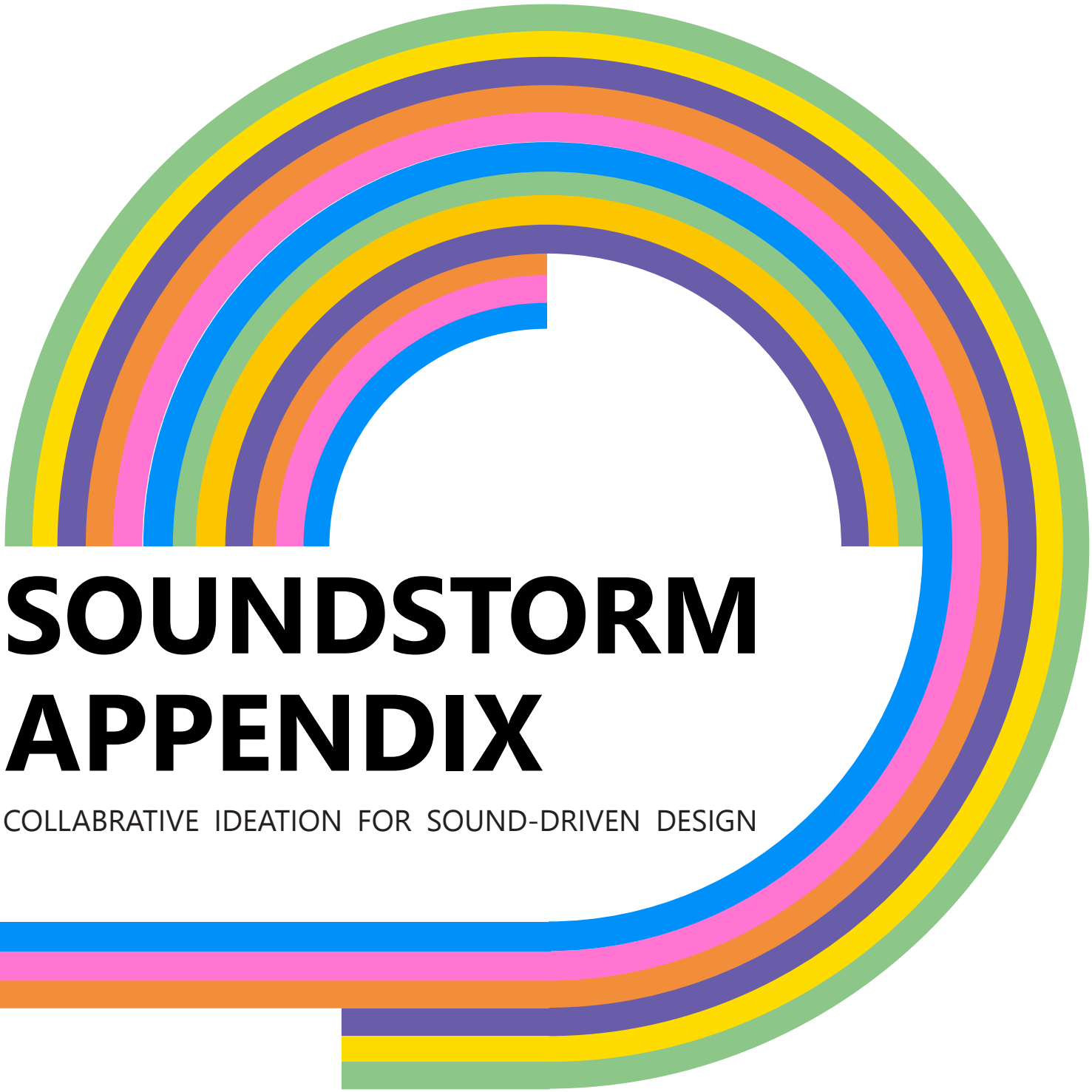


SOUNDSTORM APPENDIX

COLLABRATIVE IDEATION FOR SOUND-DRIVEN DESIGN

AUTHOR
Rob Moleman

MASTER THESIS
Msc. design for Interaction
Faculty of Industrial Design Engineering

GRADUATION COMMITEE
Chair - Elif Özcan Vieira
Mentor - Stefano Delle Monache

January, 2024

TU Delft

Critical Alarms Lab

TABLE OF CONTENTS


MAKE A WORD
WORRIED
FIND A WORD

A
INFORMED CONSENT

Informed consent
Collaborative ideation for sound-driven design

Thank you for participating in my research on group ideation for sound-driven design. I am conducting this research for my graduation assignment in the Master's program Design for Interaction. The results will be used for my master's thesis, presentation, and potential publications.

This research focuses on group ideation for sound-driven design. For this study, you are invited to participate in a group brainstorming session where you will generate ideas for a product sound case study. This session will last a maximum of 30 minutes.

The session will be recorded with a camera and an audio recorder. Data will be depersonalized by blurring faces and distorting audio unless you explicitly give permission otherwise. Data will be stored on the servers of TU Delft and will be deleted by 01-02-2024.

You are free to withdraw from the study at any time. You can indicate this during the session, or you can contact me directly. Your data will be destroyed and not used in the research.

Best regards,

Rob Moleman

+31 6 48344062

rmoleman@student.tudelft.nl

PLEASE TICK THE APPROPRIATE BOXES	YES	NO
1. I have read and understood the information about the research dated _____, or it has been read to me. I have had the opportunity to ask questions about the research, and my questions have been satisfactorily answered.		
2. I am participating in this research voluntarily, and I understand that I can refuse to answer questions and withdraw from the study at any time without having to provide a reason.		
3. I understand that my participation in the research entails the following points: • Answering a number of interview questions, which will be recorded with audio. • Participating in group ideation, which will be recorded with audio and video.		
4. I understand that my participation in the research is not compensated.		
5. I understand that the study ends in January 2024.		
6. I understand that my participation means that I am participating in group activities, and if I do not feel comfortable or safe with this, I can stop participating in the research at any time.		
7. I understand that my participation means that personally identifiable information and research data will be collected, with the risk of being identified from them.		
8. I understand that to minimize the risk of a data breach, the data protocol of TU Delft will be followed, and all personally identifiable data will be depersonalized through blurring and voice distortion unless I explicitly give permission otherwise.		
9. I understand that the personal information collected about me that can identify me, such as my name, will not be shared outside the study team.		
10. I understand that the personal data collected about me will be destroyed on 01-02-2024.		
11. I understand that after the research, anonymized information will be used for a master's thesis, graduation presentation, and potentially for publication.		
12. (Optional) I give permission to anonymously quote my answers, ideas, or other contributions in resulting products.		
13. (Optional) I give permission to use my audio recordings without modification for communication in a master's thesis and graduation presentation. I understand that this means I will be recognizable.		

