Chapter 4.8
Educational Gaming Avatars

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INTRODUCTION

Avatar (abbreviated *Av*) in online educational gaming refers to a virtual self or agent who, immersed in a real-time distributed, synthetic environment, vicariously collaborates and learns-by-doing, using virtual artifacts and peer networking to construct knowledge (Walker, 1990; West, 1994). Avatars can also be embodied agents, which are mathematical or computational formulae designed to accomplish specific goals in the online environment. Avatars, which can be 2D, 3D, or animated, are not limited, then, to humanoid or life-form representations in education; avatars can also be embodied in multimedia representations (Guynup, Broglio & Demmers, 2004) and in

computer software processes, such as *bots* and *AIs* (artificial intelligence). Technically speaking, an avatar simulates or embodies the human mind of the computer user onscreen, making the computer mouse the first occasion when a user's body enters the online environment (Biocca, 1997). No longer limited to a computer mouse, avatars in 2007 have varying degrees of photographic and behavioral realism, which can take the form of a talking head, such as *Ananova,* or can entail the physiognomy of a human being or other life forms, such as aliens, robots, and animals (*furries)*, who possess various kinesthetic abilities, such as walking and flying; communicative features, such as voice, eye contact, gesture, and attitude; and even the sense of hearing when an avatar is situated in a *soundscape.* Avatar capability and sophistication

vary greatly, depending on the software and the user's knowledge base and creative persistence.

As an educational concept, *avatar* transverses many fields: computer and scientific modeling; artificial intelligence; informatics; graphic design; anthropology; theater; behavioral science, including the psychology of play (*ludology;*) sociology; and kinesiology. Avatar use in civilian education is a new venture with limitless possibilities for expressive communication and human development, entailing a paradigm shift in how education is conceived and delivered (Owen, 1991; Tiffin & Rajasingham, 2003). Avatars offer education platforms intense interactivity with simultaneous *telepresence*; dynamic pictorial simulations; collaboration of geo-distributed partners; and social presence to garner the psychological and emotional investment of the learner. Role-playing, case studies, and *simulations* are common uses of educational avatars.

Avatar applications in online gaming continue to develop and expand and are expected to be an integral component of 21st century education world-wide, although many educators are resistant to avatars and educational games. Avatar use in mainstream education also has other obstacles, such as high-end technological requirements, development cost issues, high learning curves for avatar platforms, and ethical issues entailed with mimetic behavior in online classrooms.

BACKGROUND

The word *avatar* is derived from Hindi philosophy and refers to the bodily manifestation of a higher being in some form onto planet Earth (*Indopedia*, 2004). Internet adaptation of the word *avatar* is attributed to science fiction writer William Gibson, whose book *Neuromancer* (1984) depicts a computer network where users project their digital representatives (avatars) into a simulated world.

In 2007, avatar creation and development in K-16 education and life-long learning educa-

tion is based on the evolution of constructivist pedagogy and affordable technological advances (Dede, 1992); however, military, political, and knowledge-economy imperatives, along with the creative talents and proprietary interests of various industries, such as music, film and gaming, are also part of educational avatars' lineage. Government programs from the Clinton administration, namely, the National Information Infrastructure (NII), the product of the High Performance Computing and Communication Act of 1991, drive telecommunication and computer exploration and experimentation in educational gaming for effective learning, including avatars. Experimentation with educational gaming and virtual embodiment, however, has been conducted since World War II by the United States military and its defense contractors, which include higher education and private industry. Although much of the military work in simulations and avatars remains classified (Hausrath, 1971; Horn & Cleaves), the military conducted extensive research in constructivist pedagogy, using role playing and simulation. Distributed simulation, a powerful educational delivery mechanism, made public knowledge by the U.S. Department of Defense in the late 1980s, enables students to apply abstract knowledge by situating education in authentic, virtual contexts similar to the environments in which learners' skills will be used (Dede). Today, military institutions like National Defense University and National Strategic Gaming Center continue research and development in avatar use and publicly share some training material using avatars, such as *America's Army* and *TacOpsCav 4*.

Most people, however, are familiar with avatars through online entertainment gaming, made popular in the 1980s with graphical multi-user dungeons *(MUDs)* and massively multiplayer online role-playing games *(MORPGs)*. MUDs and MORPGs are 2D and 3D gaming sites that produce *immersible* environments for players, who then adopt avatars to interact virtually. Behavioral and morphological realism varies in these games

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