Chapter 35
Contribution to Mobility and Orientation Teaching Programs:
Assistive Technology Equipment and Tests Methodology

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ABSTRACT

The long cane widely used by blind people in their daily locomotion works as an extension of tactile sense. However, it does not supply the need to read elements located above the waistline, commonly found in urban centers, and which represent physical constraints. Those constraints, such as pay phones, awnings, dumps, and others may cause accidents, transmitting insecurity. This chapter describes the assistive technology project named Electronic Long Cane, which has been developed as a mobility aid for blind or visual impaired people in open urban spaces. The approach includes an ergonomic design along with embedded electronics placed inside the grip of a traditional long cane. The device, through haptics, warns of obstacles above the waistline, avoiding potential collisions, therefore leading to better surrounding perception and safer locomotion. There is a discussion upfront on the efforts towards improvement of the interaction between visually impaired people and the urban environment through experimental methods. The related evaluation was carried out by voluntary blind people along with experts on mobility techniques. A detailed analysis of touch technique, which is the basis for consequent design of white cane, is also presented.

INTRODUCTION

Realizing the space implies living it somehow, and regarding visually impaired people, that experience must necessarily be provided in the safest and most adequate way considering the characteristics and needs of each individual. So, all the efforts towards improvement of the interaction process between the visually impaired and the urban environment are advisable. In this context assistive technologies emerges.

Assistive technologies for urban spaces have been conciliated to attend visually impaired people. They are usually featured by integrated solutions and attempts to increase the interaction with the complexity of the surrounding space, providing significant improvement in their life quality (Hersh & Johnson, 2008).

This process, in most cases, necessarily goes through the knowing of Mobility and Orientation techniques. Teaching programs of Mobility and Orientation for visually impaired people, through their techniques, helps then to actively experience the urban spaces, and to do so they necessarily go through a process that depends, at first, on overcoming difficulties associated with the absence of vision, so that, along with their family and friends, they can, in an independent and gradual way, enjoy the spaces that are part of their day by day (Felippe & Felippe, 1997).

The long cane or Hoover's cane, as it is also known, is an indispensable tool for Mobility and Orientation teaching purposes in order to achieve an independent locomotion, mainly in open urban spaces. But, in an earlier work, Hoyle et al.. (2004) observed that traditional long cane, widely used by blind and visual impaired people, did not detect all the physical obstacles above the waistline. So, to prevent a possible collision, an electronic complement could be considered. That electronic system, should detects obstacles above the waistline giving some feedback information to avoid a collision. These were the basics of the *Electronic Long Cane Project* here described.

In this regard, the study, which may collaborate with visually impaired people in the perception and management of information related to urban spaces, gain relevance increasing the possibilities of social inclusion and life quality improvement for people who have some kind of restriction, circumstantial or permanent.

The arguments presented so far demonstrate the relevance of the present study. This task, added to the efforts made to guarantee the continuous introduction of accessibility criteria in cities configuration aims to contribute for the provision of information about the open urban spaces and the visually impaired people's perception, orientation and transport process during the use of these spaces, in particular. An important support for the proposal is offered by Dischinger & Ely (1999, pp. 1), by considering that "one of the most advanced research fields in the search for solutions to improve the accessibility to urban public spaces for visually impaired people is the design of instruments that allow obtaining spatial information through non visual means".

The goals of the chapter are to introduce the assistive technology *Electronic Long Cane* and analyze its contribution concerning the visually impaired independent locomotion in open urban spaces. For this purpose, an experiment was setup with situations commonly found by blind people, making use of the equipment developed and having its efficiency analyzed in what concerns the provision of information related to the presence of physical constrains located above the waistline.

Professors and impaired people, from important Brazilian institutions, participated during the validation process which is an unpublished experience in this country.

BACKGROUND

Urban open spaces are complex and dynamic environments in which multiple and simultaneous events are recorded. Most of these environments

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