Chapter 17
Guidelines for Sound Design in Computer Games

Valter Alves
University of Coimbra, Portugal & Polytechnic Institute of Viseu, Portugal

Licínio Roque
University of Coimbra, Portugal

ABSTRACT
The inconsequential exploitation of sound in most computer games, both in extent and nature, contrasts with its prominence in our daily lives and with the kind of associations that have been explored in domains such as music and cinema. Sound design remains the craft of a talented minority and the unavailability of a public body of knowledge on the subject has greatly contributed to this state of affairs. This leads to a mix of alienation and best-judgment improvisation in the broader development community. A sensitivity to the potential of sound for the enrichment of the experience—with emphasis on game specifics—is, therefore, necessary. This study presents a contribution to the practice of sound design for computer games. An approach to intentional sound design, informed by multi-disciplinary interpretations of concepts including emotion, context, acoustic ecology, soundscape, resonance, and entrainment, is distilled into a set of design guidelines that holistically address the different sound layers.

INTRODUCTION
Computer game sound design is in its infancy. It is still a practice almost reserved to a limited number of experts in the game industry who have typically made their own way through the field in the absence of a structured body of knowledge. The consequences are self-evident. To start with, there is no abundance of purposeful sound usage in computer games. More relevant to the study presented here, there is little theoretical support for someone, who is not one of those experts, to perform intentional sound design.

This situation is not an exception in the broader context of human-machine interfaces and interaction systems. Game development, though, is one of the fields where sound is deserving of greater attention as noted by a number of recent authors (Collins, 2008a; Ekman, 2005, 2008; Grimshaw, 2007; Peck, 2001, 2007). Additionally, in the
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wider field of Human Computer Interaction (HCI), research on sound is recognized as quite neglected (Brewster, 1994; Frauenberger, 2007; Hermann & Hunt, 2005; Kramer et al., 1997). One conspicuous sign of the lack of a relevant body of knowledge is the unavailability of clear guidelines or best practices. Yet, this kind of support does exist and is widely known with respect to the visual modality (Kramer et al., 1997).

What is more, researchers in HCI often resort to computer games as instruments to conduct studies on several aspects (Barr, 2008; A. Jørgensen, 2004) including those related to sound. Sound design in computer games is particularly interesting because it supplies evidence of the pertinence of multiple aspects of sound in interaction. To start with, computer game sound matters to usability, in the sense of “easing the use of the system by providing specific information to the player about states of the system” (K. Jørgensen, 2006, p. 48). It can also work as support to gameplay (K. Jørgensen, 2008). Additionally, sound is a valuable component of overall game aesthetics and affective perception. Furthermore, it may be used to create and enhance emotional impact (Ekman, 2008) and contribute to immersion (Collins, 2008a; Grimshaw, 2007, 2008). Nevertheless, it is important to be aware that interaction in HCI and computer games are not the same: applications typically bracketed under the HCI label are meant to be used, while games are meant to be played (Barr, 2008; Sotamaa, 2009).

The relevance of computer games in HCI research is also justified by a growing appreciation for the concept of User Experience (Hassenzahl & Roto, 2007; Hassenzahl & Tractinsky, 2006) which emerged as an attempt to promote a holistic interaction perspective beyond the more traditional efforts, such as usability. Aspects as efficiency or performance are no longer the sole design concerns: Subjective appreciation matters and also influences the former concerns. Yet again, the research has been much directed to visual modality, leaving others, like sound, less explored (Alves & Roque, 2009a).

The field that is acknowledged to be most contributive to game sound—and to many other aspects of game development, for that matter—is the movie industry. In fact, practices on game sound are strongly influenced by those from cinema. Still, although this is understandable and legitimate to some extent, it is crucial to understand that fundamental disparities exist between the two media that both impose and propose distinct approaches. It is exactly in this difference that we find most prospective development. Ultimately, what is needed is knowledge on how to compose sound attending to game scenario specifics including nonlinearity, dynamicity, and the need for variability (Collins, 2008a, 2008b).

The lack of guidance in sound design has proven to be damaging. On the one hand, developers are discouraged from integrating sound in their projects leading to unbalanced interfaces when compared to our experiences in daily life or even with other media. On the other hand, and possibly more harmfully, when developers venture into sound integration they have to resort to their best judgment, not necessarily achieving interesting results (Frauenberger, 2007). In turn, all these circumstances, have contributed to users/players becoming accustomed to the factual unimportance of sound, even developing some negative associations to sound from which the urge to the mute button is an emblematic example. Muting is interesting as a transient state, not as the defensive default.

Considering such a scenario and refocusing on research and development, two modes of attack seem to be imperative. One is sensitization. This means getting more people aware of the low-level appreciation that the audio component currently has and countering this by proposing innovative ways to explore sound potential. The other is to deliver support to enable the implementation of such ideas. This stretches from providing guidance on the potential concepts that may allow tackling