Signatures

_____	_____	_____
Participant's Name	Signature	Date

I, the researcher, declare that I have accurately read the information and consent form to the potential participant and, to the best of my ability, have ensured that the participant understands what they are voluntarily agreeing to.

Rob Moleman_____		11-12-2023
Researcher's Name	Signature	Date

Contact information for further inquiries

Rob Moleman

+31 6 48344062

rmoleman@student.tudelft.nl

B
OBSERVATION GENERATIVE SESSIONS

Several observations of different generative methods used for sound-driven design. Participants ranged from 4-5 per group and did several generative methods in a row, usually 5 minutes per method. There was no correction for any learning effect because of thtis.
The generative methods tested were:

- Brainwriting
- Nominal (1 participant)
- Brainstorm with sonic tools
- Brainstorm with pen and paper
- No method supplied

I focused observations on two aspects:

- General conduct, and if I observe the phenomena of ideation literature.
- The sonic ideas generated.
  - What type of sonic ideas
  - How do participants iterate on sonic ideas

Observations were done by directly taking notes during a session and a quick cooling-down interview.

CONCLUSIONS GENERAL OBSERVATIONS

The general conduct I observed confirmed the ideation literature. Verbal methods struggled because of interruptions. Tools shape what a group did, if there was pen and paper, they would create more written ideas.

Sonic ideas were exclusively expressed in their causal and empathetic aspects. Ideation was solely focused on the sound itself. broad exploration was done, and there seemed to be little fixation. Participants consistently found the sessions too short to explore all their ideas. This might have been caused by the participants being inexperienced in ideation, and not involved in the project for which they brainstormed.

SOUND-DRIVEN DESIGN FRAMEWORK OBSERVATIONS

I conducted one observation, in which the participants (n =5) loosely adhered to the four stakeholders of sound-driven design. The acoustic engineer was replaced by a mechanical engineer, and the sound designer was replaced by a musician. The problem statement was custom tailored to the work field of the Expert users(n=2).

This group was sensitized using the exercises from (Dello Monache, 2019), over a weeklong period. The generative session was 15 minutes, with no method supplied. After the session there was also a cooling down interview.

This group did generate ideas in all four aspects. This group also included functional and semantic aspects, though the focus was still on the sound. They did ideate on who in the problem context should be able to hear the sound, and what the sound should indicate to them.
The engineer and design researcher struggled the most to express ideas. The design researcher stated they tried to prime the other by throwing out 'Whacky Ideas', but that this did not have the effect they were used to. The engineer felt they had to little expertise to contribute to the session. Feedback on ideas given during the session was constructive and insightful, but did slow down ideation. Despite sensitizing, there was barely any use of vocal scribble's.

Delle Monache, S., & Rocchesso, D. (2019). Sketching sonic interactions. Foundations in Sound Design for Embedded Media, A Multidisciplinary Approach, 79-101.

C
PROBLEM STATEMENTS

Based on the literature discussed in chapter 3, I generated problem statements that were used during observations, and the final validation. These problem statements were about relatively common contexts, to ensure participants knew what they were about. The validation of Soundstorm was done using the Clock Tower problem statement.

Problem statements had a consistent structure and specificity, except for the Anaerobic Digester. The anaerobic digester was custom-made for the sound-driven design framework observation. The specificity was kept vague enough to allow participants to ideate for all four sonic aspects, without actively straying from the problem statement. Problem statements were kept at ~ 250 words, so they would be readable in one minute. The structure was as follows:

- The client
  - Mission statement of this client
- The product
  - How the product relates to the client
  - What the product does
  - The sound-related problem
- The users
  - 2 or 3 user types, and how they relate to the problem context
- An image, showing the context.

For the validation, I did not want the forming of a problem space and solution space to take a lot of cognitive effort from the participants. During the pilot tests for the validation, I had participants (n= 9) use multiple statements. After the pilot they would rank these statements on relatability. This was then used to find the easiest problem statement. This was the Clock tower on the TU Delft campus statement.

PROBLEM STATEMENT	RANKING
Clock Tower	1
Braun Oximeter	2
Bosch Microwve	3
Anaerobic Digester	4

Enhancing Campus Experience through Innovative Clocksound Design for Delft University of Technology's 70th Anniversary Celebrationl

Client: Delft University of Technology (TU Delft)

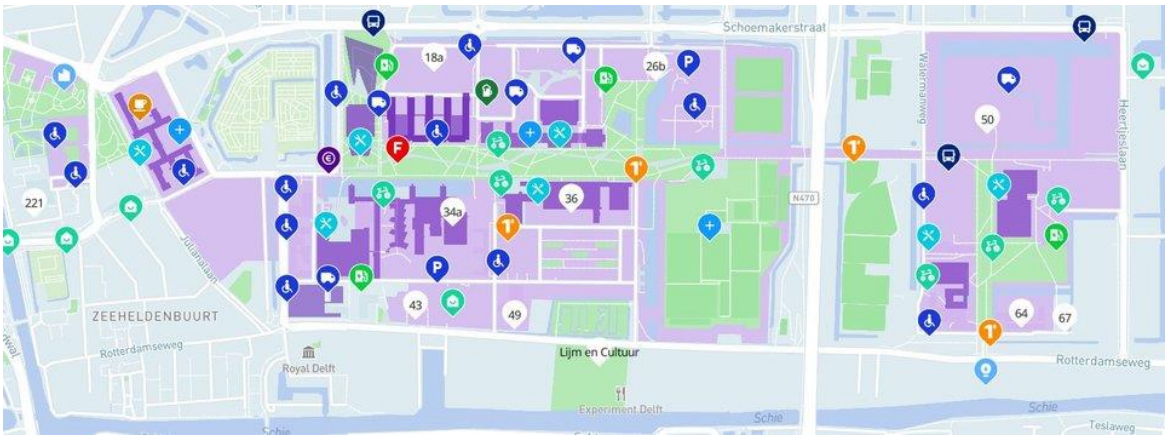
Mission: Integrating the mission of TU Delft into the fabric of campus life, we aim to celebrate the 70th anniversary of our largest building by introducing an iconic clocksound audible throughout the campus during the spring and summer of 2025.

