Heuristic Framework for Specifying and Evaluating Sound Design for Interactive Commodities

v 0.2, Daniel Hug, May 2013

1. Typology of Artifacts (Hug, 2008)

This typology has been developed along aspects of morphology and degree of abstraction of sound and object. Sound is closely related to physical, material processes & plays a core role in communicating „hidden" qualities of an object (stability, solidity, etc.). In schizophonic interactive commodities this "natural" layer merges with artificial electro-acoustic sounds in many ways. These categories thus are intended to help to orient the sound design strategy used. Of course, an artifact may encompass several typological characteristics.

1.1 Authentic commodities

These are simple objects that are self-contained in terms of form and function and have an essential identity that is not questioned, thus "authentic". Such objects can be enhanced with electroacoustic sounds in order to support their identity. Although some simple sensors and processing abilities may be required for its sonical enhancement, the object itself is normally not interactive (however, of course, it might be used to control interactive systems).

- Example: The "Mighty Mouse" by Apple is endued with a small loudspeaker emitting a subtle noise which seems to come from a small ball rolling over a grooved surface, thus replacing the sound of a scrollwheel normally associated with computer mice. Another example is the blinking light in cars, which is emitting a - electroacoustically generated - sound, suggesting an electromechanical process.
- Sound design: In this case the sensible integration of the added sound into the physical object is called for. Thus the goal of the design is to render the actual sound producing process transparent and create the actual experience of a physical process e.g. of a scroll ball rolling over grooves. The case of the blinking light is at the borderline of this category, as it contains an indicative component.

1.2 Extended commodities

Also this category describes more or less self-contained objects, however they are endowed with complex additional functionalities through interactive technologies. In this case the physical objects are mere "supporting media" which in principle do not change their identity but can be supplemented by more complex levels of meaning.

- Example: By adding a sensor and a connection with an iPod the Nike+ jogging shoe mentioned earlier is turned into a "smart" jogging shoe. Essentially we experience the shoe still as a jogging shoe, including the sonic identity that goes with it, but an abstract functionality has been added.
- Sound design: In this case the sound of the object itself remains unaltered. The sonic enhancement is taking place on a purely symbolic or metaphoric level and can be strongly oriented towards the design strategies used in audiovisual media. The acoustical integration into existing object-sounds is not necessary or should even be avoided, in order to create a product in a class of its own.

1.3 Placeholders

These objects work as placeholders for many kinds of meanings and functions and are inherently ambiguous. They can - within the constraints of their appearance and operation modality - be completely redefined through sound. The object in its materiality and form be- comes second to its function.

- Example: A good example is the controller of the Wii by Nintendo. It is a device looking like a simplified remote control, which in the player's experience turns into various virtual objects like swords, tennis bats or fishing rods. From the computer mouse mentioned above it differs in that its operation and the gestures performed are analogical to the simulated virtual objects.
- Sound design: Here the physical properties of the placeholder are connected with the more complex functionalities. The sound is defined by the type of operation of the simulated object and its functionality respectively: usually sounds are used that relate to the direct manipulation of objects, furthermore being endowed with additional semiotic potentials, a strategy we have already described above in the context of film- and computer game sound.

1.4 "Omnivalent" commodities

Complex, multifunctional systems. The essence of these devices lies in their communication abilities and the processing of data and not primarily in their form and physical properties. Their multifunctionality

and modifiablility and the resulting lack of identity makes these devices comparable to personal computers, nonetheless they are different in how they are used which usually is casual and peripheral. A further distinguishing characteristic is their closeness to the body.

- Example: An obvious example is the mobile phone and the smartphone respectively, being at the same time radio, camera, agenda, navigation device and telephone.
- Sound design: The requirements for the sound design can be detached entirely from the device itself which hardly disposes of any considerable acoustic component or sonic identity as nearly all processes are working non-mechanically. Often the sound design tries to evoke the sonic identity of the original de- vices replaced, e.g. the shutter sound of a mechanical photo camera.
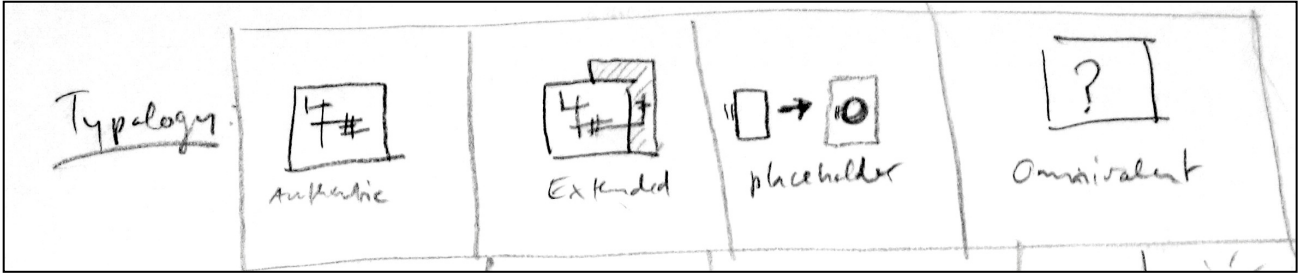
2 Situational Heuristics (Hug, 2013)

Based on the evaluation of more than 20 experience prototypes developed in sonic interaction design workshops held by the author, several trajectories across situational categories that define the relationship between interactive commodities and their use context have been identified. In the following, their poles are described. Usually, however, finding intermediary states will be required.

