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Cognitive Learning

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Using technology to improve memory and brain functions

Introduction

In order to live a full-fledged life, a healthy brain function is essential. Realizing the power of our brain, learning new skills or mnemonics will help us remember. Can technology help boost brain activity? People cannot live without technology, with technology development through these years, vast improvement where data can be recorded, remembered, and shared which includes every detail of one's life and viewed by thousands of people around the world. Will Technology help to boost our memory functions?

The memory is a process involved in retaining, retrieving, and using information about stimuli, images, events, ideas, and skills even after the original information is no longer present (Bruce Goldstein, 2015). Then the memory gets activated any time a specific past experience affects the way one thinks or acts now or in the future. Therefore, memory has things to do with the past, which is affecting the present and likely the future. Our brain is divided into two essential components, long-term memory and short-term memory or working memory. While long-term memory is a big mental bank in charge of storing information for a extended period of time, the short-term memory has limited mental space. And it's central to all the cognitive-based activities. If we do not repeat information over and over again, information stays in our memory for about Bruce Goldstein (2015). This 10 -15 seconds of information is stored in the short-term memory or the working memory. Working memory is the cognitive structure where only conscious processing happens. We are conscious only of the information that is being currently processed in the working memory (Richard Clerk, 2012).

The responsibility of storing information for a very long period of time is referred to as long-term memory, also known as the procedural memory and semantic memory that extends storing information from one minute to a long period of time (lifetime) Goldstein (2015). These

are memories of the past experience and knowledge we have learned. Memories stored in the long-term memory incline to be detailed that are recent. Much of these details will be faded over time as knowledge and experience accumulate. This is the reason why some information is lost in our memory and some retained firmly. Once information is stored in the long-term memory, it needs to be retrieved. Long-term memory is now able to view as the central, dominant structure of human cognition (Richard, 2012). Whatever we hear, and think about all depends on the influenced by our long-term memory.

Since the time of poet Simonides (500 BC) memory improvement has been an academic and a practical interest, and books designed as "self-help" have continued to appeal to the international market (Apter, 2013). Through memory improvement courses, memory skills like mnemonics and visualization have attempted to improve the working memory capacity. Baddeley emphasizes the working memory system assumed to be holding a limited number of chucks that contain a series of "pointers" to relevant information in the long-term memory (Apter, 2013). While the system limits the number of chunks, if more can be packed into the chunks with results of prior learning, the effective capacity of the working memory system can be expanded. While engaging in the learning activities, learners need to hold and process information in the short-term memory.

In the same way, through the constructive approach and learning through past experience knowledge, skills are stored in the long-term memory. This performs information encoding, the ability to convert data into schemata the knowledge-based structure, storage of information in different brain areas, and retrieval of stored information. Information stored in the long-term memory needs to be retrieved to the working memory to process the data. When all knowledge and skills are saved in the long-term memory, the process of using the working memory will be

redundant. By avoiding the working memory, the information will be directly recovered from the long-term memory.

We emerged from World War II as a dominant technology-driven economy in the world, and every major technology was developed and initially commercialized here (Tassey, 2018). Today technology had developed all over the world. For learners in the 21st century, technology facilitates learning by providing a genuine and invaluable range of skills, knowledge, capabilities, context, and ways of thinking. Witnessing an outburst of diversity and reaching out to amazing computers and the mobile devices that we could carry on our pockets, or have on our desks. Our brains are developing towards a technological world (Boemann, 2018). On the other hand, managing our goal settings, allowing us to focus, controlling our working memory is done by cognitive control, and technology impacts our anxiety to seek pressure around with constant connectivity. With the desire to use technology continuously, some are led to addiction, some as a preoccupation or pressure. Constant use of technology is capturing one's ability to perform a high level of implication within our environment and impacts the brain ability to process. Frequent use of technology impacts our brains and our overall social well-being. As technology continues to further embed into our lives, we should have a better understanding of its efforts to our brain function and to have the ability to use technology in a positive and significant way.

Our human memory converts what we remember over a time period, ultimately things are forgotten (Hahn, 2014). We live in a society that every detail is a recorded detail that is then forgotten, although one day these will tie up all our past actions, making it difficult to change our connections or to escape from them. The fast-moving technology and internet never forget and are threatening many people. This permanent memory bank gives no one escape from your digital past.

For a healthy living memory is an important part of our lives, brain function is extremely valuable, the feeling of losing or the imagination of having a bad memory could be a barricade in to our future. These could be either forgetfulness, having to suffer from a cognitive disorder or due to age, simply undergoing the decline of memory can be embarrassing and a heartbreaking issue. If and when we arrive at this moment, one could wonder whether a top technology person could invent a new technology to improve memory or brain functions.

