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The enriched environment: Making multiple connections

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One only has to reflect on what it took them to learn and master an activity and a few things may come to mind. Perhaps the activity was learning Cardiopulmonary Resuscitation (CPR), and if so, the process for learning the task, really learning it, involved making many associations with the task. In line with constructivism, the instructor likely began the course by transferring-in what the learner knew about cardiac arrest or mouth-to-mouth resuscitation. As a learner, this may have caused one to reflect on a real or televised event that included chest compressions and rescue breathing. For the teacher who began the lesson by assisting the learner with bringing in the information into the learning environment, the stage has been set for learning to occur. This is because, also in line with constructivism, we tend to build upon what we have learned.

Additionally, this stage can also help the learner develop relevance for the subject which can help keep the (the brain) learner interested and engaged (Brooks & Brooks, 2001; Piaget, 2008). What happens next is how learning occurs. Connections are made between the old and new information through the use of meaningful learning activities. Some other activities the instructor may have used may have included some didactic or declarative knowledge, some form of demonstration of the procedure, and hopefully some hands-on practice and assessment. We would cringe to think of becoming certified in CPR without being allowed or required to physically demonstrate concepts including, correct hand placement, chest compression depth, and rate of compression. Yet sadly, when we reflect on past learning experiences we can note many subjects that were taught without being able to use the information in other ways other than in rote memorization.

Even after the CPR course is over, the learning may not really cease. Later, perhaps even that evening, the learner may actually witness CPR being performed, or may perform the task themselves on a real person in need. Dewey (1938) posited that learning is often situational; existing between the learner and the environment that the task was learned in (p. 43). When they see it being performed in another setting, or actually perform it themselves in another setting, learning is continuing as they make new connections and add to the existing CPR frames of reference that they have. Still later, the learner may be surfing the Internet and they might come across an article describing how a rescuer used a bag-valve-mask (BVM), which essentially is a face mask with a large, squeezable air container attached, to deliver breaths to the patient. The learner recalls that they used their own mouth to deliver the rescue breathing, but found it interesting that breaths could be delivered by the use of the BVM. At this point, they have added to their mastery of the subject. This pattern may continue as the learner sees, hears, and uses new information that solidifies or strengthens the content and procedural knowledge for CPR.

While this may be a long example, it demonstrates much of the learning process and the need for a learning environment that is enriched with opportunities for interaction between the learner and what is being learned. Jensen (2006) describes enrichment as “a positive biological response to a contrasting environment, in which measurable, synergistic, and global changes occurred” (p. 47). His use of contrast implies that we are learning something new or different than what we already know. If the CPR instructor had used the BVM during the CPR class, that device would have been new to us as learners at that time, but not new to us later when we found it described in an Internet article. However, the latter

could have strengthened the neuron connections in the brain by reinforcing what was learned and this concept is equally important. Greene (2010) suggests that the hippocampus, located in the center of the brain is constantly evaluating information from the learning environment, serving as a mediator between new information and existing networks of neural connections that form memories (p. 24). In addition, MRI patterns show that memories are strongly associated with several connections in various parts of the brain and these memories can help us to conceive future events (Greene, 2010) and problem-solve as well.

Most interestingly, recent research by McDermott at the Washington University in St. Louis showed that remembering the past and envisioning the future draw upon many of the same neural mechanisms (Everding, 2007). This is important, because as Greene (2010) observes, putting enough associations together can help a learner to not only make predictions better, but may also help the learner navigate through their world much better also (p. 27). Using the CPR case at the beginning of this manuscript, the learner may learn the use of the BVM much quicker because they engage that same neural network that supports the memories of first learning CPR. Therefore, enriching environments complete with multiple, meaningful activities that build upon what the learner knows may allow for this to occur more effectively. These activities may include cooperative learning techniques that address the content, role play and skits, demonstrations, and opportunities to practice and apply the skills. This notion comes as little surprise to some researchers. Jensen (2006) describes experiments in the early 1960′s that studied the brains of rats that were deprived of stimulating environments and those living in more enriched environments that included more socialization with others of the same species, along with toys, boxes, and wheels. After several weeks, the brains of the rats living in the enriched environments had significantly thicker cortex in the brain, the area where higher-level thinking occurs. Their dendrite connections in the brain were also more complex (pp. 50-51) which matches the observations by Greene (2010) that nothing we learn “stands in isolation” as we make new connections by building upon what we know (p. 24).

