Experiencing Sonic Interaction Design: Product Design Activities at the SID Summer School 2010

Stefano Delle Monache  
IUAV - University of Venice  
Venezia, Italy  
stefano.dellemonache@gmail.com

Davide Rocchesso  
IUAV - University of Venice  
Venezia, Italy  
roc@iuav.it

ABSTRACT

Educational activities represent important means of dissemination and experimentation of research outcomes. The Product Sound Design Summer School 2010, organized in the scope of the EU-funded COST Action on Sonic Interaction Design (SID), aimed at bringing together the state of the art of methods and tools investigated and developed so far in the SID community, and starting an integration process of SID with Product Development and Design. The paper describes the learning environment and its aims, the activities carried on and the impact of the outcomes in terms of inspirational sources for future investigations in SID.

1. INTRODUCTION

Sonic interaction design is the activity of shaping the relationship between human and objects, and between humans through objects, by means of sound [1]. Artifacts that integrate computational capabilities are increasingly inhabiting our everyday environment, from household appliances, entertainment systems, to mobile communication devices, clothes and furniture. Objects turn multifaceted, and communication meets information. As technology becomes more and more miniaturized and embeddable, devices get smaller and visual displays tend to disappear. Sound can provide a good alternative and opportunity to convey information, communicate and share the intimate, inner qualities of use and interaction with and through objects. Notwithstanding, to provide interactive artifacts with appropriate, expressive, functional acoustic behaviour is not an easy task. Indeed, how many annoying auditory displays can we account, so that after a while one prefers to turn the device silent?

The design question is about how to make a product sensible to manipulative actions, not as an intelligent or knowledgeable subject, but as an object capable of feeding the stimuli back in a dialogic form. For this reason, prominent experts of interaction design claim that the development of a literacy on understanding, interpreting, and building up of a repertoire of sketches and prototypes is a core issue in interaction design [2, 3, 4]. Designing for manipulative interaction requires a shift of thinking and approach to practices, research and educational activities from the product itself towards interaction. Designers need tools and techniques to explore, visualize, interpret, refine interaction and accompanying products. On the other side research and education through shared practices of creation, manipulation, interpretation are aimed at being sensitized to and exploit the richness and expressiveness of movement, of both users and objects, and sound.

So far, SID related research investigated a plethora of approaches, and tools with the aim of developing a corpus of knowledge on sound to be exploited in interaction design activities [5, 6, 7, 8, 9, 10]. The development of such a literacy represents a crucial step towards the education of the future product design team members with a specific competence on interactive sound. Since 2008, the COST-Action IC0601 on SID\(^1\) organized several training activities devoted to the creation and consolidation of this innovative and interdisciplinary domain. The SID Summer School took place in August 2010 and it was aimed at summarizing some results of three years of research in sonic interaction design, widening the knowledge of the SID Action activities, and providing intensive training on product sound design in the scope of product development.

The paper has the following structure: in Section 2, we introduce the Product Sound Design Summer School 2010, the learning environment and its aims; Section 3 describes the organization and program of the activities carried on; in Section 4, we reflect on the impact of the training school; in Section 5, we draw our conclusions.

2. THE PRODUCT SOUND DESIGN SUMMER SCHOOL 2010

The Product Sound Design Summer School (see fig. 1) took place at the Aalto Design Factory, Espoo, Finland, from the 23th to 26th of August 2010\(^2\). A project of the Aalto University \(^3\), the Design Factory \(^4\) is a multidisciplinary experimental platform focusing on product development and design \(^5\) [11], and provides a framework where educational, research, and business opportunities are

---

\(^1\)http://www.cost-sid.org/
\(^2\)http://trac.sme-ccppd.org/SID/wiki/SIDTrainingSchoolProductSoundDesign201008
\(^3\)http://www.aalto.fi/en/
\(^4\)http://aaltodesignfactory.fi/
\(^5\)http://www.ulrich-eppinger.net/
integrated in mutual collaborative projects. In this framework, the Summer School program was constructed around two main guiding principles:

1. to start an integration process of SID product sound design with product development and design;
2. to bring together the state of the art of the several tools, techniques and interdisciplinary guidelines that are constantly under development and investigation in SID community.

Participants were recruited with an international call for applications, with the objective of selecting 16-20 students in the last year of masters studies, or first two years of PhD studies in design, engineering, economics, or sound-related studies. Applicants were required to send a CV, a letter of motivation, and an official transcript of their studies. Eventually, 20 participants were selected out of 56 applications.

The summer school was positioned at the intersection between product development and design and sonic interaction design: problem-based learning activities — that involve ideas to realize and problems to solve by planning, searching for information, decision making, manufacturing, assembling and testing — were merged with SID activities, such as making designers sensitive to sonic interactions by means of soundwalks, by analyzing and imitating sonic gestures, and by sonic explorations devoted to concept development, sound sketching and scenario enactment.

