Sketching Sounds – listening, moving and listening again

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Summary
Industrial design covers design of products taking all senses into account. However, most literature on product design focuses on vision. When designing multisensory human-machine interfaces tools and processes for design of sounds are needed. Sketching is essential in design. Schon and Wiggins discussed designers’ use of sketching and suggested that designers interact with the medium (typically pen and paper) in a seeing – moving – seeing way of working. First, the designer sketch to see a problem, then tries a solution by changing the sketch or suggesting a new sketch, and finally evaluates the solution by visual inspection. We suggest that design of sounds evolves through a similar process requiring the designer to listen, move and listen again. This process is facilitated by considering sounds created throughout the process as sketches. A case was studied where six designers were given the task to design a sound logotype for a car. Their processes were analyzed and compared with actions in visual sketching using pen and paper. The results support the idea of considering sound design as a listening – moving – listening process. Designing of sounds is a conversation with sounding material and crucially dependent on listening. By encouraging sound designers to use sounds as sketches during the design process creativity and efficiency were promoted.

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1. Introduction

Industrial design is supposed to take all senses into account in the design of products. However, most literature on product design has focused on vision and there is a lack of method descriptions and established practices for handling product sound in the design process. Descriptions of the industrial design process are found, for example, in Baxter [1], Cagan and Vogel [2], and Ulrich and Eppinger [3]. The processes can be adopted for product sound design without modifications because the process is not dependent on which senses are being designed for. It should be possible, therefore, to identify critical actions in the industrial design process and to use them to develop methods specific to sound design. Buxton [4] points out that sketching is a fundamental tool in industrial design and Schon and Wiggins [5] defined the design work as a seeing – moving – seeing process. The designer first uses a sketch to see a problem, then tries a solution by suggesting a new sketch (moving), then evaluates the solution by visual inspection (seeing). The same process is utilized by a composer or sound designer when working with music or sounds, listening – moving – listening, and sometimes the term “sketch” is used to describe early drafts of music compositions [6], [7]. Schon and Wiggins [5] stated that “designing is an interaction of making and seeing, doing and discovering”. They concluded that designing must be thought of as designers working in a medium. In their examples, the designers drew on paper. Designers “literally see the evolving products of their work” [5]. The construction of figures or gestalts, appreciation of qualities and recognition
of intended and unintended consequences of moves are crucially dependent on seeing. “As a designer draws, and sees what she has drawn, she makes discoveries.” This yields “an understanding of the problem of the design situation.” “Such discoveries are outputs of designing that inform, guide and stimulate further designing.” “In this sense, designing serves as preparation for further designing” [5].

Analogous ideas should be applicable to sound design. Designing sounds can be considered as working in some kind of sounding medium, and designers should be able to listen to the evolving products of their work. This is crucial for the construction of gestalts, the appreciation of qualities, and the recognition of intended and unintended consequences of moves. As the designer creates sounds and listens to what she has made, she should be able to make discoveries. This should yield an understanding of the design situation that should inform, guide, and stimulate further designing.

As sketching is such a central concept in design the idea of considering sounds used during the sound design process as sketches has evolved. Nykänen [8], [9] suggested that simple auralizations (analogous to visualizations) could be used as sound sketches, and similar ideas have been expressed by Schifferstein and Desmet [10], Özcan and van Egmond [11] and Jansen et al. [12]. Buxton [4] has described how sketching is used in industrial design and has suggested that a good sketch is quick, timely, inexpensive, disposable, and plentiful; that it has a clear vocabulary, distinct gesture, minimal detail, and appropriate degree of refinement; that it suggests and explores rather than confirms; and that it contains some degree of ambiguity. These characteristics should also be true of sound sketches. The number of sketches early in the product design process should not be limited by cost or effort. For an expert sound designer, music production tools can be used for sketching. These tools allow the composer/designer to interact with the medium in a listen – move – listen manner, even though it is more complicated than using pen and paper.

