

“I feel like there are no instructions, so I can just play around with this. There are no rules”

“I see that if I put the bridge here, I get more shrill notes, and if I put it here, they are more heavy” (high vs. low)

“It is easy to bend the note”

“I like that when you bend like this [plays a vibrato], you can hold the note longer. That is the best feature”

“I wish the instrument would tell me how to place my fingers. Like say something to me. Something haptic. Follow these vibrations.”

“At some point I would add on more strings, once I’m familiar with that one.”

# Appendix 10: Prototype V1 Quote Comparison/Grouping

## Test 1

"Well, if I play higher, you hear me better. Lower notes are like a more invisible addition"

"I don't want to attract attention to myself"

"I find rhythm difficult. I would rather just add nice frequencies."

"I don't know if I managed to play anything that really fit"

"Previously, I would just like not to have to think. I want to be almost blind. I need to play at least 4 bars."

"I feel like this instrument is very static. I would kind of like movement. Like with the shakers. I have no skill, so I can contribute energy"

"My favorite thing is this effect" (bends the note)

"I think this instrument is still a bit. There's the note, but also a drumming pattern."

"I like that the bridge feels stable, not like I could snap it"

## Test 2

"I am orienting myself on how I play the shakers. I think in rhythms."

"I think it feels pretty easy because it has one string. Pretty soon I am ready for more strings"

"I feel like there are no instructions, so I can just play around with this. There are no rules"

"It's just that if you're the bridge here, I get more skill in notes, and if I put it here, they are more heavy" (high vs. low)

"It is easy to bend the note"

"I wish the instrument would tell me how to place my fingers. Like say something to me. Something helpful. Follow these vibrations."

"I like that when you bend like this (plays a vibrato), you can hold the note longer... that is the best feature"

"At some point I would be ready to add on more strings, once I'm familiar with that one."

# Appendix 11: Final User Test Study Protocol

## Study Protocol – Testing musical instruments for music novices in social jam sessions

### Project Goal

To test a musical instrument designed to make social jam sessions more accessible for beginners in music (referred to as "music novices").

### Roles and responsibilities

- **Investigator:** responsible for conducting the study, observing, taking notes, and recording video material.
- **Assistant:** responsible for managing logistics and receiving participants.
- **Experienced Musicians:** 5 musicians to create a jam session environment

### Study Duration

2 hours

### Participants

5 music novices

### Location

"Exhale" temporary living room at TU Delft

### Study Procedure

1. **Introduction (Assistant, 5 min prior to each test session):**
  - Welcome participant.
  - Provide an overview of the session.
  - Distribute and collect signed informed consent form.
2. **Individual Testing Sessions:**
  - **Duration:** 20 minutes per music novice.
  - **Instruments:** Each novice will test 2 separate prototype instruments.
  - **Time Allocation:** 10 minutes per instrument.
  - **Order:** The order of instrument testing will be randomized.
  - **Environment:** Experienced musicians will play music to create a jam session atmosphere.
3. **Observation and Data Collection:**
  - The investigator will observe and take notes.

- Video recordings will be made during the test for further analysis and documentation.

**4. Post-Session Questionnaire:**

- After the 20-minute test session, each novice will fill out a questionnaire about their experience.

**5. Optional Group Discussion:**

- Participants are invited to stay for a group discussion at the end of all individual sessions.

**Informed Consent**

- Participants will sign an informed consent form upon entry to allow data collection.

**Data Collection**

- Observational notes
- Video recordings
- Completed questionnaires

# Appendix 12: Final User Test Questionnaire

## Study Questionnaire – Testing musical instruments for music novices in social jam sessions

### General

Please describe your experience and feelings while participating in the jam session.

Please circle the instrument you played first. This will be referred to as instrument 1.



**Please find further questions on the next pages. Feel free to use the area below if you need more space or for further comments. Thanks!!**



**Instrument 1**

**A1** How intuitive was it to play instrument 1? Please explain.

**A2** Please describe how you played instrument 1

**A3** How did it feel to take part in the jam session with instrument 1?

**A4** Were you able to blend into to the jam session with instrument 1? Please comment.

**A5** Did you feel that you could express yourself musically with instrument 1? If yes, how so? If no, why not?

**A6** Did you receive support from other musicians? Please describe this interaction.



## **Instrument 2**

**B1** How intuitive was it to play instrument 2? Please explain.

**B2** Please describe how you played instrument 2.

**B3** How did it feel to take part in the jam session with instrument 2?

**B4** Were you able to blend into to the jam session with instrument 2? Please comment.

**B5** Did you feel that you could express yourself musically with instrument 2? If yes, how so? If no, why not?

**B6** Did you receive support from other musicians? Please describe this interaction.



# Appendix 13: Final User Test Informed Consent Form

Participant ID: [REDACTED]

## Musical Instrument for Music Novices in Social Jam Sessions

This research is conducted as part of the MSc study Industrial Design Engineering at TU Delft.