Problem statement: As a symbol of celebration, the clocksound will be a distinctive feature honoring the historic clock tower. The TU Delft campus, characterized by its physical proximity connecting diverse faculties, serves as an ideal space for fostering interdisciplinary interactions among students and staff, especially during the vibrant summer months. The campus includes a variety of elements such as bus lanes, bike lanes, sidewalks, and a park, creating a dynamic environment.

We are in the early stages of design, we seek multiple creative ideas for the character, purpose(s), and implementations of the clock sound. This initiative aims to contribute to the unique atmosphere on campus, aligning with TU Delft's commitment to innovation and collaboration.

Users:

- **Students:** Engaged in lectures, group assignments, and self-study, students spend significant time on campus. During breaks, they gather outdoors, enhancing their connection to the campus environment.
- **Staff:** Faculty and staff members dedicate their working hours within their respective buildings. Though they may participate in walks or interactions during lunch breaks, the clocksound offers an opportunity to create a shared experience.
- **Facility Management:** Responsible for daily supervision and maintenance of the sound, facility management, distributed across faculty buildings, plays a crucial role in ensuring the seamless integration of the clocksound into the campus ambiance.



Enhancing Braun's Pulse Oximeter Usability Through Innovative Sound Integration

Client: Braun

Mission: Guided by a century-old commitment to design principles that prioritize simplicity, utility, and durability, Braun has consistently improved lives worldwide. People trust Braun products in pivotal moments, relying on our brand for essential tasks like preparing a special dinner, ironing a crucial shirt, or ensuring a wholesome family breakfast.

Pulse Oximeter: As part of Braun's dedication to improving lives, we present the Pulse Oximeter—a home-use medical measuring device. This device monitors oxygen saturation levels in a patient's blood through a simple clip on their finger. The saturation percentage, a crucial health indicator, becomes particularly significant when it falls below 90%, potentially posing health risks.

Home monitoring devices, exemplified by the Pulse Oximeter, empower patients and (informal) caregivers to manage their health conveniently from home. This approach is not only cost-effective but also less intrusive for the patients, fostering a more accessible and user-friendly healthcare experience.

Braun is actively engaged in enhancing the usability of its Pulse Oximeter, recognizing the potential for sound integration to improve user experience. As part of this initiative, we aim to explore innovative sound solutions that complement the functionality of the oximeter, aligning with Braun's enduring commitment to good design and user-centric principles.

Users:

- **Patients:** Utilize the oximeter for monitoring oxygen saturation levels and occasionally interpret the results, fostering a direct engagement with the product for health management.
- **(Informal) Caregivers:** Responsible for monitoring saturation results and often involved in connecting the oximeter to the patient, (informal) caregivers play a pivotal role in the usage and effectiveness of the device.
- **Co-habitants:** Individuals sharing a home with the patient, such as spouses or children, sometimes assist in connecting the oximeter, emphasizing the need for a user-friendly design that accommodates various user roles.

Harmonizing Functionality and User Experience in Bosch's Series 15 Built-in Microwave

Client: Bosch

Mission: Bosch is committed to sparking enthusiasm, enhancing the quality of life, and promoting the responsible use of natural resources. Our overarching goal is to deliver top-notch quality and reliability in all our products and services. At the core of our philosophy is the creation of technology that is truly "Invented for life."

Product/Service - Series 15 Built-in Microwave: As an embodiment of our mission, Bosch is introducing the Series 15 built-in microwave. This innovative appliance is a multifunctional marvel, combining the features of a microwave, oven, rice cooker, and pressure cooker. Designed for the household market, the Series 15 aims to revolutionize the cooking experience.

The Series 15 stands out in the market as a pioneering appliance, bringing together the functionalities of a microwave, oven, rice cooker, and pressure cooker in one device—a level of multifunctionality that has never been achieved before.

The diverse functionalities of the Series 15 demand distinct user actions. To enhance the user experience, Bosch faces the challenge of developing a sound system that reflects these differences in functionality. The goal is to create an auditory interface that seamlessly guides users through the various cooking modes and processes, aligning with Bosch's commitment to technological innovation and user-centric design.

Users:

- **Home Chef:** Individuals passionate about culinary excellence, Home Chefs invest substantial time in the kitchen perfecting their meals. They leverage a variety of cooking methods to craft the perfect dish and expect an intuitive and supportive experience from their kitchen appliances.
- **Nutrition Hunter:** This user segment is focused on efficiency and views cooking as a necessary chore. For the Nutrition Hunter, the Series 15 is a tool to get food done fast, highlighting the need for an interface that simplifies the cooking process and minimizes complexity.

Anaerobic Digester

The client

Trity Enviro Solutions is currently developing the next generation of anaerobic digesters. Within this innovative system, they are in need of an advanced monitoring system. This monitoring system serves a critical role for operators and engineers, allowing them to oversee the anaerobic digestion process and receive timely alerts in case of deviations. To distinguish their system in the market, Trity Enviro is emphasizing the importance of considering human factors, particularly cognitive ergonomics, in the design of this monitoring system.

Trity Enviro is specifically interested in incorporating a sound-driven interface into the next generation of monitoring systems. This should improve the usability of the systems, ensuring faster work times and leading to fewer operating errors.

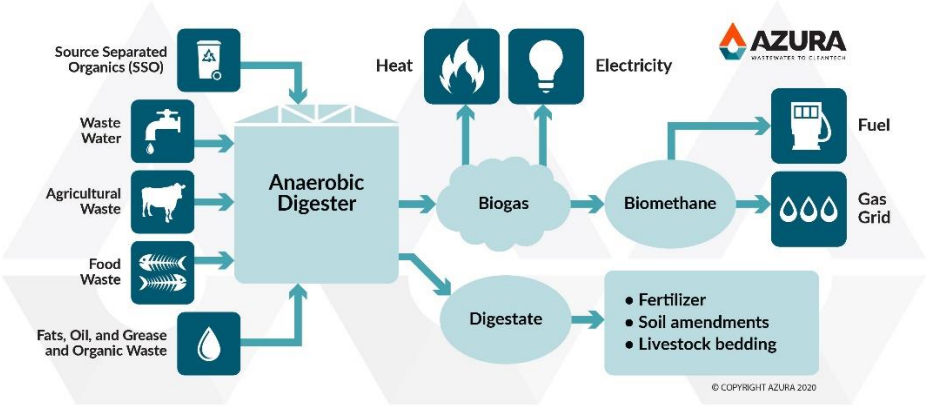
To address this challenge effectively, they have enlisted your expertise in the field.

