



BRAIN BASED LEARNING AND IT'S IMPLICATIONS FOR ONLINE AND MOBILE TECHNOLOGIES LEARNING

Vandana Maheshwari, Ph. D.

(Principal), Smt. Kapila Khandvala College of Education,

Abstract

Brain-based learning has devised a new discipline it is a comprehensive approach to instruction using current research from neuroscience. Brain-based education stresses how the brain learns naturally and is based on what we currently know about the actual structure and function of the human brain at various developmental stages. Latest neural research shows that educational techniques that are brain friendly provide a biologically driven framework for creating effective instruction. Issues concerning student learning involve how they accept, retain and process information delivered in a course. This paper briefly defines and describes brain-based learning, a theory that is under investigation in higher education, and offers suggestions on how that theory may be implemented in the delivery of information and facilitation of online and Mobile Instruction in higher education.

Keywords: Brain Based learning, Online Learning, Mobile Learning, Higher Education.



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The brain is “not only the control center of the entire human body, organizing our behaviors and biological functions, but it also is the seat of our humanity. It defines who we are, how we act, and the very nature of our species.” (Slavkin 2004, 38).

Brain-Based Learning: instructors are faced with new issues and challenges related to teaching in the online learning environment. Student learning is impacted by how the human brain accepts and processes information delivered in the course. The review of literature involves the exploration of brain-based learning, brain-based instruction, and online instructional design.

To understand brain-based learning, a study of brain cells is needed. The brain consists of many cells; one type, which is basic to learning, is the neuron. Learning takes place when two neurons communicate. When the neuron gathers information, it grows appendages called dendrites. More than 30,000 dendrites can fit onto the head of a pin (Sylwester, 1995). Dendrites constantly scan the information because the brain continually wants to learn. (It is sometimes hard to see the strong desire of the brain to learn in classrooms or online; however, the brain is always searching for meaning from gathered information and stimuli.) A synapse transmits messages between neurons via the axon (Sprenger, 2002). A synapse is a gap between the cells, an invisible bridge (Stevens & Goldberg, 2001) that allows the neurons

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to communicate as information travels through the brain. When neurons repetitively communicate with each other, a neural network is formed (Sprenger, 2002) and a pattern is repeated.

Physiologically, the genetic structure of the brain seeks for meaning, pattern interconnectedness, relevance and useful applications (Greenleaf, 2003) from its surroundings. It established the concept of neural plasticity; the brain's ability to constantly change its structure and function in response to external experiences (Wolfe & Brandt, 1998). As information and skills are collected, they are organized according to meaning related to the information. As a result, students learn in different ways due to their previous experiences, perceptions, and prior knowledge about the subject (Slavkin, 2002). Understanding how the brain learns and relating it to the educational field resulted in the concept known as brain-based learning. It is defined as any teaching technique or strategy that utilizes information about the human brain to organize how lessons are constructed and facilitated with emphasis placed on how the brain learns naturally (Slavkin, 2004). Brain-based learning offers a framework to enhance student learning.

Instructional Design – Online Classes

Instructional design is measured by how well the design supports and facilitates the achievement of the instructional objectives (Koochang & Du Plessis, 2004). It relies on learning models and theories that encourage learning and is considered by some an art and science that “brings the learner from the state of not being able to accomplish certain tasks to the state of being able to accomplish those tasks” (Broderick, 2001). Attention is shifting to concept of active learning that involves constructing new knowledge based on prior knowledge, real-world observation with real problems in real situations, and constructing interpretations of observations (Adler, 1998; Gagne et al, 1992).

Instructional design for online classes must include learning principles and conditions that meet the learner's needs (Egbert & Thomas, 2001). Key elements of instructional models for online classes include: learner consideration, learning task, learning content, content organization, instructional strategies, media, learning environment, assessment of instruction, materials for delivery and evaluation/feedback (Sherry & Morse, 1995; Moore & Kearsley, 1996; Simonson, et al., 2000). Recently, Koochang and Du Plessis (2004) developed an online model that demonstrates the interconnectedness of the instructional design (content), learning

(user) and usability (system). Instructional design for online classes is constantly being assessed and reassessed to determine quality learning outcomes.

Implications for Development/Facilitation of Online Classes and Mobile Learning

There are many suggestions for integrating brain-based learning into the educational environment that are applicable to online courses and Mobile learning. Following are four suggestions based on findings from neuroscience research: memory/retrieval, learning styles, increasing attentiveness, and the role of emotion in learning.