Investigator: Arthur Collins

Contact: (Removed for confidentiality reasons)

### Informed consent participant

I participate in this research voluntarily.

I acknowledge that I received sufficient information and explanation about the research and that all my questions have been answered satisfactorily. I was given sufficient time to consent my participation. I can ask questions for further clarification at any moment during the research.

I am aware that this research consists of the following activities:

1. Playing two prototype instruments in an ongoing jam session with 4-8 other participants, under observation by the investigator.
2. Filling in a questionnaire about my experience playing the prototype instruments.

I am aware that data will be collected during the research, such as notes, photos, video and/or audio recordings. I give permission for collecting this data and for making photos, audio and/or video recordings during the research. Data will be processed and analysed anonymously (without your name or other identifiable information). The data will only be accessible to the research team and their TU Delft supervisors.

The photos, video and/or audio recordings will be used to support analysis of the collected data. The video recordings and photos can also be used to illustrate research findings in publications and presentations about the project.

I give permission for using photos and/or video recordings of my participation:

*(select what applies for you)*

- in which I am recognisable in publications and presentations about the project.
- in which I am not recognisable in publications and presentations about the project.
- for data analysis only and not for publications and presentations about the project.

I give permission to store the data for a maximum of 5 years after completion of this research and using it for educational and research purposes.

I acknowledge that no financial compensation will be provided for my participation in this research.

With my signature I acknowledge that I have read the provided information about the research and understand the nature of my participation. I understand that I am free to withdraw and stop participation in the research at any given time. I understand that I am not obliged to answer questions which I prefer not to answer, and I can indicate this to the research team.

I will receive a copy of this consent form.

\_\_\_\_\_  
Last name

\_\_\_\_\_  
First name

\_\_\_ / \_\_\_ / 2024

Date (dd/mm/yyyy)

\_\_\_\_\_  
Signature

# Appendix 14: Final User Test Questionnaire Responses

Final Test Questionnaire General

Please describe your experience and feelings while participating in the jam session.

4 1 2 3 5

Relaxed. A bit nervous

Curiosity but also boredom and frustration

It's hard to make pleasant sounds, less enjoyment.

Exploring the instrument gave me a purpose, reducing my initial insecurity

Felt harmonious while being part of a group, felt like I could contribute to the music

Had fun. Was curious. There were moments where I felt I was not contributing enough because I couldn't play what was coming to my head. So there was a lot of frustration as well.

Would have wanted multiple notes simultaneously

# Final Test Bass Instrument

(V4)



How intuitive was it to play the instrument? Please explain

4 1 2 3 5

**The middle section (string and moveable part) was intuitive.** However I needed an explanation about the function of the stoppers on the sides. I was also not aware that I could change the volume with the knob.

This one felt intuitive or at least easier due to the lower noise, it makes wrong notes feel more forgiving to play.

It was more intuitive with this instrument (bass). After the boring experience of 1, I decided to do something different and explore the instrument randomly.

Pretty intuitive to make some fun sounds. **The options of where you can pluck and what you can move are somewhat limited.** So you can quickly explore the options.

It was very much intuitive, as the instrument was like a cajon, and you can sit on it and play with the string and you can connect with the instrument due to the sound.

Please describe how you played instrument

I had 3 preset notes, but I mainly played the middle one the whole time. Every time I moved the moveable part I **tried both sides of the string.** At first I tried sitting on it, but I felt I couldn't reach the lower part completely. So I switched to a position where the instrument was laying horizontally on the floor and I was sitting next to it.

As a cajon, strumming the string, plucking, changing the note while playing.

Firstly I followed the suggestions of the investigator, and then I tried different ways to play. **The sound of 2 is more soft and it is not sharp. I felt more free to try.**

I moved the wooden thing while plucking. I liked moving while a sound came out, so the sound would kind of morph.

By sitting on it, like on a cajon, but I guess maybe a bit bigger. And plucking the string and moving the bridge to get the ultimate bass effect.

How did it feel to take part in the jam session with this instrument?

**It was nice but I would have liked to express more rhythm.**

Very relaxing, felt exciting as it makes you feel you can discover new notes and sounds, very harmonious.

It was nice, but only being able to play one note at a time made me feel quite limited in my choices

I felt more relaxed and interested in exploring how the sound could be different.

Good. I liked the low sounds. It also helped that they mixed well, so I did not get too self-conscious. I also could make some fun sounds with the sliding of the wooden parts, which inspired others!

Were you able to blend into the jam session with the instrument? Please comment

I'm not sure if I could completely join/blend from a musical point of view, **also, due to the fact that I couldn't be heard by others so well.**

I was busy exploring the instrument, did not put much attention on blending into the session, but sometimes I did blend into it by accident.