One can imagine how a single sound could be used to give information about a file arriving in a message system. The file hits the mailbox, causing it to emit a characteristic sound. Because it is a large message, it makes a rather weighty sound. The crinkle of paper indicates a text file – if it had been a compiled program, it would have clanged like metal. The sound comes from the left and is muffled: The mailbox must be in the window behind the one that is currently on the left side of the screen. And the echoes sound like a large empty room, so the load on the system must be fairly low. All this information from one sound! [13]

Today, this is reality. These kinds of sounds can easily be generated in most human-machine interfaces. The limitation does not lie in the generation of the sounds, and the quality of designed signal sounds has become more dependent on creativity and good processes than on technology. There seems to be consensus about the importance of sketching in product design, and the idea of sketching sounds is developing [8], [9], [10], [12], [14]. The objective of this study was to examine how professional sound designers use music production tools for making early sketches for signal sounds. Further, knowledge supporting development of methods and procedures for sketching sounds was acquired.

2. Research design

The research was performed as a case study described below, and a qualitative analysis was undertaken based on interviews with the designers. Volvo Car Corporation appointed a team consisting of six sound designers (four professional composers specializing in sound production for audio, film, and web applications and two sound and vibration engineers with experience in car development) to design prototypes for a sound logotype for Volvo cars. The sound was supposed to welcome the driver into the car and to contribute to the experience of the brand identity of the car. It was not defined exactly when the sound was to be played. The team was told that it was supposed to be played some time when the driver is approaching the driver seat or during the first moments in the seat. The sounds were not addressed to a specific car model but were intended to be concepts for possible use in future models. Input to the project included written descriptions and a number of
verbal attributes defining the Volvo brand identity and a number of mood boards used at Volvo for internal communication of brand identity. The idea was that the given key attributes and mood boards would serve as inputs to an iterative design process based on sound sketching. The sound designers were asked to create sound sketches that would then be discussed in a jury group. Based on the discussions within the jury group, the designers analyzed the jury group responses and modified and created new sound sketches. In this case study the process was iterated twice.

3. Analysis of interviews

In the excerpts from the interviews shown below, the interviewer is denoted I and the six designers denoted D1 to D6 (D1 to D4 are the four professional composers specializing in sound production for media and D5 and D6 are the two sound and vibration engineers specializing in car development).

3.1. On the use of sound sketches

This paper focuses on the creation and use of sounds as sketches. The concept of sketching sound was introduced to the designers in the studied cases and sketching was defined using Buxton’s [4] definition of the characteristics for a visual sketch. The interviews with the sound designers were analyzed in order to extract their views on sketching of sound. A question raised was whether the sound designers consider the sounds as sketches and if they find this to be useful. First, the designers were asked if they had been considering sounds as sketches prior to the project, and if so whether they had used the term sketching. Designer 3 said that he uses the term sketch when working with other professionals within his area of expertise (music production):

Excerpt 1:
D3: I use tune sketches or production sketches when I make music. A professional can imagine how it will sound. A person who doesn’t have this ability just concludes that the sound is no good. I feel like we got those kinds of comments from the jury group. In the second round, we made sure the sound sketches were more worked through.
I: Production sketch, do you say that?
D3: Yes, we do.

As Designer 3 expressed, professional composers and sound designers have a common view on what a production sketch is and can imagine how the final product might sound. However, this did not work in the interaction with the jury group in the studied case. Designer 3 was the only designer who spontaneously used the term sketching. Designer 1, 2, and 4 expressed a way of working that is similar to sketching, but they used the words example, draft, idea, and demo (see Excerpt 2, 3, and 4).

Excerpt 2:
I: Was the idea of sound sketching useful?
D4: If you are used to working with sounds, I think you can imagine it as a sketch, and you can imagine that it can sound better. If you see a sketch of a painting, you kind of fill in what is missing. I thought that this would work for sounds as well, but it didn’t. A bad sound just sounds bad. It is easier in the world of music. Then a demo is a sketch. For example, you don’t use real guitars, or whatever, but the one who listens can fill it in.