Trity Enviro is seeking sound design concepts for the following key aspects:

1. Auditory Warnings: Develop sound concepts for warning signals related to biogas levels, temperature fluctuations, and pH levels falling outside safe operational margins.
2. Digestion Process Progress: Create sound concepts that convey information to operators about the current stage of the digestion process within the tank.
3. Menu Navigation: Design general menu sound concepts that enhance the user experience and facilitate smooth navigation within the monitoring system.

Your insights and contributions will play a pivotal role in shaping the future of Trity Enviro's anaerobic digester monitoring system.

Working of anaerobic digester



An anaerobic digester is a biological system used to break down organic materials, such as food waste, agricultural residues, and sewage sludge, in the absence of oxygen (anaerobic conditions). Its primary function is to convert these organic materials into biogas and nutrient-rich effluent through a microbial fermentation process. Here's how it works:

1. **Collection and Feeding**: Organic waste materials are collected and loaded into the digester. These materials can include plant matter, animal manure, and other biodegradable substances.
2. **Anaerobic Environment**: The digester creates an oxygen-free environment, usually in a closed tank or vessel. This absence of oxygen is essential because it encourages the growth of anaerobic bacteria and other microorganisms.
3. **Microbial Activity**: Anaerobic bacteria in the digester begin to break down the organic matter. They do this by converting complex organic molecules into simpler compounds like organic acids and volatile fatty acids.
4. **Biogas Production**: One of the main byproducts of anaerobic digestion is biogas. Biogas is composed mainly of methane (CH4) and carbon dioxide (CO2), with trace amounts of other gases. This gas can be captured and used as a source of renewable energy.
5. **Nutrient-Rich Effluent**: As the organic matter is digested, it also produces a nutrient-rich effluent that can be used as a natural fertilizer for crops. This effluent is a valuable resource for agriculture.
6. **Temperature and pH Control**: Proper temperature and pH control are crucial for the efficient operation of anaerobic digesters. Different types of bacteria thrive under specific temperature and pH conditions, and maintaining these conditions optimizes biogas production.
7. **Retention Time**: The organic materials must remain in the digester for a certain period, known as retention time, to ensure complete digestion. The retention time depends on the feedstock and the specific digester design.
8. **Digestate Handling**: After digestion is complete, the remaining solids, called digestate, are separated from the liquid effluent. The digestate can be further processed and used as a soil conditioner or for other purposes.

Anaerobic digesters play a crucial role in waste management, renewable energy production, and sustainable agriculture. They help reduce the environmental impact of organic waste by converting it into valuable resources while also generating clean energy in the form of biogas

FOR our future

IDE Master Graduation

Project team, Procedural checks and personal Project brief

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

- The student defines the team, what he/she is going to do/deliver and how that will come about.
- SSC E&SA (Shared Service Center, Education & Student Affairs) reports on the student's registration and study progress.
- IDE's Board of Examiners confirms if the student is allowed to start the Graduation Project.

USE ADOBE ACROBAT READER TO OPEN, EDIT AND SAVE THIS DOCUMENT
Download again and reopen in case you tried other software, such as Preview (Mac) or a webbrowser.

STUDENT DATA & MASTER PROGRAMME

Save this form according the format "IDE Master Graduation Project Brief_familyname_firstname_studentnumber_dd-mm-yyyy".
Complete all blue parts of the form and include the approved Project Brief in your Graduation Report as Appendix 1 !

mily name Moleman
initials R given name Rob
nt number 4350782
reet & no.
ode & city
country
phone
email

Your master programme (only select the options that apply to you):

IDE master(s): ( ) IPD ( ) Dfl ( ) SPD
2nd non-IDE master:
individual programme: - - (give date of approval)
honours programme: ( ) Honours Programme Master
specialisation / annotation: ( ) Medisign
( ) Tech. in Sustainable Design
( ) Entrepeneurship

SUPERVISORY TEAM **

Fill in the required data for the supervisory team members. Please check the instructions on the right !

** chair Elif Ozcan Vieira dept. / section: HCD/DA
** mentor Stefano Delle Monache dept. / section: HCD/DA
2nd mentor
organisation:
city: country:

comments (optional)

Chair should request the IDE Board of Examiners for approval of a non-IDE mentor, including a motivation letter and c.v..

Second mentor only applies in case the assignment is hosted by an external organisation.

Ensure a heterogeneous team. In case you wish to include two team members from the same

APPROVAL PROJECT BRIEF

To be filled in by the chair of the supervisory team.

chair Elif Ozcan Vieira date 17 - 07 - 2-23 signature EÖzcan

CHECK STUDY PROGRESS

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

Master electives no. of EC accumulated in total: _____ EC

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

List of electives obtained before the third semester without approval of the BoE

YES all 1st year master courses passed

NO missing 1st year master courses are:

name _____ date - - signature _____

FORMAL APPROVAL GRADUATION PROJECT

To be filled in by the Board of Examiners of IDE TU Delft. Please check the supervisory team and study the parts of the brief marked **. Next, please assess, (dis)approve and sign this Project Brief, by using the criteria below.

- Does the project fit within the (MSc)-programme of the student (taking into account, if described, the activities done next to the obligatory MSc specific courses)?
- Is the level of the project challenging enough for a MSc IDE graduating student?
- Is the project expected to be doable within 100 working days/20 weeks ?
- Does the composition of the supervisory team comply with the regulations and fit the assignment ?

Content: APPROVED NOT APPROVED

Procedure: APPROVED NOT APPROVED

comments

name _____ date - - signature _____

Tools for collaborative ideation during sound-driven design

project title

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

start date 11 - 07 - 2023

22 - 12 - 2023 end date

INTRODUCTION **

Please describe, the context of your project, and address the main stakeholders (interests) within this context in a concise yet complete manner. Who are involved, what do they value and how do they currently operate within the given context? What are the main opportunities and limitations you are currently aware of (cultural- and social norms, resources (time, money,...), technology, ...).

