

WIRING BRAIN AND MUSCLE: TEACHING CAMBODIAN TEACHERS TO INTEGRATE MOVEMENT INTO THE CLASSROOM

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The original purpose of my project was to build soccer fields for children at different schools. These fields would be used for recreation and games to help the children develop and grow. By creating these fields, it would provide a safe environment for children to play and learn to work together as a team. While researching the idea of movement though, I discovered that physical activity appears to help with cognition in children. This idea of movement affecting learning sent my project in a new direction. I became very interested in understanding how movement stimulates the brain and affects cognition. The purpose of my new project was to provide instruction for in-service teachers in Cambodia about different movements that have been successful in improving learning and cognitive thinking. My first research question was, "How is the brain and learning affected by physical activity?" In order to answer this question, I started a review of the relevant professional literature.

I found the work of Dr. Paul E. Dennison (Dennison & Dennison, 1989) to be particularly interesting. Dennison created movements that have shown positive results with school children--precisely the kind of movements I was looking for. This raised two more questions relevant to my project. First, will I be able to use his different movements as the basis of my instructional techniques? Second, how can I best instruct educators in Cambodia so that they will understand the benefits of these techniques and be successful in using the movements?

LITERATURE REVIEW

The brain is the most complex part of the human body. This three-pound organ is the seat of intelligence, interpreter of the senses, initiator of body movement, and controller of behavior. The brain is the source of all the qualities that define our humanity. During movement, however, the brain is not the only element being activated, but it participates in the creation of new neural pathways (Craig, 2003; Ratey, 2001).

Movement is an essential part of an individual's life. As a person learns to move, he or she becomes more aware of their environment. Recent research has shown that people use the same brain regions to figure out cognitive problems as they use during physical movement. New evidence shows

that movement is critical to all other brain functions, including memory, emotions, language, and learning (Freeman, 1998; Hannaford, 1995; Ratey, 2001; Restak, 1984).

Neurological research indicates that the cerebellum, which coordinates physical movement, also organizes the movement of thoughts. It creates progression of thoughts--such as organizing a kitchen, making an argument, or creating music--as well as creating sequences of movements, such as catching a football. In addition, it appears that previous theories suggesting that each section of the brain functions in isolation have changed. New research suggests that brain functions are in fact a part of a single system, bringing different regions of the brain into effect in many different ways (Craig, 2001; Doyon, 2002; Ratey, 2001; Restak, 1984).

This new research suggests a greater relationship between different activities, such as making a decision and physical movement. For example, when a person learns to ride a bike, which is a motor function, the individual will use the cortex of the brain. However, as the person masters the technique, the activity becomes automatic and the responsibility for the information is shifted to the neurons in the lower parts of the brain. This action frees up the neurons in the cortex for new learning. This same action happens with cognitive learning. At first, a person will use his or her cortex to learn new information, but as one masters the knowledge, it is then transferred to the lower parts of the brain and becomes automatic. With physical movements, the neural connections become stronger and work more efficiently. As the connections become more efficient, this information about physical movement is also transferred through the cortex to the lower parts of the brain more quickly. Through frequent transmissions of information between neurons, a permanent relationship can develop (Craig, 2001; Doyon, 2002; Ratey, 2001; Restak, 1984).

Although brain activity is occurring during learning, the main way that a person is able to learn is through the strengthening of neurons. The neural pathways during early development that are used most often become strengthened and automatic. Similarly, the pathways that are not used become weak and are eventually eliminated and disappear from the brain. Therefore, the use-it-or-lose-it theory applies. If these pathways are stimulated early enough, a permanent base of wiring for the brain is created--neural networks. This idea seems to show that the quality of these more complex neural networks depends on the initial base of neurons developed during early childhood and the new experiences that help to create new networks of neurons after the base has been established. Repetition strengthens these neural networks (Craig, 2001; Doyon, 2002).

For an individual to be able to learn, neural pathways must be strengthened. Physical movement has been found to contribute to this strengthening. For example, as a child practices movements, the entire brain is involved in the learning. Through research, special movements have been developed that strengthen the neural pathways in young children that engage the entire brain in learning (Dennison & Dennison, 1989).

PROJECT DESCRIPTION

Based on my review of the research, I changed the focus of my project. I received permission to use several of Dennison's movements to develop a teaching aid for Cambodian teachers to use in their classrooms. After determining the five most beneficial movements, I developed an information pamphlet that contained all of the movements that I wanted to present to the Cambodian teachers. For each movement, I gave simplified and detailed instructions on how to perform the exercise, recommended times to use the movement, and provided information about how the students would benefit. I included exercises that have been proven to help with reading and writing skills and the development of students' abilities to concentrate. The final element of the information packet was a short summary of the relationship between brain function and physical activity.

In order to be certain that I could perform the exercises properly, I met with a local teacher in Ohio who uses these different techniques in her classroom. I was able to practice the routine that she uses with her students.

The final preparation was to develop a simple way to present the information to the teachers in Cambodia. I created an interactive presentation that would take the teachers through a normal exercise routine. My presentation would highlight performing the exercises, the appropriate duration, and evaluation of the effect of the routine on student learning.

IN-COUNTRY ACTIVITIES

While traveling to Cambodia, our learning community had one last planning session in Los Angeles. During this session everyone gave each other feedback on their projects. The group felt that my presentation was much too complicated for the Cambodian educators to understand. My colleagues' constructive criticism proved hard for me to accept. However, during the long flight to Cambodia, I had time to digest all of the ideas that the group had given me. I used this time to redesign my entire lecture in order to simplify all of my concepts. One member suggested that I try to explain the movements and exercises as if I were speaking to someone with a second grade education. While difficult for me to comprehend, I was finally able to redesign my lecture in a way that was simpler.



Once in the country, there were only two more steps that I needed to take before I was ready to present in front of the teachers. First, I wanted to practice my presentation in front of my colleagues; second, I needed to purchase some supplies. Practicing my presentation in front of the learning community gave me the experience of working with a translator. I learned that I must present very slowly and be clear when explaining how to perform the movements. After purchasing small cups and drinking water, I was ready.

RESULTS

Through my observations, it appears to be customary for Cambodian educators to include many short recesses during the school day to break up the time that children spend listening to teachers lecture. I saw immediately how the information in my presentation would be useful to the teachers. Many of the games that I saw the children playing were very similar to the movements that I would present. If the educators perceived that children learn better when they are instructed for a period of time and then have a short break with some type of physical movements, then perhaps the educators would more willing to try my movements in their classrooms. From the positive response of the Cambodian teachers, I believe that my presentations were successful.

REFLECTION

While in Cambodia I discovered new things about the world and myself. At first I could not keep my eyes off the people and the surroundings. Everything was so different! I could not believe the poverty that I saw. Children and disabled people begging in the marketplaces were common. This was the first experience that I have had with people coming to me and asking for money. During the first part of the trip, I found it very difficult to say no. During the last part of the trip, I found myself able to ignore the individual standing by my side, looking up at me and saying, "Money?" When I look back at this I understand that I was becoming acclimated to their culture. Upon returning to the United States and slowly returning to my normal lifestyle, I have a new appreciation for simple things, such as clean water, food, and a nice place to live.

I also discovered a newfound ability to adapt to change. During the entire trip, it seemed like everything was constantly changing. The preparation of my project changed many times. Upon my arrival in Cambodia, I had to change my entire lecture. This forced me to adapt very quickly to the new circumstances. Before this experience, I had never been challenged to completely rebuild something so quickly.

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