Chapter 5
An Overview of Accessibility and Usability of Educational Games

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ABSTRACT

This chapter presents an overview of accessibility and usability for educational computer-based games and the first survey of the accessibility and usability of digital educational games. The overview includes a discussion of accessibility and usability, both in general and in the specific context of educational games, as well as a brief presentation of issues relating to game design, including of mobile games. Since there are no previous studies of the accessibility and usability of educational computer-based games, studies of the accessibility and usability of the related areas of virtual learning environments, digital games for entertainment and PDF documents, are also presented. The overview of accessibility and usability and the results of the survey are used to draw up a structured list of 62 guidelines and recommendations, organised into three categories at the first level and ten at the second level. These guidelines and recommendations are illustrated by an example of their application to a fictitious new educational game.

INTRODUCTION

Aims and Objectives:
Learning through Games

A combination of increasing interest in learning through games and advances in Information and Communications Technologies (ICT) have led to the development of a number of computer-based educational games and gaming environments. This

trend is likely to continue. There is also increasing recognition of the needs of disabled students and the importance of integrating them into mainstream education, as well as the importance of doing this appropriately and the associated requirement for adequate resources to support this. This makes it imperative to consider the requirements of disabled students (and staff) to ensure their full inclusion while the development and dissemination of educational computer-based games and gaming environments are still at a relatively early stage.

This raises the issues of whether and, if so, how best such approaches can be used to support disabled learners. Thus, it is important to understand the underlying pedagogical assumptions on which the particular course topic or module and the use of educational digital games are based. This will also require consideration of the affect of these pedagogical assumptions on disabled students and whether it will be necessary to modify some or all of them to enable full inclusion of all disabled and non-disabled students. In addition, guidelines will be required to support the development of high quality accessible and usable educational computer-based games. Discussion of the associated resource implications is beyond the scope of this chapter.

Therefore, the overall aim of the chapter is increasing understanding of the conditions to be met for good practice in designing educational gaming environments which are effective, fun to use and fully accessible by disabled (and non-disabled) students. Specific objectives include an introduction to accessibility and usability issues for computer-based games and gaming environments, with a particular focus on the accessibility and usability requirements of disabled people. Other objectives include a presentation and evaluation of the state of the art with regards to the development of educational computer-based games and their usability and accessibility, and the development of guidelines and recommendations to be followed.

The Social and Medical Models of Disability

The context in which educational gaming (and other) technologies for disabled (and non-disabled) people are developed is influenced by definitions of and attitudes to disability. There are two main approaches, the medical and social models.

The medical model is based on the international classification of "impairment," "disability," and "handicap" (sometimes referred to as the ICIDH model) developed by the World Health Organisa-

tion (WHO, 1980). It views disability as residing in the individual and focuses on the person's impairment(s) as the cause of disadvantage, leading to the approaches of occupational therapy and rehabilitation. It should be noted that organisations of disabled people dislike the term "handicap," and it should not be used.

The social model of disability emphasizes the physical and social barriers experienced by disabled people (Swain, et al., 2003) rather than their impairments and considers the problem to be in society rather than the disabled person. It comprises the two concepts of impairment and disability, with "disability" defined as the loss or reduction of opportunities to take part in the normal life of the community on an equal level with others due to physical, environmental, or social barriers. The social model is compatible with the empowerment of disabled people and user-centred and participative design approaches (Damodaran, 1996; Rowley, 1998). It was first developed by the Union of the Physically Impaired Against Segregation (UPIAS, 1976) and then modified by the Disabled Peoples International (DPI) (Barnes, 1994). In the social model, it is the steps that are the problem not the wheelchair or the lack of large print books rather than the person's eyesight.

The importance of the social model was recognised in an update of the WHO classification system. In the new version, commonly termed ICIHD2, the terms "impairment, disability and handicap" were replaced by "disability, activity and participation" (WHO, 2001). While disablement is considered to be the result of the interaction between an individual's health and contextual factors, the individual's condition rather than external factors are still the main driver of the classification. This differs from the social model in which impairment is considered simply to be part of human diversity, but disability is recognised as being created by social and community environments that have been designed without taking the needs of disabled people into account.

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