The Role of Multimedia and Hyper Media in Enhancing Information Processing Ability of Learners

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Abstract

Information processing ability is the uniqueness with which an individual perceives the concept of information that is conveyed having diversity of meanings from everyday usage to technical settings by means of mental stimulus. Human mind acts as a software and brain as hard ware in information processing and is closely related to cognitivism, "a theoretical approach in understanding the mind, by quantitative , and scientific methods" similar to a mechanical speaker converting an electrical signal in to sound waves the organic human brain transforms the information received as sensory input, to Thinking, learning & memory by binding the information chemical molecules to receptor site proteins on nerve cells forming neural networks or circuits which contain thoughts, memories, knowledge and skills. In this paper the importance of the usage of multimedia and hypermedia to enhance the information processing ability has been highlighted.

KEYWORDS: Cognitivism, Information Processing ability, Multimedia and Hypermedia

Introduction

Information processing ability is the uniqueness with which an individual perceives the concept of information that is conveyed having diversity of meanings from every day usage to technical settings by means of mental stimulus. (Williams, C. K. I. & Rasmussen, C. E. (1996)).Thus it is possible to define information processing as an approach to the goal of understanding human thinking or cognition. (Rumelhart, D., & McClelland, J. (Eds.). (1986). Human mind acts as a software and brain as hard ware in information processing and is closely related to cognitivism a theoretical approach in understanding the mind, by quantitative , and scientific methods. Similar to a mechanical speaker converting an electrical signal in to sound waves the organic human brain transforms the information received as sensory input, to Thinking, learning & memory by binding the information chemical molecules to receptor site proteins on nerve cells forming neural networks or circuits which contain thoughts, memories, knowledge and skills. (Marks, L.E, Elgart, B.Z, Burger, K., & Chakwin, E.M. (2008). This process takes place throughout the entire body via information chemicals called neurotransmitters, neuro-peptides and hormones. This ability of content-general information processing is developed naturally due to the presence of a number of content specific circuits in the

human brain. (Fjeld, M., Bichsel, M., & Rauterberg, M. (1998). There fore, it is believed that newborns and infants possess many more innate information-processing abilities. As we grow older the information processing ability grows, the out come of this is called learning. Learning takes place to a best extent under challenging circumstances with a strong success belief (Kolb, D. A. (1994) .At the same time we learn worst under threatening and helpless circumstances. These two states represent different configurations of neuro-chemical processes in the brain that is physical responses in the body and psychological states of mind. The human brain is designed to scan information through the senses, processing and storing it, and retrieving it when necessary. It has a natural ability to detect patterns and a natural need to discover meaning; it possesses various memory pathways; and it allows us to correct ourselves and learn from experience (Bennett, M.R. & Hacker, P.M.S. (2003). Many evolutionary biologists and evolutionary psychologists now believe that the human brain contains many functionally-specific or context specific information-processing/behavioral circuits which do not dictate but strongly predispose us to think, feel and behave in certain ways. Earlier research suggests that performing a challengeable task produces the hormones adrenaline and nor adrenaline (Foster-Deffenbaugh, L. A., (November, 1996). At the same time being successful and confident also raises levels of the brain neurotransmitter serotonin and puts us in a good mood. While failing and feeling inadequate lowers it and causes the psychological state of hopelessness and despair.