Yes, because of the low sound it kind of got along with the percussion and guitars well.

At times yes, but making the note you want or adjusting 'les repères' (the points of reference) at the right place is not easy. That said, wrong notes didn't stick out like a sore thumb.

Yes, I could set myself in sync with the instrument and could listen to musical notes and could easily reach out for the optimal or accurate sound

Did you feel that you could express yourself musically with the instrument? If yes, how so? If no, why not?

I was lacking more freedom to experiment with rhythm and notes.

I haven't handled the instrument yet, it was more about understanding the instrument, but maybe I could use it to express myself if I had more time to play it.

I am not sure I have developed any musical expression yet... I did feel like I could add to the jam, which was nice.

Yes, also that I have a taste for bass section and rhythm, which makes it easy for me to hear the sounds generated.

Not really. I felt it was hard to follow the tempo of the rhythm. Especially, I thought I could try and make beats by plucking the string, but hard to match the key of the other players.

Did you receive support from other musicians? Please describe this interaction.

I received the suggestion to pull the string differently so it could be heard differently.

Same as for other instrument (Yes, they were kind and did not care about what I played :) But they smiled to me sometimes. That was nice.)

At some part they started building based on a funny sound I made, with percussion, that was nice. It made me feel like I was adding to the jam.

Yes, I did receive support as the instrument made me blend into the jam session, I could give bass notes to the respective guitar notes/songs in the session

I didn't really receive support, mainly because I think it was hard to hear it.

# Final Test Soprano Instrument (V3)



4 1 2 3 5

How intuitive was it to play the instrument? Please explain

Almost the same, but maybe more intuitive because at the beginning it had no stoppers. Also the size is more manageable.

Intuition is similar to instrument 1, but the higher notes were less friendly.

Less intuitive. It felt like the sound was off more often because it was higher? It was difficult to not make the instrument sound off while moving the wooden part.

I tried to blend in with the other musicians, started by playing the same sound again and again.

Investigator showed me how to play it (placed stoppers), and I followed. I did not think a lot how to play it, but I would not describe it as intuitive.

It was intuitive but definitely had a learning curve to it; as the notes had to be set up. As it was played more like visual, it had a bit of a learning curve.

Please describe how you played instrument

It was standing between my legs while I was sitting on the floor. When I was exploring the different notes I found one that blended nicely with the music the others were playing (guitars) and then I took that note and tried different rhythms and patterns.

(Described in previous question)

Mainly plucked the string while moving the bow. Sometimes tried to strum the string but that's harder. But it is easier to hold.

As the instrument is portable you can easily place it on the lap, adjust the notes or set it up and plucking the song with the bridge.

I plucked to create one note and made a rhythm and also plucked and moved the wooden part.

How did it feel to take part in the jam session with this instrument?

I was frustrated when I found a note that I liked but I was still not able to create the melody that I imagined.

I was nervous and didn't know what to do, really. I got lost at the end.

I felt it was harder to actually be part of the session.

Less secure, more like I was just making random sounds.

With this instrument (soprano), I struggled at the start, but once the notes were set up I could catch up pretty fast, a late involvement but good involvement.

Were you able to blend into the jam session with the instrument? Please comment

I felt more integrated than with the other instrument.

I don't think so, but maybe?

I'd say mostly no. I had a harder time hearing my notes and matching keys and rhythm.

Investigator helped me find the tone that fits other musicians, some of the sounds I played fit in the session, but some of them were too sharp.

Less, for me the guitars and the instrument did not go well together. It also often sounded off.

I could, but it took a bit of time, and due to which it feels that to use this instrument one needs a bit of guidance at the start, which I guess is normal for every instrument...

Did you feel that you could express yourself musically with the instrument? If yes, how so? If no, why not?

Yes, better than with the bass instrument. I found a note that I liked and I experimented different combinations with it.

No, I didn't spend enough time to explore the instrument.

Yes I could, it was more in sync with the guitar so once the notes were hit, it rings out a perfect harmony in the session.

It was challenging. I really felt limited by only playing 1 note at a time.

Hmmm... Less than the other. Because I did not feel like it made the sounds I wanted it to make.

Did you receive support from other musicians? Please describe this interaction.

Once I found a note that I liked, you (investigator) added a stopper on its position.

Yes, they were kind and did not care about what I played :) But they smiled to me sometimes. That was nice.

Yeah and no. As the time to understand the notes took time, I felt that this is a heavy learning curve to it, due to which the sync and harmony was lost at the start. But this was regained after the setup was done.

No, I don't think they heard me playing.

I tried to find out how I could use the black/red things to figure out how I could play a consistent note. I did not find a way.

