

# Web 3D Challenges on the Socialization and Integration of People with Activity Limitations

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**Abstract.** The Web 3D presents theoretical possibilities to render many physical and mental disabilities disappear. It allows users to do things they may not be able to do in the real world. This paper examines the requirements regarding accessibility and discusses the impact that 3D worlds could have on the socialization and integration of people with special needs.

**Keywords:** Web 3D, Accessibility, Second Life, haptic devices, socialization.

## 1 Introduction

Humans, like most other animals, are by nature social creatures. From the time of birth, to the time of death they continuously learn, evolve and change in order to adapt to new situations and conditions. These processes dependent heavily on the availability of a community in which a person is immersed and from which s/he is inspired, encouraged or forced to comply with always changing conditions. People with any type of special needs, in addition to their disability they also suffer from some sort of deprivation in their potential to socialize and interact with other members of their communities. This deficiency influences more domains of their lives than those directly affected by their specific disability. Disability affects on the average 15-20% of every country's population. There are at least 650 million people with disabilities worldwide [1]. Conflict and poverty continue to cause high rates of disability in the less developed world. The incidence of disabilities in the developed world is however increasing in parallel to their population's aging. In their 2000 Eurostats, the European Parliament estimated that there were 37 million disabled people in the EU [2], or around 11% of the population. This figure was predicted to rise by 2020 to around 18% of the population [3]. Yet, recent Eurostats [4] bring the percentage already up to 16%. Every country calculates the number of disabled differently. However, it would be safe to estimate that 1 in 6 is disabled. This is an enormous percentage. The smooth integration of these members in the normal life and working forces of society is a must. It is also important that issues of accessibility have become a high priority on the EU-Commission's Agenda [5].

Despite the significant progress achieved towards developing awareness and taking practical steps to conform with EU directives, many products and services are still not made accessible to people with disabilities that need them the most. The "design for

disability” and “design for all” concepts have not made it into the designers’ labs. Moreover, most current applications of accessible and/or assistive technologies have focused on “correcting” physical and/or mental disabilities to facilitate “normal” behavior within the context of real-world environments. For example, early applications aimed to develop hearing aids and limb prostheses. The wide availability of broadband and mobile technologies has created new spaces within which people interact. The mobile phone and simple applications that come with the Internet such as Email or chatting connect the world in ways we never knew before. However, individuals with physical or mental limitations many not be able to access, use and benefit even from such “undemanding” technologies. Web 3D brings new challenges. While the opportunities are significant, the obstacles to accessing them become even more complex. This paper focuses on the challenges and requirements for the socialization of people with activity limitations when immersed in Web 3D environments.

### **1.1 Understanding the Meaning of Socialization**

A simple search for a definition of the term “socialize” reveals a great diversity of meanings and interpretations. For example, Dictionary.com defines socialization as “a continuing process whereby an individual acquires a personal identity and learns the norms, values, behavior, and social skills appropriate to his or her social position” [6]. If we apply this definition to a person with special needs, it would entail that the person has to learn to behave according to his or her position. Because his or her “position” is inevitably influenced by his or her disability, the definition implies that the person has to “conform” to his or her condition. In other words, it places the responsibility only on the individual and not on the society. This definition regards the individual as a passive element who has to socialize within the limits of one’s physical and mental abilities. The emergence of immersive 3D virtual environments presents however new opportunities. The “disabled” doesn’t have to be disabled in the virtual world. This becomes a matter of choice and not a matter of imposition. Therefore, the individual is no longer obliged to “behave according to his or her position!” The Webster’s New World College Dictionary definition of socialization is probably more appropriate for the occasion. It defines socialization as the process of “adjusting to or making fit for cooperative group living; adapting or make conform to the common needs of a social group; to fit for companionship with others; to take part in social activities” [7]. Especially the last two definitions underline the relationship with the others, thus making it clearer that socialization depends also on the “others’ behaviors.”

The Businessdirectory.com defines socialization as a “process by which individuals acquire the knowledge, language, social skills, and values to conform to the norms and roles required for integration into a group or community. It is a combination of both self-imposed (because the individual wants to conform) and externally-imposed rules, and the expectations of the others. In an organizational setting, socialization refers to the process through which a new employee ‘learns the ropes,’ by becoming sensitive to the formal and informal power structure and the explicit and implicit rules of behavior.

Despite their distinctions, most definitions regard socialization as an act of survival. However, they make clear that for socialization to take place, the individual has

to be able to interact with other members of his or her community. For people with activity limitations, it is therefore important that we consider possible obstacles to normal interactions. When immersed in virtual 3D environments, the obstacles are different from those in real life.

## 2 Virtual Worlds for People with Activity Limitations

Virtual worlds allow users to do things they may not be able to do in the real world. Most virtual worlds are accessible through the Internet, such as the most popular Second Life, Active Worlds, World of Warcraft, Entropia Universe, Sims Online, Everquest, EVE online, There, Moove, HiPiHi, etc. Others depend on game consoles such as the Xbox, PlayStation, Nintendo and analogous. Some are free; others come at a price [8]. All these environments are referred to as Massively Multiplayer Online Games (MMOG), even though some of them can hardly be considered “games.” In most games, like for example World of Warcraft, players assume the roles of in-world heroes as they explore, adventure, and quest across a vast world. Games have a clear, goal-oriented structure. On the other hand environments such as that of Second Life do not have a narrative. “Avatars are ‘infinitely customizable’ and the environment can be modified in almost any way its landowner wishes to; Second Life is a 3D online digital world imagined, created and owned by its residents” [9]. Leaving bodies and real-world identities behind, they are creating new realities as they go [10]. A physically disabled individual, a deaf or blind person, or a victim of cerebral palsy who is now slower in his or her reactions and memory retrieval abilities can leave all disabilities behind. In Second Life, one can “create” a new identity, can “occupy” a new body; one can even “fly” and enjoy supernatural power. This is what one experiences when immersed in such environments. However, it is not always the case that such supernatural powers are accessible to all; because, people with some form of disability might have also difficulties navigating and communicating within a virtual environment. Consider for example a blind person trying to move around in a 3D virtual world. Or consider a mentally slow person trying to keep up a conversation in a chat box. Or consider a paraplegic trying to control the movements of his/her avatar through the arrow keys of his computer.