So what does this mean to the facilitator of learning? It means that the learning environment can be made as stimulating as possible to help learners make as many connections with the material being learned as possible. This is what is going to solidify or strengthen the connections of the neurons in the brain along with existing memories. The result can also mean better recall on required state examinations which is a main focus for many educators. However, knowing how to get to reach a high level of enrichment is both a challenge and an art that must be developed. It is not the teacher, but instead, the facilitator of learning who will look for ways to include meaningful activities in the lesson that stimulate each of these modalities to make meaning of the content. A stimulating, enriched environment requires incorporating all of the learning styles, including, visual/print, visual/picture, auditory, kinesthetic, and verbal/kinesthetic modalities (Dunn et al, 2009).

If it is a math formula, show them how the formula is used and then have the learners work together to arrange items in the classroom in such a way that demonstrates usage of the formula. Then have one group teach the other members of the class how it is applied. Doing so may make more associations in the brain which can strengthen the connection and the memory for that task because the learners must teach or do something with the information. This is also moving away from rote memorization where the connection in the brain may be limited or isolated regarding the number of connections. Learning math using rote teaching methods may cause the learner to forget it, because in essence, they never really made enough connections with the knowledge, so they may have never really learned

it. The brain may also have a difficult time reconstructing the math formula because the connection is weak.

Likewise, science lessons that are made more meaningful and relevant are likely to hold a learner's attention longer. Many science teachers already hold an advantage over other teachers because the very nature of constructivism shares many similarities with learning the sciences. Many of the connections that we hold in our brain, including the memories and frames of references that we construct and build upon were acquired through experimentation. Greene (2010) keenly notes that the root of learning and memory is generalization and that we use our existing knowledge to make inferences about new or novel relations (p. 27). Here we can see similar processes between learning and science experimentation. We can be told ten times that the stove is hot, yet we are still curious enough to find out for ourselves as well, sometimes with painful reminders.

But learning does not have to be painful and making the science lesson relevant and enriched is not hard to do. The facilitators need only look around and observe the tools that are available for the lesson. Assist the learners with transferring-in their existing memories or frames of references and what they want to learn related to the lesson objectives. If studying plants or parts of the flower, move the students outside to select a unique specimen that interests them. For older students, lipsticks, batteries in cell phones, and soda become tools for lessons that involve melting points, periodic tables, and chemical elements and reaction. These resources are still only tools however, and the facilitator will still need to include many activities including allowing for physical movement during the lesson through collaboration with other learners or physical manipulation of the items being studied. Again, the more ways they can work with what is being learned, the better.

It is important to note that in both of these suggestions; movement is encouraged during the learning process. Research suggests that while increasing blood flow to the brain, movement can also help to release dopamine in the brain which can enhance mood, learning, and memory (Jensen, 2008, p. 41). In this way, learning can be meaningful, engaging, and fun. In addition, research also suggests a strong relationship between motor and cognitive processes, with the cerebellum being the key link between the body and mind (Jensen, 2008). This may explain why many of us function or think much better on our feet. The challenge for teachers is to look at movement in the classroom as not being a distraction, but instead, a learning modality that may reap huge rewards in terms of generating understanding.

In the age of accountability, teachers are being held to a higher standard and they should be. But accountability does not mean teaching to the test. Instead, it means teaching the subject well enough so that the learner is able to understand the subject; really understand it. By making numerous connections with the information, the learner may be better prepared to respond successfully to evaluation. The facilitator of learning is up to this task. They will include multiple activities that take them off the center stage and help the learner engage with the subject in many enriching ways so they can make the content their own.

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