2.1 Social situation:
- Private – public: As sound pervades space, this is a very important aspect. Obviously, in a private situation the design seems to be much more free. However at the same time the sound will also stand out more and its occurrence may be more significant, which may require a finer tuning of repetitions (variations), complexity and elaboration. In public spaces, on the other hand, it is important to make sure that those concerned will hear the sound(s). This depends less on volume than on the *relational plausibility* of elements of the acoustic ecology. Subtle modifications allow the sounds to be picked out of the soundscape by those who know the sonic pattern of the modification. The more private an interaction is, the more also the aspect of *ergo-audition* can be played out. In public this requires that the sound be produced within a suitable acoustic community.
- Summary: The sound addresses me / I address others through the sound

2.2 Level of intimacy (incomplete):
- „Ob-jectified" – pocketeable – wearable – implant: This trajectory spans a wide range of possible relationships to an artifact.
- Summary: A sound can mark a distance or whisper in my ear

2.3 Relationship to user and task:
- Assistant – tool: The artifact as "mere tool" always remains objectified and by definition is not autonomous. Sounds here are a manifestation of the work done with the artifact rather than produced by the artifact itself. The sound design thus relates to the qualities of the work itself rather than to those of the artifact itself, unless the latter is "authentic". In this case, the sounds need to base on the given sonic properties of the artifact. The "companion", on the other hand, is a subjectified artifact that may act independently and whose sound design aims at working out an autonomous character9. In terms of task oriented activities, an artifact-as-companion can be conceived as "supporter". An interesting variation of these basic types could be the artifact as slave, where "toolness" and a higher level of autonomy are combined.
- Summary: A sound can characterize an artifact as trying to help or as being used

2.4 Type of use:
- Casual or professional: The casual pole stands for incidentality and a low level of attention during interaction. This reduces the need for a detailed elaboration of the relationship between action / gesture and the sound. Also the complexity of the sounds can be rather limited to a minimum that makes the sound interesting in a given situation. A casual interaction also implies that the attention may shift to other artifacts in the process, which suggests that the sounds be fine tuned to fit into the acoustic ecology, allowing a smooth shift of focus to and away from it. The opposite is the case for the professional artifact, where a sound can be as complex as required for the interaction and its relationship with control gestures, functions and procedures is essential. In a professional environment the soundscape is defined by the tools used, and certainly can claim attention to a certain degree.
- Summary: A sound can be playful and surprising or complex structured and determined
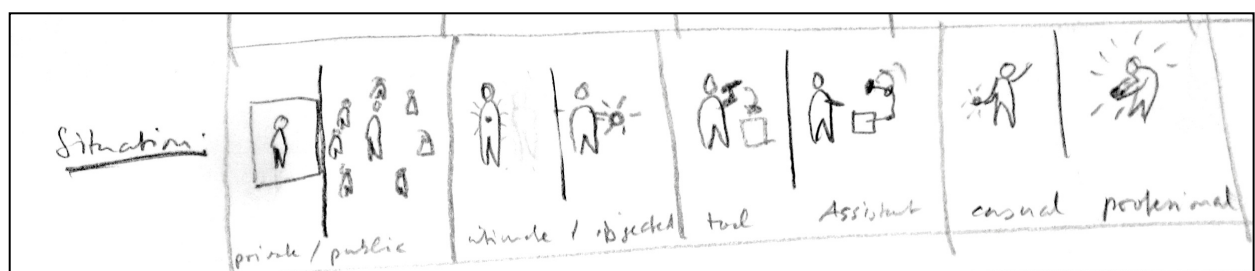
3 Narrative Metatopics (Hug, 2009/Hug 2010)