For this purpose, two partnering companies, Hipui and Powerkiss, were involved in order to provide participants with a real scenario to be confronted with. For the summer school, Hipui was interested in exploring the use of non-verbal sound to support the execution of gestural input in handheld and eyes-free devices. Powerkiss’ open problem was in auditory signalling their wireless charging technology, so that the latter could be invisible and merge completely with the host artifact, a table for instance. Sonic branding aspects and context of use, private or public, had to be considered.

In figure 2, the proposed design themes frame the contents of the whole training activities.

![Figure 1. The poster announcing the Product Sound Design Summer School](image)

**Figure 1.** The poster announcing the Product Sound Design Summer School

**Figure 2.** The structure of the Summer School

### 3. ORGANIZATION AND PROGRAM

#### 3.1 Day One

The first day was devoted to provide some basic skills and tools aimed at being sensitized to sound in interaction, at collecting and enacting fast and rough ideas, and at generating quick and dirty sonic prototypes:

- **Soundwalk and listening session (F. Behrendt):** it encompasses a series of listening and sound walking exercises, aimed at sensitizing to sonic interactions, improving listening skills, expanding the vocabulary to talk about sounds, representing visually and orally the temporal, spatial, embodied aspects of sound. In particular, guidance was given in order to reflect on the role of sound in both urban and indoor space, how sound can facilitate or disturb navigation and orientation, and how it is possible to design sonic interactions for complex multisensory environments [12].

- **Vocal sketching session (I. Ekman):** it introduces the use of vocal sounds as means for rapid sonic prototyping of design ideas, especially in the early stage of the design process. Can sound designers make use of their voice, in the same way visual designers sketch on paper with pencil? The session motivates participants to exploit their vocal capabilities in a series of warming up exercises and design-oriented task. For instance, groups were asked to use their voice to sketch the sonic behaviour of a given artifact [7].

- **PD6 - product development in 6 hours (W. Raduma):** it is a workshop format developed at Design Factory. A product development process is squeezed in 6 hours. PD6 is a tool for accelerating team building, enacting fast and rough ideas generation, improving communication and effective problem solving. Prototyping and hands-on are at the center of a non-linear, iterative process of planning, concept development, design, testing and refinement [13, 14].

---

6 http://www.hipui.com/
7 http://www.powerkiss.com/
Two teams (1 and 2) were asked to create a system that makes wireless charging intuitive, easy and informative, while the remaining teams (3 and 4) had to create an interactive alternative for a display and keyboard/touch interface. Requirements for both briefs were that feedback and interaction should be handled by means of non-verbal sound and gestures.

3.2 Day Two

The second day was dedicated to provide analytical tools for concept development and to experiment with various sound making techniques for sonic prototyping:

- Narration and performativity in sonic interactive commodities (D. Hug): this session provided analytical tools for interpreting and developing narratives around sound, starting from a systematic analysis of film or game sound cases. In particular, the concept of narrative metatopics was introduced, namely abstracted themes and attributes associated with narratively significant artifacts and interactions in fictional media [9]. Participants learned to identify design ideas, and apply narrative strategies to sound design. In practical sessions they were asked to experiment with Foley sound making techniques, and to refine and prototype with a Wizard-of-Oz approach the outcomes of the PD6.

- Sound - from perception to basic design (S. Delle Monache): this session introduced an analytical approach to sound perception and listening via experimenting various manipulations of sound feedback in continuous and multisensory interaction. According to a basic design approach, the groups were asked to solve a design problem, with well-defined objectives and constraints, and to prototype the sonic interaction by manipulating the control parameters of some sound models, available in the Sound Design Toolkit, a physics-based sound generation application [8, 10].

3.3 Days Three and Four

Day three and four were finally dedicated to independent work of the groups. The briefs given for the PD6 workshop were refined and better specified as follows:

- Powerkiss: Create a system that makes wireless charging intuitive, easy and informative. Extend you device for social information sharing;

- Hipui: make an interactive alternative for a display and keyboard/touch interface. Extend your device for information navigation;

- Requirements for both: feedback and interaction are handled by the use of non-verbal sound and gestures. Demonstrate the discovery of its functions and capabilities in an extreme situation with experience prototyping.

4. OUTCOME

To run the school, the twenty selected participants were grouped in four multidisciplinary teams, each composed of two designers, one engineer, one economist, one musician. Teams 1 and 2 dealt with the design theme suggested by Powerkiss, while the remaining two teams (3 and 4) concentrated on the Hipui theme.

During the first two days, specific workshops exposed the participants to the basics of product design and development, and gave them the opportunity to experience various perspectives on sonic sketching and prototyping, in order to share a common starting platform. In the second half of the school, the groups were asked to explore the design themes indicated by the companies, and to design mock-ups and prototypes to demonstrate their exploration. Finally, their realizations were evaluated by companies, instructors, tutors, and evaluators (see fig. 3).

As seen from the participant, the School took a telescopic form, with an initial introduction that tried to encompass the whole workshop development. The School chief organizer, Cumhur Erkut, initially explained the aims and strategy by devoting just a couple of sentences to each of the fundamental components (soundwalk, toolkit, etc.). This priming allowed the participants to start thinking about how to gain the most from the planned activities. Just as important, there was the description of the environment and facilities, as given by the Design Factory director Kalevi Ekman. The partner companies were also called to present their expectations to the participants, although these were kept quite open to the unexpected. Then the activities of sound walking and vocal sketching were conducted, as described in section 3, before the crash exposition to the product development cycle.

