

## Chapter 42

# Application of Digital Technologies, Multimedia, and Brain–Based Strategies: Nurturing Adult Education and Lifelong Learning

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### ABSTRACT

*Teaching adult learners is challenging because the characteristics of adult learners and their expectations are different from children/early adolescence. Recent advances in digital technology offer various opportunities that are particularly useful in fostering adult learning by transforming traditional “live” classroom-based into “virtual.” This chapter aims to explore how the digital technologies affect the way the brain learns and memorizes, including cognitive, emotional, and behavioral dimensions to promote personal and professional development. First, this chapter presents the application of digital technologies that support and engage adult learners in enhancing knowledge acquisition and retention, discusses the specific engagement techniques for adult, along with the research on multimedia learning. This chapter also covered neuroscience studies related to brain-based learning and strategies. The opportunities and challenges of the use of digital technology and multimedia platform to be effective learning tools for academic context and lifelong learning are also presented.*

DOI: 10.4018/978-1-7998-8598-6.ch042

## INTRODUCTION

Digital technologies have become an indispensable tool in our life, but it still plays a minor role in education. Colleges and universities should seek out ways to integrate these new technologies into old-fashioned “live” classroom-based setting so that adult learners find it easier and motivated to learn new subjects/knowledge besides enabling educators to explain instructional contents effectively and present learning materials attractively by using multimedia presentation tools. Some of the most prominent technological tools are the personal computers, laptops, tablets, mobile phones, and interactive whiteboards. These advanced electronic tools can support meaningful learning through personalization, participation, and productivity (3Ps) that suits adult education and learning (McLoughlin & Lee, 2008). Explicitly, with the use of electronic tools, we can fine-tune the instructional method to make it more learner-driven by personal needs, choices and interests (personalization), more active involvement in learning by sharing ideas, opinions and solving problems (participation), and increases adult learner’s creativity and innovation skills by inducing curiosity to learn and further knowledge exploration that enable them to generate innovative ideas, knowledge and develop self-efficacy and expertise (productivity). Furthermore, social media is another catalyst for personalized learning setting, specifically through connection, collaboration, and knowledge sharing. For instance, social networking, online teaching, class blogs, wikis, and podcasting, *YouTube*, *Facebook*, *Twitters* increase collaborative communication and learning through social media by sharing ideas, opinions, videos, as well as comment on other’s plans and aspirations (Davidson & Goldberg, 2009). These new and portable technological tools make distance learning easier, allow faster feedback and collaborative efforts between peers and group of experts around the world. Furthermore, online teaching and learning (i.e., e-Learning) are fast-growing industry; many top universities like Harvard University, MIT, Oxford University and so forth are introducing online courses as the open-source learning platforms to enable educational innovations everywhere by connecting people and technology globally.

Moreover, individual differences among adults is another key factor in fostering adult education and learning. Every individual is different in terms of cognition, emotion, personality trait, learning style, language, cultural, and social behavior (Montag & Panksepp, 2017; Parasuraman & Jiang, 2012). Similarly, the human brain is unique and so every person is different that need different teaching approaches. Many other factors influencing one’s ability to learn and remember, including the level of attention, nutrition, physical exercise, reward, emotion, rehearsal (repeated practice) and so forth (further discussion in following parts of the chapter). However, how the brain learns and remembers still a controversial topic. The reason of the increased interest of educational psychology and neuroscience research is that to explore how information is being processed in the human brain and to investigate the underlying neural mechanisms related to learning and memory processes via functional neuroimaging techniques. These functional neuroimaging techniques are ranging from high spatial resolution like functional magnetic resonance imaging (fMRI) to a high temporal resolution such as electroencephalography (EEG) and functional near-infrared spectroscopy (fNIRS). Through neuroscience findings, it might offer significant brain-based strategies to improve instructional approaches and establish a conducive learning environment that supports lifelong learning for adults. As a result, adult learners curious about learning, feel excited about the new knowledge and prepare the brain to learn and remember.

The following of this chapter is organized as: first, presents the characteristics of adult learners and the recent application of technological tools to support teaching and learning This is followed by a discussion of the specific engagement techniques, along with Moreno’s Cognitive-Affective Theory

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