Chapter 21
3D Assistive Technologies and Advantageous Themes for Collaboration and Blended Learning of Users with Disabilities

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ABSTRACT

The significance of newly emergent 3D virtual worlds to different genres of users is currently a controversial subject in deliberation. Users range from education pursuers, business contenders, and social seekers to technology enhancers and many more who comprise both users with normal abilities in physical life and those with different disabilities. This study aims to derive and critically analyze, using grounded theory, advantageous and disadvantageous themes, and their sub concepts of providing e-learning through 3D Virtual Learning Environments (VLEs), like Second Life, to disabled users. Hence providing evidence that 3DVLEs not only support traditional physical learning, but also offer e-learning opportunities unavailable through 2D VLEs (like Moodle, Blackboard), and offer learning opportunities unavailable through traditional physical education. Furthermore, to achieve full potential from the above-mentioned derived concepts, architectural and accessibility design requirements of 3D educational facilities proposed by different categories of disabled students to accommodate for their needs, are demonstrated.

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INTRODUCTION

The ultimate goal of this research is to analyze factors enhancing disabled students' blended learning experiences comprising of both face-to-face and online courses. The research focuses on the investigation of:

1. Educational prospects that can help achieve maximum assimilation, achievement and enjoyment from e-learning within 3D Virtual Learning environments such as Second Life.
2. Finding the effect of 3D virtual architectural design elements of learning spaces on students and their e-learning experience.

The driver for emphasising on the above areas is recognising the design characteristics of the learning space as one of the vital aspects recognised in affecting students' physical learning. This would hence allow reaching best practices in virtual architectural design of 3D educational building facilities. Subsequently it would most definitely help increase the accessibility of the learning space and make it more suitable and desirable for the benefit of students and augmenting their e-learning experience within virtual worlds.

This research applies to multiple sectors of disabled students in higher education e.g. large universities (under-graduate and post graduate student), community colleges, adult education and ongoing researchers. This study is also not specific to Second Life but rather general to 3D Virtual worlds in general since the psychological impact of the design of a 3D virtual learning space on its users is universal in any virtual world.

Online 3D Virtual Learning Environments (3D VLEs) have been since their onset a receptor for virtual campuses, built by hundreds of universities such as Harvard, Princeton, and Oxford. Innovation in educational techniques within these virtual existences offer e-learning opportunities for all diversities of students in many fields including science, medicine, engineering, business, law, computer science, humanities and many more (Kay, 2009). Such opportunities include experimentation, teleporting between sites, flying, game-based activities, role-play, modeling and co-creation, immersion, critical incident involvement, medical training and many other practices. This has reaped noticeable participation, satisfaction and hence achievement from students (Calongne, 2008). Through 3D VLE online courses, online avatars allow students and their instructors to interact synchronously by audio, text chat and other media presentation techniques (Butler & White, 2008). It thus becomes imperative to utilize the merits and drawbacks of delivery of e-learning within these environments to encourage blended learning. The appearance of digitally inclined generations of students, some of which are confined due to disability and whose refuge to a more able life is through technology, whom Prensky (2001; 2007), Oblinger and Oblinger (2005) refer to as "Digital Natives, "Games Generation" and "Millenials", deems it rational to anticipate that in order to boost future learning, these students will be encouraged to employ the game-like 3D virtual worlds, or VLEs like Second Life, Active Worlds and others to accommodate for new evolving learning style changes. These changes play a vital role in shaping future e-learning since "Today's students are no longer the people our educational system was designed to teach". This pedagogical transformation is considered beneficial even by researchers like Margaryan and Littlejohn (2008) who argue that students are not using technology effectively to support learning, but rather primarily for recreation.

This research helps demonstrating, by practical grounded theory evidence, the presence of three advantageous themes for using 3D VLEs to deliver education to disabled users:

- Proving that 3D VLEs augment and complement traditional learning techniques in physical classrooms to help reach higher educational achievement.

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