Technology and memory have a strange relationship and helps to advance brain functions. One of the main challengers to boost brain and memory functions throughout our life is to be occupied with the mental task, which is learning new things that stimulated challenge. Technology tools provide the means through which individuals engage and manipulate both resources and their own ideas, and some kinds of technology tools can extend memory and make thinking visible which, involves brainstorming and concept mapping (Driscoll 2002). Others help to represent knowledge as well as communication. Technologies promote communication within and outside the classroom by making it easier for feedback, reflection, and revision to occur.

Career ambition in science, technology, engineering, and mathematics (STEM) is prepared for the youth in making the high school years a critical time period for identifying the cognitive and motivational factors. This increases the likelihood of future employment and individual differences in career selection. The implementation of technologies enables learners to interact, explore, and engage scientific reasoning (Wang, Ye & Degol, 2017). Technology itself does not guarantee to learn, it is the educators and learner's responsibility to use the available technologies that determine transformation for learning to occurs. Educators need to respond to

the challenge and explore the power of technology to help learners achieve the important outcome.

Interactive learning environments responds enthusiastically to learners' actions and related to active, learner-engage processing materials (Kalyuga, 2007). These kinds of environments promote deep cognitive processing and result in the active construction of new knowledge. The total cognitive load should not exceed limited working memory when a learner deals with the working memory capacity. The cognitive theory of multimedia learning is a visual and audio representation. The cognitive load theory suggests that multimedia learning is best explained if close attention is given on how information is processed and stored in the human mind, that includes texts, graphics, arts, sound, animation, and video. Because all information is processed in the working memory before it can be stored in the long-term memory, working memory is assumed to be crucial in multimedia learning.

Technology helps children with attention deficit hyperactivity disorder (ADHD) encounter in their lives either at home or in school the experience of self-control, behavioral, and learning problems (de la Guía, Lozano, & Penichet, 2015). This disorder includes hyperactivity and difficulty in maintaining attention, and over time, this causes deterioration in the child's ability to control behavior. To aim the enhancement and stimulating the learning process of these children, the evolution of new technology application is being used. This makes a major contribution to learning. Learners enjoy the use of sound and animation associated with CD-ROMs, and presentational software. This novel interactive system aimed to improve memory, attention, and associative capacity in children. With various games been marketed through technology, student must stay focused. This enables the student to meet up with advanced

technology, train their working memory, which helps them to improve their daily life and cognitive abilities regarding memory and attention.

Computer-based learning environments that include the cognitive theory of multimedia learning are included in online learning to be used by the struggling learners and students with learning disabilities (LD) (Greer, Crutchfield, and Woods, 2017). This learning environment provides auditory and numerous forms of visual stimuli incorporated into the curriculum which adapts and supports the students need. Technology which, is technical equipment and machinery is used to prompt and record self-monitoring behaviors of students who struggle with behavior problems especially those with inattentiveness, hyperactivity, and impulsivity who often have difficulty in school (Bruhn, Waller, & Hasselbring, 2016). This is performed because they are not proficient in regulating their own behavior. Self-monitoring is one of the many self-management strategies used to improve students-regulating abilities that teach students to be aware of a specific behavior.

Building literacy, language skills, and independence can be supported to the learners by text-to-speech and by integrating technology using digital storybooks, speech recognition (Silver-Pacuilla & Fleischman, 2006). Technology also provides access to computers for those who have physical disabilities, constraints related to fatigue, poor handwriting, spatial organization or spelling, and help struggling writers, spellers to get their ideas on paper. E-resources are being encouraged for students with vocabulary and background knowledge gaps. The graphics organizing tools facilitate brainstorming, concept mapping, and outline the same way the teacher does with the teacher-led instruction technology.

Parkinson's disease (PD) is second most common neurogenetic disease that has an estimated prevalence of between 1 to 3 per 100 people of ages 65 years or older. Around 70% of

individuals with PD will develop a speech impairment, as this cannot be relieved by medication (Andreetta, Adams, Dykstra & Jog, 2016). An individual's natural voice is used for speech amplification devices that are a portable augmentative and alternative communication devices. the age of joining the mind with technology is started tapping into the brain to treat Parkinson or help the paralyzed people by amp up the brainpower (Baggaley, 2017). Accordingly, the technology uses electrical signal cracking through the nervous system that will help command the computer. With the help of technology research, this delivers messages to the brain through an electric current into the correct neurons. Also, they have made away to restore a person's sense of touch or hearing, treat tremors caused by Parkinson's.