As activities such as sound walking and vocal sketching require some practice and reflexion, they were also continued in the early second day, with a more analytic attitude. This turned out to be beneficial to introduce theory and practices in sound narration and performativity. By using physical objects of a toolkit, the participants were asked to produce sounds with some qualities (e.g., searching / finding with hesitation), or to mimic salient film sounds. It is interesting to notice that software sound models were introduced only after extensive direct experience of physical sounding objects. Actually, sound models were introduced with a rhetoric trick. The participants were asked to reproduce, by using physical objects, a given recorded sound. Only after their direct, physical attempt, the fact that the reference sound was synthetic was actually unveiled. On the one hand, this made the participants trust the models. On the other hand, it encouraged them to adopt a similar approach when designing the sound using software models.

Two basic design assignments were accomplished in the second day. One was to create a soundscape with two impact sounds and two friction sounds, where none of them stands out (the Antiprimadonna). It is remarkable that all groups got different yet interesting and balanced soundscapes. The second assignment was to sonify the gesture of stirring flour and sugar with water, and it made the par-
participants aware of the performative potential of everyday objects, when they are properly augmented with sound.

In days three and four the groups were left largely alone in developing their projects. They were allowed to expand or deviate from the preliminary sketches, but checkpoints were established in both days to keep them on a secure track. It was agreed that prototypes could still be based on wizards, but the sounds, as compared to the initial sketches should be refined.

A short video documentation of the activities carried on in the summer school can be found at http://www.vimeo.com/16655747.

Figure 3. Evaluation by Maija Itkonen, CEO of Powerkiss

5. EVALUATION

The Product Sound Design Summer School was announced on various social, professional and research networks, blogs, institutional websites, and mailing lists. 56 applications were received from all over the world: 39% Engineering, 36% Design, 9% Economics, and 16% Music. Musical skills, amateurish or professional, are the binding factor between the diverse backgrounds. Compared to previous educational activities organized by the SID-COST Action, the applicants profile was much more design- and less scientific- or artistic- oriented. Conversely, almost nobody had specific skills on sonic interaction design.

The letters of motivation served to frame the expectations of candidate participants and highlighted a strong demand of understanding by doing what a sonic interactive, aesthetic experience is, and how it is actually possible to shape it designerly, with respect to:

- the product itself (product designers);
- the technological development and implementation (engineers);
- the impact of product sound on users’ experience, brand positioning and customers’ loyalty (managers);
- the inner dynamic relationships between sound, shape and materials beyond a musical application, and to environmental sustainability (musicians).

For this purpose, the workshop modules were constructed in order to ensure a ratio of 80-90% of practice and 20-10% of related contact teaching. This explains why an intensive training on sound-related methods and techniques was given in the early stage of the design process. The specific interests raised in the letters of motivations combined naturally in the group exploration in the second half of the training school, integrating various aspects of the product development process.

After completing the summer school, students were asked to evaluate, in a feedback form, the workshops, the instructors, their experience of the training activities, and participation to groups work. In general, the training school gained an overall high score. The activities and the various perspectives on SID, though condensed in two very intensive, and sometimes hectic, days, were almost unanimously evaluated useful learning experiences, with a high degree of applicability to own work. Considered the multidisciplinary background of the participants, and the different levels of access, such a result confirms a value and trust in the tools and techniques that are being investigated in the SID community.

As seen from the instructors, tutors, and evaluators, the school was a great source of inspiration. It was understood that giving much details about software tools (for example, detailing the sophisticated mapping strategies that can be implemented) diverts the attention from the design aspects of sound in interaction. It was recognized that the diverse backgrounds that were initially mixed in all groups are actually needed to develop good product sound design, and that a common platform for effective team work can be found. The problems and hints giving by the partner companies were at the same time concrete and broad and they elicited a number of research questions that are likely to animate the community for several months to come.

6. CONCLUSION

The Product Sound Design Summer School 2010 represented an important means of dissemination and experimentation in context of a series of methods and tools developed so far in the SID community. In four days, participants had the opportunity to experience and practice sonic interaction design. A strong, hands-on, pedagogical approach to the different matters enabled students to start quickly a discourse around sonic interaction and product design. Moreover, it gave a measure of the effectiveness of an integration between SID and product development, towards the definition of a format of activities and disciplines in SID education.

7. ACKNOWLEDGEMENTS

Thanks to: Stephen Barrass (evaluator), Frauke Behrendt (tutor), Inger Ekman (tutor), Kalevi Ekman, Cumhur Erkut (chief organizer), Daniel Hug (instructor), Antti Jylhä, Sandra Pauletto (evaluator), Wycliffe Raduma, and Sylviane Sapir (evaluator). The authors were, respectively, instructor and evaluator.
8. REFERENCES