Sound design is a multidisciplinary field (Ozcan, 2008). Combining expertise in psychoacoustics, engineering, and interaction design among others (Ozcan, 2008). Its applications are equally broad, ranging from media (Grimshaw, 2010) to product sounds (Lyon, 2000), and many other examples. The sound design field is shifting. From one where the sound of a product is designed as an afterthought to one where it is considered earlier in the design, or where the design is sound-driven (Edworthy, 2018) (Franinovic & Serafin, 2013). Sound-driven design is an approach that considers the purpose, quality, technical execution, listening experience, and cultural values instilled by sound (Delle Monache, 2021). Sound-driven design combines the user-centred approach of UX designers and design researchers, with the sound-centred approach of sound designers and engineers (Delle Monache, 2022). Sound design is becoming an integral part of product and service design.

However, visual thinking is heavily ingrained in design researchers (Heylighen & Nijs, 2014). Working with sound does not lend itself well to visual thinking. Sound is experienced through a different sense (Gibson, 1966), and always has a time component. Changing the time spent sensing a sound changes the sound itself. Methods that work with visual thinking don't necessarily also work for sound-driven design (Sousa, 2017).
The methodologies employed by sound designers share similarities with those of engineering design (Hug, 2020). But most of the ideation and embodiment of sounds happens as a craft (Hug, 2020). Sound designers often start from a vision handed to them (Hug, 2020). This is similar to the interaction vision method (Pasman, 2011), but sound designers are often not involved in shaping the sound vision, only in its embodiment (Hug, 2020). To achieve sound-driven design this difference in working needs to be bridgeable. There is a need for methodologies and tools for sound-driven design.

The listening experience is highly dependent on the context of use (Ingold, 2000). Users are experts in their own context. Allowing users into the entire design process should improve contextual awareness, and therefore also improve the resulting design. Cocreation is a design method that is done together with the end users in an active collaboration (Sanders, 2008). This collaborative effort can be utilized throughout the entire design process and has the potential to improve the design results (Sanders, 2014). Collaborative design methods, such as co-creation, involve stakeholders in the design process (Sanders, 2008). This leads to increased contextual awareness during the design project, which should in turn lead to designs that better fit the context of use.

Collaborative methods can be applied during all stages of the design process, from the fuzzy front end (Tate, 2018) to detail design (Lu, 2000). Each stage brings its own set of challenges (Piirainen, 2009). During the ideation phase, most stakeholders involved with sound-driven design are actively engaged. Users and design researchers care about the purpose of the designs, whilst sound designers and sound engineers care about the embodiment of the designs (Delle Monache, 2022). This difference in approach results in a semantic gap during collaboration. Similarly, the stakeholders have different ways of expressing their thoughts and ideas. Design researchers apply visual thinking (Heylighen & Nijs, 2014), sound designers use sound-creating tools (Hug, 2020), engineers use mathematical models to predict sounds (Ballou, 2013) and users have no set way of documenting design (Sanders & Stappers, 2008).

space available for images / figures on next page

introduction (continued): space for images

image / figure 1:

image / figure 2:

PROBLEM DEFINITION **

Limit and define the scope and solution space of your project to one that is manageable within one Master Graduation Project of 30 EC (= 20 full time weeks or 100 working days) and clearly indicate what issue(s) should be addressed in this project.

The differences between the stakeholders, the semantic gap and the design expression, make it difficult to collaborate between them. If these differences are not addressed during collaborative ideation, reaching a consensus between the stakeholders will be difficult (Barney & Voegelin, 2018). These differences can lead to a far spread in ideas generated (Chan, 2017), which in turn can stifle iteration on ideas between the stakeholders. This iteration of ideas is one of the benefits of collaborative ideation since it leads to a synergistic effect between participants (Paulus & Yang, 2000). Therefore, it is necessary to facilitate these differences for productive collaboration. The central research question is as follows:

How can collaborative ideation for sound-driven design be facilitated between users, design researchers, sound designers, and acoustic engineers?

The project will focus on facilitating for an insular collaborative ideation session. This will involve considering the session itself and the necessary preparation for its execution. This might involve sensitizing participants with tools such as vocal scribbles (Ekman & Rinott, 2010). Or engaging in Soundwalks (Westerkamp, 2002), to train people's attention to the sounds around them (Case & Day, 2019). The project will not encompass the analysis typically conducted before ideation or the convergence process after ideation. The sessions will be analysed using protocol analysis(Jiang, 2009).
During the project, I will investigate the method of expression during ideation. Since the project is about sound-driven design, this expression will also be sound-driven. This might include vocal scribbles or simple tools such as the one developed by Vardanyan (2023).

ASSIGNMENT **

State in 2 or 3 sentences what you are going to research, design, create and / or generate, that will solve (part of) the issue(s) pointed out in "problem definition". Then illustrate this assignment by indicating what kind of solution you expect and / or aim to deliver, for instance: a product, a product-service combination, a strategy illustrated through product or product-service combination ideas, ... In case of a Specialisation and/or Annotation, make sure the assignment reflects this/these.

I will design a tool/intervention that will improve collaborative sound-driven ideation by offering the design team a set of relevant design representations that derive from their professional culture and background in sound-driven design process. These design representations will facilitate communication, understanding and creativity by supporting their expressions during the ideation process.

This will result in a tool, usable during the ideation session. The tool will be usable by all four participant types, namely Users, Sound designers, Desing researchers and Acoustic engineers. It will allow the participants to express their ideas during the session in some form of shared representation.
The specific method of expression and the type of representation for these expressions will be determined over the course of the project. Since this depends on the differing needs, and current way of expression, of the four participants.

I will focus on designing synthesized intentional sounds, such as alarms. Intentionally produced sounds usually have a well-defined purpose, which should make it easier to ideate. Similarly, the production of synthesized sounds has controllable variables, thereby reducing complexity in its theoretical embodiment.