Although one of the simplest and most effective ways to boost brain and memory functions is exercise, Technology pave way for heart monitors that track exercise making sure it's the correct rate, the accelerometers that record minute to minute acceleration, pedometers which counts the number of steps taken during the day, like walking, jogging and running. Nevertheless, the Dance Dance Revolution was initially designed to engage in gameplay it has shown these generate health benefits. In the same way, a person's attitude and behavior can be changed by using persuasive technology, which promotes physical activity and health benefits. These exercises allow greater blood flow to the brain, cultivating the growth and survival of neurons and nerve-protecting compounds.

For our survival, we need to consume food. Our diet improves brain function and provides energy to build our body. There is evidence that dietary factors affect our molecular systems and mechanisms that maintain mental functions. The technology allows a person to quickly check and verify what food can be beneficial or what food can cause an allergic reaction or builds up gas and by the vitamins and nutrients it includes, which can protect us against any

diseases. As there are so many productions that promote and increase nerve growth and brain functions, one is able through technology to accurately and easily track blood levels, which allows simpler optimization of brain functions.

In conclusion, technology is advancing at a tremendous space making miracles and solving medical problems at a fast speed. As technology affects our memory, attention and our day to day life, our memory is more occupied with Wi-Fi, smartphone, E-mail, Laptop, Google, calendar alerts, and Facebook that takes off our personal time. With so much technology and with no time to sit and rest, repeatedly forgetting things like where we kept the car keys or the mobile phone one worries whether they are losing their minds. This could lead an early detection of a problem. Although the age of information flow is occurring so fast, we are coming to an understanding that our brains have limitations and whether there are any possibilities to expand with perfect memories, although the future could bring these dreams too. We need to know that forgetting things are normal and we need to deal with the information that comes in and out so that the memory does not become overloaded, which leads to forgetfulness.

Our brain needs attention focus, and needs techniques to develop as forgetting things are embarrassing as well, and it’s dangerous. Our short-term memory acts as the temporary storage, and failing to transfer intelligent information from the short-term memory to the long-term memory will be a drawback. If one does not make it a point to remember the information, it will quickly disappear from the short-term memory as such, it’s clever if you remember information quickly. Thinkers and internet users could actually improve their skills to grasp information rapidly, which sharpens our short-term memory. It’s also wise to improve our short-term memory-making way to get sufficient sleep, exercise and mental inspiration, having a healthy diet, having less stress would definitely help the short-term memory to function to the fullest.

A Memory from a few minutes to years back is saved in the long-term memory (Bruce Goldstein, 2015). The stronger the memory, it empowers us to recollect events or facts on demand, but weaker memories are remembered only when someone is reminding or prompting. For us to improve memory, one must speed up and sharpen brain stability to process what you grasp through these senses and this could be done mostly through vision and listening. It is a good practice to revise the memory over time by merging or incorporating what is already in memory. If something is well-remembered means that the information has quickly and clearly mapped in the senses. The one who has poor memory is because it does not have the ability to record sensory information clearly, for this technology has advanced so that information through teaching, learning materials, and study guides are incorporated to build up attention.

Technology has changed our lives and how we use our attention to other equipment. Smartphone has preoccupied our lives and culture. Technology has provided us the ability to reach out to a friendship at a distance. Lately, we don't have to remember all the details as digital devices remember information and can be saved anytime, and the same way recalled on time.

The struggle of remembering a certain actress, a historical event, a name of a president, is all on fingertips at all times listed on the internet. Remembering any telephone number or address is not difficult as these are all saved or stated on the phone and either just a click away or obtained by e-mail or google. The internet has become the main external memory where the information is stored and retrieved, and this changes how our brain works and processes. The main reason we do not give our full attention is due to technology advancement, information comes from all sides we don't bother to remember, but better at finding information. In the past, all study materials were in the form of reference guides, books or binders but with the technology advances, the books are digitized that anyone can read this through the computer,

laptop or on a smartphone from anywhere. Travel is not restricted to travel. For those students who have difficulty in reading, these could easily maximize the screen or build with audio for easy listening from the electronic device.

Providing an element of fun, ADHD student's stays focused and engaged in classrooms through technology-aided advancement, although they may not be learning their favorite subject technology application are included with video, games, gadget, and timers. Also, cloud storage such as Google Drive and Dropbox help them to save their work so that they could use information both in school and at home.

People who live in remote locations need a well-living environment and health services. Advanced technology is used to facilitate early diagnosis that includes adequate treatment and to rely on technology to detect health problems among older citizens. New technology also uses traditional approaches towards helping people with mental illness that includes cognitive behavioral therapy, which is counseling, medication, exercises, and most important to them a healthy diet. Now Google answers every question before one can work up the brain to answer.

Technology is frequently described as making people foolish or stupid when it comes to brain and health activities. But this plays a positive impact on our lives and memories. If technology is used wisely without getting addicted and makes way to care for our brain, we could easily incorporate possible advantages in both the technology and memory.

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