Excerpt 3:
I: How do you usually work with this type of assignment?
D1: You start by creating some examples. Usually the client chooses one of them. You get directives from the client from the start and you try to interpret those directives. They are usually verbal descriptions of feelings. Maybe the client wants a specific instrument. After that it usually goes quite fast.

Excerpt 4:
I: How do you usually work with this type of assignment?
D2: You make a draft, an idea, or a couple of ideas. When making film music you make a couple of quick drafts of different concepts. Then the client might give their opinion. Then one sends some sounds back and forth. Then you make the real music. That’s the way I have worked.
I: Sketches, is that another word for what you already have done?
D2: Yes, kind of. It’s like making many, rather than a few perfect things.

Both Designer 3 and 4 expressed that sound designers and music professionals are able to use the sounds as sketches but that this did not work with the jury group. Designer 3 developed his ideas and said that sound professionals have a language for describing sounds that other people do not have (Excerpt 5). He suggested that “sound references” are useful in communication within product development teams and with clients.
Excerpt 5:
D3: If you work professionally with sound and music, you have another language for describing sounds. I will use many more sound references in the future to try to figure out what kind of sound a client wants. It cannot be described by words. I believe quite strongly in this idea, to make many sounds and then try to pick the best. I also believe in trying to find a way for communication based on the use of reference sounds.

Designer 6 expressed that he found the concept of sound sketching useful.

Excerpt 6:
D6: It is easy to understand because it is analogous to visual design, just that you call it sound sketches.

The interviews confirmed that sound designers and composers work in a listening – moving – listening way similar to the seeing – moving – seeing process suggested by Schon and Wiggins [5]. The designers appreciated the use of sound sketches and the analogy with visual sketching. However, several designers expressed the problem with getting all participants in a product design team to understand that the sounds are sketches. It becomes a pedagogic and methodological problem to establish the idea of sketching in sound design.

3.2. On the development of sketching strategies

Sound sketches can be used in different ways. For our research design purposes, a structured process consisting of two iterations of evaluation sessions was used. It must be noted that this might not be the optimal way of working in real-life projects. The interviews were used for obtaining responses on how processes should be developed in order to support actual projects. The main objections against the process used in the case study were that it was too slow, there were too few iterations, and the interaction between the client (the jury group) and the designers was too formal (see Excerpts 8 and 9).

Excerpt 8:
I: Is there something that you think should have been done in a different way?
D6: Use more iterations.

Excerpt 9:
I: What was bad about the process?
D6: I think you should work more directly with the client. Maybe work in sessions and create something together. The delivery will then be immediately confirmed by the client. It happens quite a lot when you are two.

Suggestions for real-life projects would, based on these responses, be to use more and faster iterations and to have designers working in a more hands-on approach together with the client.

The main benefits of the process were that both designers and jury group members felt that a lot of ideas were created. Working together in a joint medium encouraged creativity and helped the group arrive at a common opinion. Schon and Wiggins [5] stated that “as a designer draws, and sees what she has drawn, she makes discoveries” and that this yields “an understanding of the problem of the design situation”. They further wrote that “such discoveries are outputs of designing that inform, guide and stimulate further designing”. As a sound designer creates sounds, and listens to what she has made, she makes discoveries. This process yields an understanding of the problem of the design situation. Such discoveries are outputs of designing that inform, guide, and stimulate further designing, and this theory is supported by some comments from the designers. For example, Designer 1 said that there were a lot of ideas being generated all the time, and further designing was stimulated by listening to sounds from each other (see Excerpt 10). Designer 3 said that the relay race (some designers made a “relay race” where material was handed over from one designer to another for creation of new ideas and for further development) “definitely added something” and that it “mixed many persons’ creativity” (see Excerpt 11 and 12). He further pointed out the benefit of using combinations of auditory, verbal, and graphical representations of the creation in order to share and develop ideas (see Excerpt 13). Designer 5 pointed out that music production tools contain lots of pre-made sounds that other people have judged to be interesting. Listening to these sounds stimulates further designing. Designer 6 also highlighted co-creation and suggested that new designs can be stimulated by the designer and the client working together (see Excerpt 9).