There are several ways to embody a tool to allow for shared representations. The tool could take the shape of an interactive table, allowing participants to collect, modify and recall sound expressions. Or it could take the shape of a number of sound-producing objects that can be used by all participants to express ideas. Finally, it can also take the form of a preparation package, that introduces participants to collaborative ideation for sound-driven design and allows them to practice expressing themselves in ways that will be helpful during the session. I have a personal bias towards solutions that are tangible and used during the ideation session.

PLANNING AND APPROACH **

Include a Gantt Chart (replace the example below - more examples can be found in Manual 2) that shows the different phases of your project, deliverables you have in mind, meetings, and how you plan to spend your time. Please note that all activities should fit within the given net time of 30 EC = 20 full time weeks or 100 working days, and your planning should include a kick-off meeting, mid-term meeting, green light meeting and graduation ceremony. Illustrate your Gantt Chart by, for instance, explaining your approach, and 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 activities.

start date 11 - 7 - 2023 22 - 12 - 2023 end date

The project is divided into 2 phases: The analysis phase and the design phase, following the design diamond model.
During the analysis phase, I will explore the wants and needs the stakeholders have in collaborative ideation for sound-driven design. To gain an understanding of the roles within sound design for products and services, I will conduct desk research on the topic of sound design. Then, I will conduct expert interviews with professionals in these roles to gather insights into their wants and needs.In order to conduct tests and measure collaborative design effectively, I will learn and apply protocol analysis techniques. This will involve conducting additional desk research to understand how to perform collaborative design and how to measure its outcomes. By acquiring this knowledge, I will better understand the sound design process and the specific requirements of stakeholders, making it also important for user research.Finally, I will conduct one or more tests, in the form of (small) collaborative ideation sessions. Some of these tests can further be analyzed using protocol analysis, to better map the connections between generated ideas. This will allow me to validate my eventual intervention and further enhance my understanding of the wants and needs related to collaborative sound design.During the Design phase, I will develop an intervention that aims to improve collaborative ideation in sound-driven design. The requirements and features of this intervention will be based on the findings from the analysis phase, specifically the identified wants and needs of the stakeholders. I will allocate time for iteration and prototyping activities to refine the intervention, ensuring it aligns with the desired goals and addresses the identified challenges. Prototypes can consist of paper mock-ups of tools or (partially) functional models. These prototypes could then also be used during the validation.
Throughout the project, I have budgeted time for reporting. The listed sub-activities relate to writing the final report. I have also scheduled revision moments to accommodate any changes in content and

MOTIVATION AND PERSONAL AMBITIONS

Explain why you set up this project, what competences you want to prove and learn. For example: acquired competences from your MSc programme, the elective semester, extra-curricular activities (etc.) and point out the competences you have yet developed. Optionally, describe which personal learning ambitions you explicitly want to address in this project, on top of the learning objectives of the Graduation Project, such as: in depth knowledge a on specific subject, broadening your competences or experimenting with a specific tool and/or methodology, ... Stick to no more than five ambitions.

Personal motivation
I want to learn and practice collaborative design. I think that everyone is capable of designing. Involving users in the design process allows them to design products that they actually want. Currently, I am inexperienced in this area, and I would like to improve this.

Learning goals:
In this project, I have three learning goals.
Collaborative Design
I want to improve my ability to conduct and actively participate in collaborative design processes. To achieve this, I will:
Learn at least one collaborative design method, acquiring the necessary knowledge and skills.
Conduct collaborative design sessions during the project, to practise the method I learned.
Seek opportunities to engage with experts in the sound design field, honing my social skills in the context of design collaboration.
Writing:
Writing has been a challenge for me, impeding my progress in studies. Therefore, I want to enhance my writing skills. I want to be able toto produce clear, understandable, and readable written reports. To accomplish this, I will:
Plan for writing by setting specific tasks and deadlines.
Arrange peer meetings with a specific focus on writing and the quality of my reports.
Utilize AI tools to assist with proofreading and rephrasing the texts I write, ensuring accuracy and clarity.
Communication:
I want to improve my ability to articulate ideas and plans clearly and concisely. To do this I will: Improve my ability to articulate ideas and plans clearly and concisely, engaging and informing others effectively.
Enhance my skills in exchanging ideas with stakeholders and peers, aiming for consensus and a shared understanding.
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FINAL COMMENTS

In case your project brief needs final comments, please add any information you think is relevant.

E
SOUNDSTORM RULES AND CARDS

SOUNDSTORM

CONTENT:

20
Product Cards

60
Sound Cards

1
Timer

OBJECTIVE

Work as a team to get the highest score by successfully completing as many cards as possible.

SETUP

Shuffle the 20 product cards, reveal the top card. This will be the product for this round.

Shuffle the 60 sound cards, and place them in the middle.
The youngest person draws the first card.

GAMEPLAY

Flip the timer.

Players take turns drawing sound cards and performing their tasks. The task always relates to the product of this game.

Once a player has completed the task, the card is placed on the score pile, and the next player draws a card.

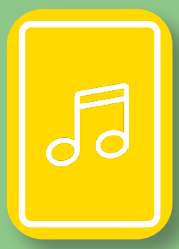
This continues until the timer ends.

SCORING

Count the cards in the discard pile, this is the score of your team.

CARDS

MAKE



Produce a product sound based on the card.

"Yada lada dadada"
- a happy stroller sound

DESCRIBE

Use words to describe a product sound based on the card.

"Like dragging your finger through sand"
- a sleepy pencil sound

FIND A FUNCTION

Describe how the product could use the sound on the card.

"When you land after taking a big leap"
- a trainhorn sneakers sound

REPEAT

Repeat the answer given by the previous player

REPLAY

Replay the challenge played by the previous player.