### 2.1 Accessibility in Web 3D

Technology can become in itself an access barrier for people with special needs. People with any sort of disability are excluded from web-based communities when the technology does not cope with the required functionalities to support their interaction. With the appropriate technological support, users with special needs may meet the social requirements, which are traditionally considered success factors for web-based communities [11]. The authors of the above observations, carry on to argue that in order to guarantee that democratic participation can be accessed by all community members, who have not been trained in usability and accessibility criteria, one should: (1) engage community members to guarantee contents accessibility by applying some contents accessibility guidelines; (2) exploit an open and flexible architecture that provides accessible services, namely EU4ALL architecture. Kelle and Garcia include the principle

of accessibility to the well-accepted challenges for multimedia research [12]. Rowe and Ramesh in their ACM Report on Future Directions in Multimedia Research [13] place top priority on “making authoring complex multimedia titles as easy as using a word processor or drawing program.” Considering also the immersive VR factor of a 3D world, the authors suggest as the second ‘grand challenge’, “to make interactions with remote people and environments nearly the same as interactions with local people and environments.” Kelle and Garcia take this a step further and extend requirements adding the often-overlooked principle of accessibility. Creating an immersive VR experience that heeds at least most of the requirements of the W3C Web content Accessibility Guidelines [14], [15] is suggested by the authors as the third ‘grand challenge’.

Despite the wide availability of broadband technologies and the emphasis given to issues of accessibility by the European Commission itself and by the W3C community, successful applications are still missing. Two COST Actions in Europe, Cost219ter: Accessibility for All to Services and Terminals for Next Generation Networks and Cost298: Accessibility for All to Services and Terminals for Next Generation Networks, have used structured dialogue to identify the obstacles which prevent them from developing applications and benefiting from broadband technologies despite their wide availability. The results published in various occasions can serve as model for further work [16], [17]. The authentic and true engagement of all stakeholders not only in the design phases of projects, but moreover in the preceding discussion and exploration of the obstacles is considered instrumental for successfully dealing with the obstacles [18].

## 2.2 Haptic Devices

The potentials of using haptic devices to support people with special needs have been considered since the end of the nineties. They have mostly focused on the blind. However, very few projects have been focused on using haptic devices to navigate in virtual worlds [19]. The recent developments in virtual 3D world technologies created a pressing need to develop technologies that could support individuals with activity limitations interact with others in-world. A promising approach involves gaze-driven control of one’s avatar [20]. This area is open to innovation and creativity. Future products will be of great value for the aging and for all types of disabilities.

## 2.3 What Do People with Special Needs Say?

Although both relevant research as well as professional applications that facilitate the normal integration of persons with disabilities in virtual worlds is still in their infancy, there are nevertheless numerous reports in the literature from people who experience its benefits. For example, Simon Steven, who suffers from cerebral palsy, says “for some disabled people, Second Life is an opportunity to escape from their impairment” [21]. Second Life citizen, Niels Sopor has found an opportunity to forget his physical disability and experience walking life through his avatar. Second Life has also provided Niels with the tools to express himself in artistic ways denied him in real life. He has, for example, been able to hold a camera in Second Life and take photos and make short movies [22]. According to the same report, David Wallace, a quadriplegic, has found everyone he met in Second Life to get along and be accepting. This is

partly because the prejudices stereotypes of others towards people with disabilities are simply not there. Also Aka Simon Walsh, another Second Lifer who is a cerebral palsy patient, felt so comfortable in the virtual environment that he decided to keep his wheelchair and carry it with him when the dances in Wheelies, the nightclub he operates in Second Life [23]. In sum, even though the number of reports is very small, almost all of them are positive. Thus, people with special needs encourage us to work in this field and make 3D worlds more accessible to them.

### 3 Conclusions

Virtual 3D worlds offer magnificent opportunities and present significant challenges for people with activity limitations. Not only there is a moral and legal obligation to include this part of the population in the emerging Information Society, but there is also a growing awareness in the industry that disabled and elderly people can no longer be considered as insignificant in market terms [24]. The literature has already a small number of reports grounded on empirical findings from persons with special needs. To take full advantage of new opportunities, it is however necessary that such environments feature interfaces rendering them accessible. Making contemporary Web 2, web 3D environments and mobile technologies universally accessible can serve close the gaps not only between people with differences in their physical and mental abilities, but also the educational, economic, political and other gaps across our planet [25]. As Pier-Luigi Emiliani observes most discussions regarding technological interventions on behalf of people with disabilities for their integration within the information society are presently being carried out without an in-depth knowledge of the problems that they will have to face [26]. More research is needed, especially to define the differential requirements regarding design issues for different types of disabilities. Finally, the proactive development of “Design for all” products is much more promising strategy compared to our currently reactive approach of developing adaptive interfaces to existing products, simply because technology change accelerates [27].

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