To enhance the information processing ability it is an indispensable task for the teacher to adopt implicit relationship between good learning techniques and the sequence in which the brain processes the information (Reber, A.S., Kassin, S.M., Lewis, S., & Cantor, G. (1980). The present research study focuses to explain the implementation certain learning techniques at the conscious level influences the information processing ability. It also emphasizes that the process of learning are concerned with how we learn rather than what we learn. These processes are sometimes referred to as thinking skills or learning to learn skills as suggested by (carol McGuiness 1999).The major components of thinking skills that could promote "learning across curriculum are 1) information processing skills: Locates and collects relevant information : sort, classify, sequence, compare, contrast and analyze by part/ whole relationships. 2) Reasoning skills: Gives reasons for opinions and actions, draws inferences and makes deductions, use precise language to explain what pupils think and make judgments and decisions informed by reasons or evidence.3) Enquiry skills: Ask relevant questions ;pose and define problems; plan what to do next and how to research; predict outcomes and anticipate responses; test conclusions and improve ideas. 4) Creative thinking skills: Generate and extend hypotheses to apply imagination; and look for alternative innovative outcomes.5) Evaluation skills: Evaluate information; judge the value of what the pupils read, hear and do; develop criteria for judging the value of their own and others' work and for having confidence in their judgments. The learning techniques implemented in the present study promotes the components of thinking skills for eg in the first component namely : information processing skill ,the learners are trained to use techniques such as attribute listing,metaphorical thinking ,synectics,and journey method. Second component of

thinking skill involves learning techniques namelylateral thinking ,Ideatoons. The third component involves techniques such as brain storming ,mind mapping The fourth component involves lateral thinking ,visual imageryand fifth component involves brain storming and mind mapping .Carol MCGuiness(1999)sugested that by integrating effective learning techiniques in teaching learning process could aim for the desired goal .Ellis(1985) defined learning technique as "how an individual perceives, comprehends, organises, and recalls infrmation.Carl jung (1954) viewed that there were different ways in which individual perceive the information , make decisions,and think about what they perceived.hence forth the learning techniques are unique in their respective style to cater the needs of different types of learners.Kolb(1984) in his theory suggested that the learning techniques provide i) Concrete Experience (CE);where information is taken in through direct experience .ii) Reflective Observation (RO) ; where learning is less active than in the concrete dimension, consisting og observing, gathering and analysing information. iii) Active experimentation(AE) ; where learning involves finding practical solutions to problems and iv) Abstract Conceptualization(AC); where logic and abstract thought are a feature of learning.He also suggested that the visual .Auditory, and kinaesthetic learners using these three channels for receiving the information are benefited by the learning techniques.

The role of the brain

Advances in medical science and technology made it possible to structure and function of the human brain in great detail. Techniques such as Magnetic Resonance Imaging(MRI) and Positron Emission tomography (PET) scanning provide accurate pictures of brain activity leading to the identification pf specific areas of brain that are responsible for aspects of individual's learning and behavior. The brain can be divided in to three parts. The brain stem; the cerebellum and cerebrum. The brain stem is often called the " primitive brain" as this type of brain is found in all animals. In humans, this area of the brain is related to vision and hearing.The mid brain (the medulla) maintains vital functions such as breathing and heart beat . The cerebellum (little brain) is associated with movement ,posture and balance.The cerebrum (higher brain) is divided in to two hemispheres (left and right). The cerebrum is divided in to four lobes each of which is maintains the following actions.

The frontal lobe (problem solving, abstract thought, voluntary movement).The parietal lobe (touch, understanding sensory information and some aspects of language and reading). The occipital lobe (vision) and the temporal lobe (hearng, auditory memory and memory in general).

Brain cells are the means by which messages are sent and received by the brain. There are two types of brain cells namely; i) Glial cells and ii) neurons. Glial cells carry nutrients and speed repairs. Neurons contain axons for sending information and dendrites for receiving information. They are connscted to each other via synapse, which is the gap between the two neurons. Therefore a synapse is a junction between an axon of one

neuron and dendrite of another. Messages are sent across synapses by neurotransmitters. These are " chemical messengers"that transport elctrical signals from one neuron to another. Neurotransmitters can either excite or inhibit neuron activity. For e.g Serotonin regulates learning and emotion; and Dopamine regulates sensations of pleasure). The number of neurons remains fairly constant throughout an individual's life but the number of synaptic connections is subject to change depending on the levels of neurotransmitters.There are two processes that are important in the relationship between the brain functioning and learning namely ; Synaptogenesis and prunning. Synaptogenesis is the process of forming new connections between neurons, and prunning involves removing weak contacts and strengthening others.The saying " use it or lose it" is applicable to human brain. In order to understand the structure and functionof human brain in teaching and learning process to effectively enhance the information processing ability of an individual, could be possible by bringing changes in brain's connectivity via changes in potentiation at the synapse or via the strenghthening pruning . There fore, successful teaching and learning directly affects the brain function by changing the connectivity (Goswami2004).