Memory and Retrieval

Students will remember content more if it is moved from short-term memory to long term memory through a technique called “elaborate rehearsal.” Class content, or a concept to be learned, can be contained in role plays, debates, video clips, art or music (Stevens & Goldberg, 2001). Some of these teaching strategies are easier to put into place in online classes. However, technology is making it easier every day.

Another technique to help students retain information via online classes is “chunking.” This is effective if students are required to recall lists of information. Chunking can be easily implemented into online classes through such areas as discussion points, downloadable handouts, and PowerPoint lecture notes.

Learning Styles

The brain uses its hundred billion plus cells to process information and images in many ways and on different levels. Most students have a preferred and a secondary modality for learning commonly called learning styles. These preferences involve receiving information through auditory, visual or kinesthetic means (Clemons, 2004). Ninety percent of learning is visual with eighty-five percent of the brain wired for visual processing. Rhythm/music allows us to encode information effortlessly. Music at 60 beats per minute may maximize retention (Lucas, 2004).

Increasing Attentiveness

The average learner attention span is 15-20 minutes -- depending on age, gender, and background. Learners, especially traditional-aged college students, have been conditioned to speed and quick sound bytes rather than prolonged learning tasks. The average student packs more into his/her workday than can effectively be managed. Online techniques can be used to minimize distractions and maximize attention.

The opening and closing of online session are the last bits of information remembered. Gain attention by using quotes by famous people that relate to content, humorous video clips (e.g. Muppets), post tests in the form of crossword or words search puzzles that contain key content terms and concepts.

Role of Emotion

Learning is strongly influenced by emotion. Strong emotion connected with an experience causes chemicals in the brain to send a message to the rest of the brain such as, “This information is more important. Retain it for future use.” However, if the emotion is too strong (usually dealing with a threat or stress) there is a decrease in efficiency of the rational thinking cortex of the brain and learning stops (Wolfe & Brandt, 1998). Blood moves away from the frontal lobes, thereby reducing the ability to think clearly or recall information. Peak learning happens when the brain is in high challenge and low stress (Lucas, 2004).

Realize that gender differences can impact learning. The male brain is great at hunting (e.g. video games) while the female brain is great for seeing, listening, memorizing, reading, nonverbal cues, and articulating emotion (Lucas, 2004).

Mobile Technologies Learning

University students are equipped with mobile phones and software that allowed teachers to send text-based, audio-based and video-based messages to the students. Data was collected using questionnaire, focus groups and log files. The study concludes that students prefer to have information and learning content sent as text.

Mobile technology is currently the most useful as a supplement of ITC, online learning and other traditional learning methods, and is playing a central role in enriching the learning experience. It is now widely believed that it has been proven in the various countries that mobile learning could and has been a huge factor in getting disaffected young adults to engage in learning, where traditional methods has failed to do so. This is the new learning society and everything is changing rapidly – the market, the need and the people. Therefore, Mobile Technology is the future learning technology..

The use of mobile technology allows for cloud teaching where access to people, resources and information will float freely regardless of location (Sutch, 2010). The uses of mobile technologies are changing the way we live and how we access education. Countries around the world are starting to see that Internet access anywhere and anytime is a human right

for citizens and have set goals to establish the infrastructure to allow access by all, which will facilitate the use of mobile technology in education.

Mobile learning is not about the technology, it is about the learner. The learner is mobile and is at the centre of the learning, and the technology allows the learner to learn in any context.

Teacher training must be re-invented to prepare teachers for the technology-enhanced educational system. Education must examine the way educational resources are designed and delivered and take into consideration the needs and characteristics of current and new generations of students.

Mobile learning can transform pedagogy to cater for new generations of learners because it offers the opportunity to use active learning strategies and for learners to learn in their own context, which will result in higher-level learning (Cochrane, 2013; Stoerger, 2013)

Student learning is impacted by how the human brain accepts and processes information delivered in the course.

There are several more ways by which both students and Teachers can creatively use online and mobile technology in the classroom. Originality and designing of materials, stimulate emotions with such techniques as excitement, fun, curiosity, anticipation, or surprise to enhance learning. Interaction will enhance attentiveness in online courses. It can increase productivity and help us achieve greater results in our work, thereby making us effective. Brain-based learning offers a framework to enhance student learning.

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