

# Chapter 7

## Cognitive Load and Disorientation Issues in Hypermedia as Assistive Technology

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### ABSTRACT

*Advances in information and communication technologies have raised the quality of inclusive education programs. Inclusive education, a recent advance in educational technology, has served to increase the ability of students with special needs. Hypermedia as an assistive technology has the potential to teach and train individuals with disabilities. However, like every technology, hypermedia itself is not problem-free. Disorientation and cognitive load are two of the most challenging problems related to hypermedia learning environments. The purpose of this chapter is to highlight disorientation and cognitive load problems in hypermedia learning environments where learners usually face a serious problem while navigating such environments.*

### INTRODUCTION

Information and communication technologies, and in particular computers, have an undeniable impact on integrating learners with barriers into the mainstream education system. One of the most useful information and communication technologies for teachers of individuals with disabilities is hypermedia learning environments (HLEs). Hypermedia learning environments can be the vehicle for inclusive education as an assistive technology (AT).

Hypermedia presents information in an interactive way, and it is accessible to all types of learners. It provides a combination of text, sound, graphics, and motion video that can be controlled by the user.

With a minimum of training, hypermedia can be used to create very individualized learning environments and tools. This gives teachers the capability to create computer programs to teach the specific objectives that are needed to advance their curricula and individualized learning plans. Hypermedia learning environments can also be used to compensate for some disabilities (Perkins, 1995).

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## **ASSISTIVE TECHNOLOGIES**

In today's information age, AT is not a luxury for students with disabilities. Assistive technology is a necessity for their growth and development. The use of AT enables these students to participate in activities typical of their age group. Assistive technology also provides a way by which these students can succeed academically as well as socially. Basically, the use of AT enables these students to do things and experience successes they would otherwise have been unable to do (Kelker, 1997).

Assistive technology provides creative solutions that enable individuals with disabilities to be more independent, productive, and integrated into the mainstream of society and community life. The benefits of AT have been recognized as a vital part of special education. Assistive technologies include devices used by children and adults with disabilities. Namely, these types of devices are designed to compensate for functional limitations and to enhance and increase learning, independence, mobility, communication, and environmental control and choice.

Weikle and Hadadian (2003) reported that there is valuable evidence supporting the use of AT devices for communication, as functional tools, to promote social outcomes, and as retention aids for learning activities in young children with disabilities.

The Technology-Related Assistance for Individuals with Disabilities Act of 1988 (Public Law, 100- 407, 1988) describes an AT device as "any item, piece of equipment, or product system whether acquired off the shelf, modified, or customized that is used to increase, maintain or improve functional capabilities of individuals with disabilities." In very basic terms, AT can be thought of as products that assist in eliminating the effects of a disability or most simply as products that make life easier for persons with disabilities. This broad definition comprises thousands of devices—both high- and low-tech—that can be

classified in categories such as writing, computer access, reading, communication, and electronic aids for daily living, mobility, and leisure. Ultimately, with this extreme amount of information, it takes adequate knowledge of AT to best determine the AT needs of students with disabilities.

As a category of Assistive Technology Aids and Devices, Educational and Vocational Aids include computers, adaptive software and job modifications. If used appropriately, AT can facilitate a child's development by providing access to developmentally appropriate activities (Simms, 2003). Behrmann (1998) emphasizes the importance of AT as a means of inclusion into age-appropriate classrooms as well. Assistive technologies can provide the tools to bring more young children with disabilities into the general educational setting (Behrmann, 1998). The benefits of AT for students are cognitive as well as social and emotional. Hetzroni and Schrieber (2004) state that with the use of a word processor, students were able to produce material that was more acceptable and coherent in comparison to prior work samples.

## **HYPERMEDIA LEARNING ENVIRONMENTS**

What is hypermedia? The history of hypermedia has roots traced back to 1945. Vannevar Bush proposed a machine called "Memex" in his *Atlantic Monthly* article titled "As we may think" (Dix, Finlay, Abowd & Beale, 1998). According to Bush, "a memex is a device in which an individual stores all his books, records and communications and which is mechanized so that it may be consulted with exceeding speed and flexibility. It is an enlarged intimate supplement to his memory" (Bush, 1945). After 50 years, Bush's vision turned into effective models. Today's technology allows reading, browsing, and linking in a non-linear electronic environment.

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