Excerpt 10:
D1: I haven’t worked in parallel in this way before. There were a lot of ideas being generated, which maybe we didn’t use.
I: What was good with this way of working?
D1: I got input on my suggestions rather quickly. We got ideas from each other.

**Excerpt 11:**
D2: We also made a relay race, one designer started the sketch and handed over the files to another, who continued, and who then handed them over to a third, etc. It felt good. We will work in that way more in the future. We didn’t plan to communicate orally, but of course we talked. We were sitting in the same room. But we mainly communicated through the sounds, and we didn’t use any written communication. The communication was based on how it sounded.

**Excerpt 12:**
D3: I liked the relay race. It definitely added something. It mixed many persons’ creativity in a very good and concrete way.

**Excerpt 13:**
D3: You sit together with the computer. You can listen and point: “the thing you made there…” It is very tangible. You can point on the sound graphically. Very useful. We talk and point to the same extent.

**Excerpt 14:**
D4: When you can send the sounds back and forth a number of times you meet [the designer and the client].

**Excerpt 15:**
D6: The difficult thing is when you sit alone and do not get any feedback. I have dragged in my colleagues to listen. You become insecure when you sit alone and design.

Based on these responses, the recommendation for future sound design projects would be to adapt the concept of sketching, use more and faster iterations, work hands on with the client using a joint sounding medium, for example some easy to use music production tools, share sound sketches and combine auditory, verbal and graphical representations of the creations.

3.3. **On the use of music production tools for product sound design**

Schon and Wiggins’ [5] thought of design as designers working in a medium and that designers literally see the evolving product of their work. We wanted to investigate whether music production tools are a suitable medium. The designers did not express much about their individual use of media and how it influences their design process, but interesting observations were made about how sound media were used for interaction between designers. For example, the “relay race”, where material was handed over from one designer to another for creation of new ideas and for further development (see Excerpt 11 and 12). These comments show the importance of listening in the sound design process. They also show that the use of sounding media is essential for communicating and reflecting upon the material, and that music production tools provide this opportunity. In addition to sound, the modes of communication used in sound design can include speech as well as gestures and graphics. Designer 3 expressed the use of combinations of speech, graphical representations, and gestures in the communication between designers (see Excerpt 13). Designer 3 further developed his reasoning in Excerpt 5 by pointing out that professional sound designers develop a way to communicate based on the sounds they create, and that the designer will try to communicate with the clients based on the use of reference sounds.

Our conclusion is that a group of professional sound designers develop their use of the music production tools at hand and combine the use of these tools with written or oral communication and gestures. It was also clear that the sound designers thought that the functionality available to them in standard music production tools is sufficient for applying the sketching idea in the sound design process:

**Excerpt 16:**
I: Do today’s music production tools give you enough support for applying the sketching idea when you are working alone?
D6: Yes.

4. **Conclusions**

Sound designers’ use of sounding media during product sound design was explored. The analysis was based on Schon and Wiggins’ [5] idea of sketching being a seeing – moving – seeing process. It was found that designing sounds must be thought of as sound designers working in a medium. Sound designers literally hear the evolving product of their work. As a sound designer creates sounds, and listens to what she has created, she makes discoveries. This yields an understanding of the problem of the design situation. Such discoveries are outputs of designing that inform, guide, and stimulate further
designing. Designing serves as preparation for further designing [5]. Listening while designing sounds helps to make discoveries readily accessible and more subject to conscious control and choice. Modern music production tools are tangible tools for listening to, talking about, and “pointing at” sounds.

To conclude, we consider sound design to be critically dependent on listening. The sound designer listens, moves, and listens again. Using sound sketches facilitates this process. Sound designers can use conventional music production tools in this process. It was found that by encouraging sound designers to use sounds as sketches during the design process creativity and efficiency were promoted.

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References