HIGHSCORES

TEAM	PRODUCT	#	TEAM	PRODUCT	#

IRON

IRON

BOOKCASE

BOOKCASE

CLOCK

CLOCK

STROLLER

STROLLER

FRIDGE

FRIDGE

PENCIL

PENCIL

KETTLE

KETTLE

OVEN

OVEN

STOVE

STOVE

LUNCHBOX

LUNCHBOX

DOG LEASH

DOG LEASH

BARBECUE

BARBECUE

SNEAKERS

SNEAKERS

TOILET

TOILET

CAR

CAR

JEANS

JEANS

SOFA

SOFA

FIREPLACE

FIREPLACE

DOOR

DOOR

CAR

CAR

MAKE A SOUND

LOVELY

MAKE A SOUND

HAPPY

MAKE A SOUND

ENERGETIC

MAKE A SOUND

TALL

MAKE A SOUND

BLUE

MAKE A SOUND

DREAMY

MAKE A SOUND

CHEAP

MAKE A SOUND

ITCHY

MAKE A SOUND

WET

MAKE A SOUND
ANGRY

ANGRY
MAKE A SOUND

MAKE A SOUND
LONELY

LONELY
MAKE A SOUND

MAKE A SOUND
SAD

SAD
MAKE A SOUND

MAKE A SOUND
MECHANIC

MECHANIC
MAKE A SOUND

MAKE A SOUND
SILLY

SILLY
MAKE A SOUND

MAKE A SOUND
ANIMAL

ANIMAL
MAKE A SOUND

MAKE A SOUND
WOODEN

WOODEN
MAKE A SOUND

MAKE A SOUND
ELECTRIC

ELECTRIC
MAKE A SOUND

DESCRIBE A SOUND

ORGANIC

DESCRIBE A SOUND

ORGANIC

DESCRIBE A SOUND

HEALTHY

DESCRIBE A SOUND

HEALTHY

DESCRIBE A SOUND

HUNGRYt

DESCRIBE A SOUND

HUNGRY

DESCRIBE A SOUND

PURPLE

DESCRIBE A SOUND

PURPLE

DESCRIBE A SOUND

SCARY

DESCRIBE A SOUND

SCARY

DESCRIBE A SOUND

BRAINY

DESCRIBE A SOUND

BRAINY

DESCRIBE A SOUND

FLIRTY

DESCRIBE A SOUND

FLIRTY

DESCRIBE A SOUND

NOISY

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NOISY

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F L A S H Y

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F L O W E R L Y

F L O W E R L Y

DESCRIBE A SOUND

DESCRIBE A SOUND

C L I C K Y

C L I C K Y

DESCRIBE A SOUND

FIND A FUNCTION

GRUMPY GORILLA

FIND A FUNCTION

GRUMPY GORILLA

FIND A FUNCTION

PEW PEW

FIND A FUNCTION

PEW PEW

FIND A FUNCTION

GONG

FIND A FUNCTION

GONG

FIND A FUNCTION

WET FART

FIND A FUNCTION

WET FART

FIND A FUNCTION

SQUEALING PIG

FIND A FUNCTION

SQUEALING PIG

FIND A FUNCTION

BUZZING BEE

FIND A FUNCTION

BUZZING BEE

FIND A FUNCTION

TRUMPET

FIND A FUNCTION

TRUMPET

FIND A FUNCTION

TRAIN HORN

FIND A FUNCTION

TRAIN HORN

FIND A FUNCTION

DING DONG

FIND A FUNCTION

DING DONG

FIND A FUNCTION

CRUNCH

FIND A FUNCTION

CRUNCH

FIND A FUNCTION

LEAKY FAUCET

FIND A FUNCTION

LEAKY FAUCET

FIND A FUNCTION

WHOOSH

FIND A FUNCTION

WHOOSH

FIND A FUNCTION

POPPED BALLOON

FIND A FUNCTION

POPPED BALLOON

FIND A FUNCTION

RUSTLING LEAVES

FIND A FUNCTION

RUSTLING LEAVES

FIND A FUNCTION

CRISP CRISP

FIND A FUNCTION

CRISP CRISP

FIND A FUNCTION

TWEET TWEET

FIND A FUNCTION

TWEET TWEET

R E P E A T
THE LAST ANSWER

R E P E A T
THE LAST ANSWER

R E P E A T
THE LAST ANSWER

R E P E A T
THE LAST ANSWER

REPLAY
THE LAST CARD

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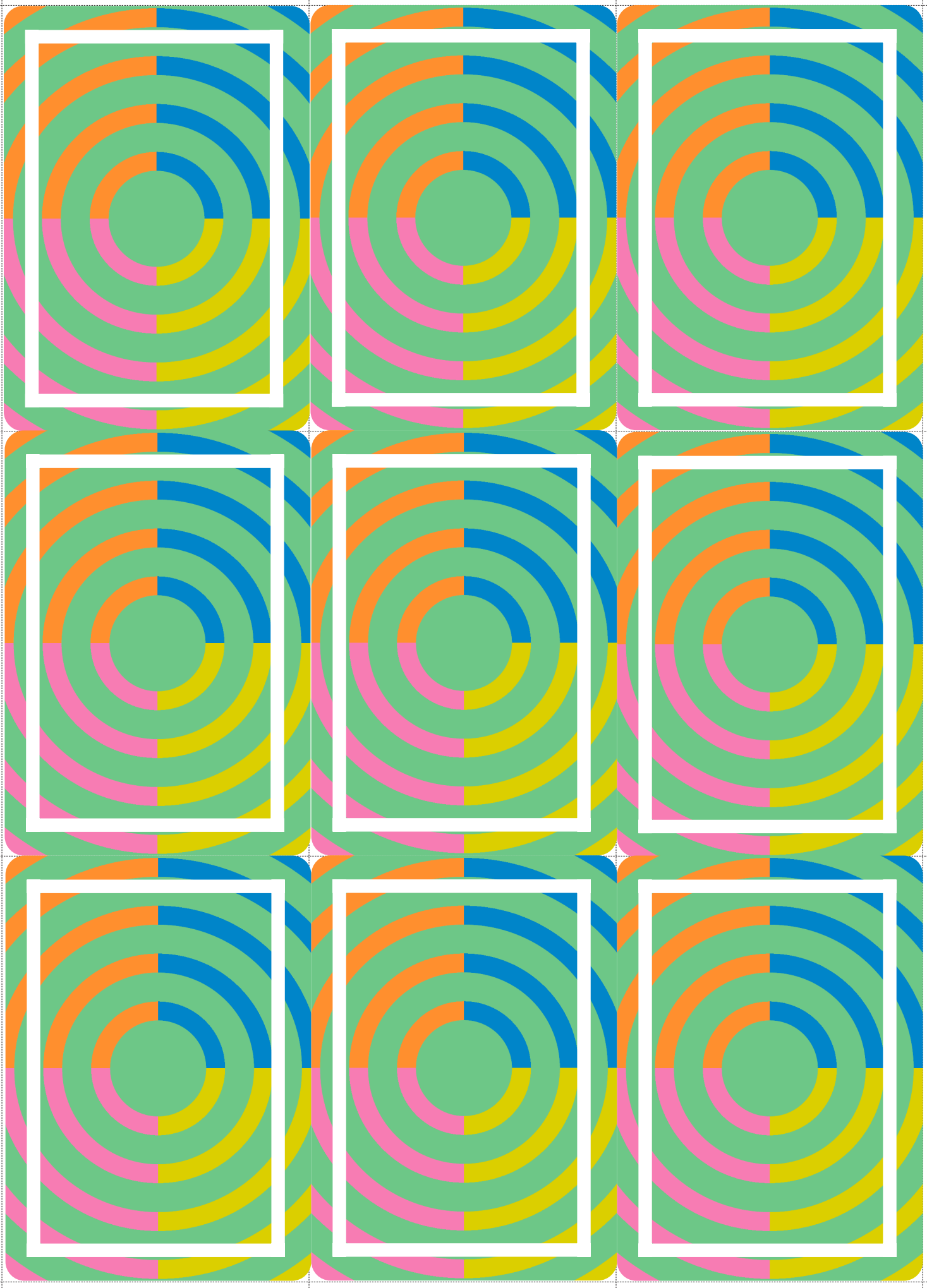