Narrative metatopics are abstracted themes and attributes associated with narratively significant artifacts and interactions in fictional media, like film or games. They were established in structured sessions of group discussions, coding and clustering of extracts from over thirty films and games, in which sound played a significant interpretive role. Thus, narrative metatopics provide a means of navigating a complex semantic space, and can be associated with a collection of specific sound design strategies, which serve as material to build grounded sonic interaction design hypotheses as a starting point for design. They also are meant to serve to *link qualities of interactive processes* with *qualities of sonic processes*
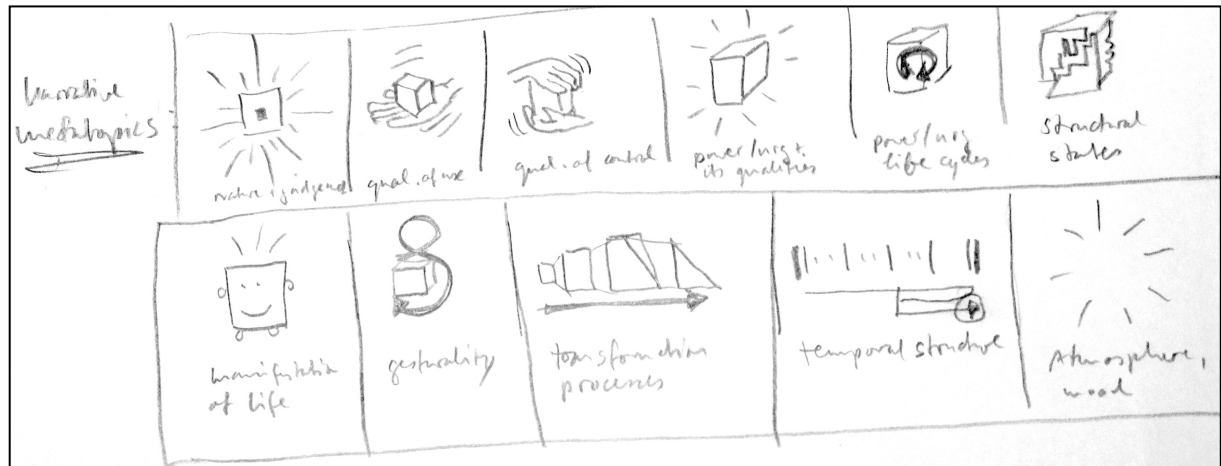
- **Nature and judgment of artifact**
    - Familiar-unknown, friendly-evil, …
    - Danger level
    - Uncanniness, eeriness, strange, defamiliarized
    - Qualitative characterization, as magic, valuable, precious, or "just" simple tool
    - Technical – organic, industry vs. "nature" vs. "magic" vs. electric etc....

- **Qualities of Use**
    - (in)correct use
    - (in)appropriate use
    - Succeeded or failed use
    - Compatibility with other artifacts or user

- **Qualities of Control**
    - In control, out of control
    - Autonomous vs. remote control
    - Level of autonomy / control / agency / intentionality
    - Hacking, diverting from intended use
    - Eating / swallowing / taking over / infection with alien power

- **Power / Energy and its Qualities**
    - General presence of power or energy
    - Type: magic, natural/physical, electrical,...
    - Moral judgment: evil/good, scary/friendly, familiar/alien, human/superhuman, comprehensible/incomprehensible
    - Extension: ubiquitous / immersive / penetrative / localized
    - Power relations (to other sources / to user)

- **Energy/Power Life Cycles and Dramaturgy**
    - Activation, starting, charging, building up, discharging, releasing, transferring, exchanging, storing, loss of
    - Adjustment, calibration, tuning

- **Structural States**
    - Solidity, stability, integrity, decay, dissolving, closing, sealing, breaking open…

- **Manifestation of Life**
    - Dead matter becomes alive
    - Anthropomorphization
    - Smartness, understanding vs. simple processing of information, computing
    - Organic/inorganic nature
    - Living matter/animated matter
    - Animal presence
    - Pain

- **Gesturality**
    - Movement/gesture
    - Transfer of emotional expression on sound material ("gestural sound")

- **Transformation Processes**
    - Transition, change, transformation, metamorphosis, (e.g. turning good or evil)

- **Temporal structure**
    - Pacing, speed
    - Determined process vs. open-ended
    - Outburst vs. closure

- **Atmosphere, Mood**
    - Atmospheric machine ("stimmungsvoll")
    - Dream world/otherworld
    - Dissonance, consonance
    - Intimacy/distance

Bibliography

Hug, Daniel: Towards a hermeneutics and typology of sound for interactive commodities. In Proceedings of the CHI 2008 Workshop on Sonic Interaction Design, Firenze, 2008.

Hug, Daniel: Investigating Narrative and Performative Sound Design Strategies for Interactive Commodities. In Ystad, S. et al., editors: Auditory Display - 6th International Symposium, CMMR/ICAD 2009, Copenhagen, Denmark, May 18- 22, 2009, Revised Papers. Volume 5954, Springer, 2010, 12–40

Hug, Daniel: Barking Wallets and Poetic Flasks - Exploring Sound Design for Interactive Commodities. In Franinovic, Karmen/Serafin, Stefania, editors: Sonic Interaction Design. MIT Press, 2013