The impact of Mulmedia and Hypermedia on Information Processing

Research on multimedia and related instructional technologies over many years has been characterized by inconsistent findings about their effects on learning. Multimedia usage in a class room provides visual input, auditory input, learner control, attention, working memory, motivation, cognitive engagement, intelligence, reflection, and long-term storage, each of which is either an intervening or moderating variable or in some cases both. Clark(1983) concluded that "Media and their attributes have important influences on the cost or speed of learning but only the use of adequate instructional methods will influence learning . Similarly usage of Hypermedia provides Cognitive psychologists' digital database to examine the comprehensive processes involved in human information processing, and critically, how information is stored in memory. These findings can be applied to issues inherent in the conceptualization and implementation of digital libraries. It is said that Digital libraries can serve as rich test-beds for cognitive theories, while cognitive theories can inform design specifications for digital libraries. Reimann, P. (2003). Suggested the usage of hypermedia offers researchers an opportunity to consult more information sources. The exposure to these knowledge resources enables learner to improve his/ her information processing ability. (Moore Hart M.A. 1995) suggested that Student-centered learning activities are designed to provide students with opportunities to take a more active role in their learning by shifting the responsibilities of organizing, analyzing, synthesizing, and evaluating content from the teacher to the student . Usage of multimedia and hypermedia enables with opportunities to learn and practice group management and decision making skills as the result of enhanced information processing ability.

Objectives of Study

➢ To find the impact of multimedia and hypermedia in enhancing the information processing ability.

Research Questions

➢ How the usage of multimedia improves information processing ability?

➢ What is the impact of hypermedia on information processing ability?

Sample

The experimental study was conducted on a group of engineering students (boys and girls) in the age group 19 -21 years. The students were exposed to the usage of multimedia and hypermedia in teaching and learning a particular unit in engineering Chemistry.

Methodology

A standardize questionnaire consisting of 30 statements to evaluate the impact of multimedia and hypermedia in enhancing the information processing ability was distributed to students and were asked to read the statements carefully to tick the options yes/no. The scores obtained as the result of survey was statistically analyzed to interpret the results.

Results and Discussions

The scores revealed that majority of the students find the usage of multimedia and hypermedia enables them to grasp the information given to them. The observation has been supported by the following evidences as follows. (Holden and Holmes, 1995) suggested that the development of digital technologies impacts on the nature of learning and literacy. To maximize the instructional effectiveness in a multimedia environment, educators must remember two basic features of learning. First, students learn more often through social interactions; and second, the nature of the Net and the Web encourages superficial explorations of data. Educators must develop teaching strategies that ensure the usage of multimedia in this new learning environment. Many experts see the computer, combined with multimedia capabilities, as the new tool that can transform education.

Conclusions

Multimedia puts the sizzling effect into a website, merging the fun element with serious business. This concept puts together sound, picture, graphics, video, text, and other elements in explaining a particular concept. The use of multimedia features in a website gives an impression that the website is tech-savvy and follows the latest designing trends. However it should be well merged with web content. Product presentations, online tutorials, online games, corporate presentations, etc. can be successfully presented with

the aid of multimedia technology. Hypermedia enables us to link text to text, text to image, and image to image, on both a macro and micro level. In distance education multimedia and hypermedia allows students at remote locations to participate in live instruction through videoconferencing, to collaborate on projects through shared "whiteboards," or to replay instructional material that has been pre-recorded. Using the World Wide Web as the base, a student can browse through a database consisting of course material in various formats: images, audio and video recordings, and textual information. In addition, the student can request more information while reading text, viewing illustrations, or listening to audio presentations.

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