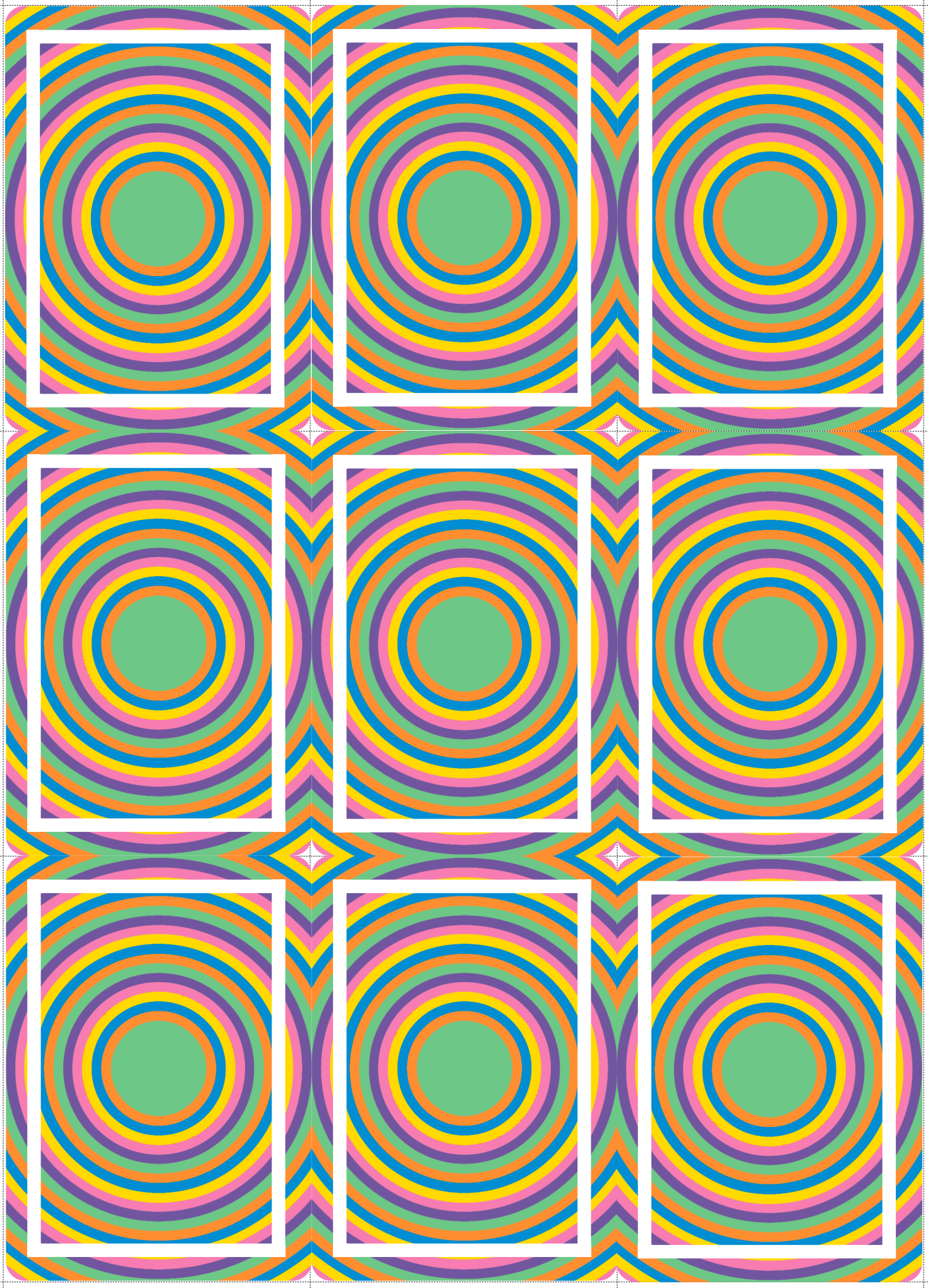

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TOPIC LISTS INTERVIEWS

Here I include the topic lists I used during the semi-structued interview I had with acoustic engineers (n=2) and sound designers (n=3). These topic lists served as the starting point, and reminders during the interviews. When conducting the interviews I ensured they were natural conversations, the topic lists served as a guide. The interviews were ~ 30 minutes each.

The interviews were recorded, and I took written notes during them. These are not shared here, the interviews often contained sensitive information.

TOPIC LIST ACOUSTIC ENGINEERS

- Get verbal informed consent for the interview.
- Describe the work you do.
- What steps do you take during this process.
- What are the stakeholders you collaborate with.
- How and when do you communicate with these stakeholders.
  - What do they deliver to you.
  - What do you deliver to them.
- What tools and/or software do you use during your work.

TOPIC LIST SOUND DESIGNER

- Get verbal informed consent for the interview.
- Describe the work you do.
- What steps do you take during this process.
- When do you diverge in your process
  - How do you do this diverging
- What are the stakeholders you interact with during your work.
  - What do you need from other stakeholders to do your work.
  - What do you show to these stakeholders.