Understanding how the brain works facilitates education

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The final structure of the human brain is determined by genetic and environmental influences. We modify the brain by a process which we call education. Since the advent of the printing press we have stored information about ourselves and the rest of the universe by printing books and papers that are stored in libraries; government buildings, private enterprises, homes and many other places We expect parents and other responsible persons to select from this huge store of knowledge the material that will be most useful for the growing children. These materials are transferred to the memory areas of the brains by repetition and by the use of reward systems that causes the children to wish to repeat the learning experience.

By the age of 5, many children are enrolled in school where the transfer of material to the memory sections of the brain continues. Programs that produce the greatest storage of material in the brain are considered to be superior. This frame of reference persists through all forms of higher education. Before going on let us consider the difference between memory and thinking.

The memory portions of the brain can store and retrieve material on demand. We speak of short term and long term memory. Old persons may recall the events of their youth when they can no longer recall the events that occurred that morning. The normal brain can not hold memorized material for ever. The rate of memory decay has been studied in normal subjects under many conditions. Any new material is placed in the recent memory storage area and will not be retained for long unless the subject decides to do things that will facilitate the movement of the newly acquired material to the long term memory region. I can facilitate the movement by closing my eyes waiting a few minute and then seeing if I can accurately recall the newly acquired material. If the recall is correct I will repeat the process several times during the next few weeks until I am certain that the newly acquired material is now securely stored in long term memory. If not occasionally reinforced the forgetting curve will still cause long term memory to fade.

In summary we can agree that short term memory is very useful for events that occur on a daily weekly or monthly schedule, that effort is required to move material from short term to long

term memory and that the forgetting curve keeps the human brain from being the ideal place to store all of knowledge acquired by man since the advent of the printing press.

(Something missing here – Frank) grading the papers. I liked to believe that my answers were better than those of my less experienced students but in truth many a student has aced me. All I can do is to give the student an A and remember the event for many years. Philip Handler, the Duke professor of biochemistry, was interested in how students learned. I teased him about his examination questions. As long as he knew the answers to his questions he was testing memory. I did not know the answers to my questions. I was encouraging the students to think. Those with better formulations than mine earned an A.

Over the years we have all debated to what degree could the computer replace the memory oriented educational system. The human brain is still the wonder of the biological systems and up to the present no one has made any progress towards creating a man made system equal to the human brain. We have more years in medical school, 2 more years as a general medical intern before he can be licensed practicener (Something missing here – Frank) pointed out that our brain is not capable of storing all of the material discovered over the years by mankind. Is the computer able to replace the memory oriented educational system which requires the MD to enter kindergarden at the age of five, spend 12 years in grammar and high school, 4 years in college, 4. 2-4 more years are required to become a specialist

To effectively function in the field of today one will continue to use the brain for short term memory storage. After all the brain is always with us and is ideally made for short term memory. The forgetting curve is neutralized by hourly and daily **use** of remembered material. Material that is only used once or twice per day will be stored in cheap handheld computers. The purpose of this paper is to encourage the teachers to prepare for the dramatic changes in education that will occur when long term memory is shifted to computers and the space in the brain previously used for long term memory becomes available for other uses.