Pyvox 2: An Audio Game Accessible to Visually Impaired People Playable without Visual Nor Verbal Instructions

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Abstract. In games, we can discern two approaches to learn how interactivity works: the instructions for use and the interactivity itself. The number of spoken languages is evaluated at more than six thousand eight hundred: for this reason, instructions for use can’t make games understandable for all potential users, which is especially true for audio games accessible to visually impaired players, since those games can not count on visual support and have small budgets. Such games don’t provide translation, perhaps because of a lack of cost effectiveness. So, if the purpose of a game is to learn in a friendly but challenging way how interactivity can become complex, why not start this process from the very beginning, without the need of textual instructions? Some musical toys have their sighted users accomplish very simple actions in a funny way, without the need of instructions for use. Moreover, video games show us that it is possible to separate the learning process of a complex task in small steps easy to master. We have made a game according to those principles and realized an experiment to test it. All the players managed to progress in the game but not all understood all the principles of the game. For this kind of game, we assume that players do not have to understand the game during the first contact but they have to be encouraged to continue interaction. At last, the increase of the difficulty level has to be very progressive.

Keywords: audio games, accessibility, usability test, interactivity, sound design, interactive music.

1 Introduction: Audio Games without Language for a Greater Accessibility

1.1 Without Visual Support, Languages Are Less Understandable

Accessibility in games is becoming every year a more important preoccupation in the industry and the report published by the IGDA marked a significant step [1]. The purpose of this study is to understand how visually impaired people can easily master new accessible audio games. Recent research and observation gave a good overview of the existing audio games [2], [3], [4], [5]. Actually, there are more than four
hundred games which are accessible to visually impaired players. It is possible to adapt mainstream games into accessible ones as it was done for quake adapted into audioquake [6]. It can be easier to think about the accessibility of a game starting from the beginning of its development. For this to be done, research proposed guidelines for a better accessibility in games [7], [8].

However, these studies do not consider accessibility problems related to language aspects: language is an inaccessibility factor for those who can’t master it. Moreover, recourse to translation, which implies increasing development costs, doesn’t allow us to target all the potential users: there is too much language, even among the most spoken, to operate all the translations. Now, an important part of existing audio games requires good understanding of the principles of interactivity: for this reason, the comfort given by language is tempting but even for those who master the adequate language, it can be an obstacle to amusement. Most of the actual and popular audio games need a lot of reading before players can start to play them efficiently. For players who don’t master English, the game is not accessible. This is why it can be advantageous, for accessibility studies or for economical needs for international distribution, to develop games (followed maybe by other kinds of software) without communication via language.

1.2 Some Studies Encourage the Making of Audio Games

Are audio games without language realistic? A. Darvishi confirms that an information technology environment using various sonorities provides support for the understanding of the interactive process [9]. But this study doesn’t say if sounds alone could be sufficient for correct interaction. For this reason again, the encounter of experimental research on audio games and the field of non linguistic communication could bring interesting results. This can be a way to orientate the purpose of audio games towards a more musical outcome: interactive music. Even without the help of tactile perception, J.L. Alty points out that music is usable as the main means of communication, with three centres of interest: the communication of musical algorithms, debugging, and communication for blind people [10]. Regarding this third area, A. Darvishi uses sound synthesis in a virtual environment accessible to the blind, each sound being the result of a particular configuration of the environment [9]. One of the problems of this approach could be the difficulty to convey precise information with sound synthesis, because of its very abstract nature, not really suitable for communication. However, there are various ways of arriving at a fuller level of communication. For example, B.N. Walker manages to communicate numerical data via a musical abacus [11]. In addition to scientific studies, other ways of investigation may be very helpful.

2 The Influences of Multimedia Experiments and Video Games

Audio games are not the only interactive enjoyment. We will now study how interactivity works with musical toys and what is the importance of language in them. They could be a good source of inspiration for working on the first contact between an audio game and its users. Then we will consider video games because some of them present interesting learning processes. Both multimedia experiments and video games could provide clues for the design of audio games without language.