Touch, Movement and Learning

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> "Did you know that touch is one of the most complex, multi-level, and multi-functional senses in our body? Through touch, millions of bits of input pass to the nervous system and brain through the skin, which is equipped with millions of tactile receptors. Touch is essential for neurodevelopment and neuroplasticity." (Svetlana Masgutova 8-2020 newsletter, Svetlana Masgutova Educational Institute; Masgutova Integrative Neurodevelopment Sciences Group (MINDS group)

The Sense of Touch

The skin is the largest organ of the body and has a variety of touch sensors in it. These receptors alert the brain about pressure, contact with the outer world, changes in temperature, tactile discrimination so small objects can be manipulated, and pain due to pressure or damage to the skin. Tactile receptors are also in joints, tendons, muscles, and limbs. The information that tactile receptors provide the brain forms the system of proprioception, which enables focused, accurate and deliberate movement, automatic movement (like automatically pulling back your hand that is on something hot) and standing still. Visual input and auditory input, or their lack, also are part of the information processed by the proprioceptive system to enable skilled movement and learning.

Consider this: When you are walking across a room at night and the lights suddenly go out, do you reach out to touch what is around you to know where it is safe to move? Touch can be used to seek and acquire information, and to move and affect objects – both activities are useful for playing an edutainment game.

Infants explore the world through their senses. Their primitive reflexes enable them to develop their ability to reach out, to touch, to grasp, to throw or release something, to push away or pull towards them an object, to roll over, to hold their head up, to sit up, and to walk. These early body motions are the building blocks that develop into more complex patterns of awareness, movement, and intellect. Each motion of the body requires activation of many areas and systems of the brain, and the early motions of an infant start their development of becoming aware and responding to sensory information. Mastering early movements leads to the development of intelligence and cognition that leads to observing and thinking, imagining, remembering, learning, and intuitively knowing. Ultimately complex reflexes and movement and thinking patterns are developed, enabling the brain and body to move, speak, dance, draw, learn to read, play, and make music. And it all began for all of us with touch – the feel of air on our skin at birth, of hands holding us, and of Mom's skin. (Svetlana Masgutova, Birthing Reflexes Class, Salt Lake City, UT, 6-2007; and Primitive Reflexes 1 & 2, 6-2005.)

Motor Development Stimulates Brain and Intellect Development

> "Motor development is a primary expression of coordinated neurological function in infant and early child development. It influences future development in all other spheres – physical, emotional, cognitive – and the formation of personality." (Svetlana Masgutova, "Applications in NeuroDevelopment: Tactility for Neurogenesis and Neuroplasticity. Pathologies of Tactile System." Masgutova Integrative Neurodevelopment Sciences Group (MINDS group) **8-2020**)

Motor activity teaches the brain how to develop, and thereby develops mental activity. Unfortunately for young children, they are still largely restricted to sitting still at their desks for hours in school, and listening to and watching instructions on how to learn to read, do math, write, and to know about the world.

> "Children need to move, touch and experience to learn. When students use their bodies in the learning process, it can have a big effect, even if it seems silly or unconnected to the learning goal at hand.... We understand language in a richer, fuller way if we can connect it to the actions we perform." (Katrina Schwartz https://www.kqed.org/mindshift/39684/why-kids-need-to-move-touch-and-experience-to-learn; 3-16-15.)

The stress of learning is reduced by using the body to move and breathe to release and free energy for thinking and for brain-body function. For example, turning the head left and right activates the ear semi-circular canals in the ears so they can activate accurate hearing and memory (both short term and operative memory); walking with arms and legs moving diagonally (the cross-crawl movement) helps to reduce neuro-emotional-mental-physical stress and return integration to brain function; and yawning oxygenates the body and moves the cranial plates so they stimulate cranial sacral fluid circulation around the brain so it can function better.

The activities involved in a digital edutainment game like Sky Village – Trail of Spells enable children to move, touch and experience to learn to read abstract words and symbols. Key to gaining benefit from Sky Village – Trail of Spells is the use of its tools that fit the sensory learning experience of the player.

Kinesthetic Learners

Kinesthetic learning occurs from processing through touch and movement while learning a skill or information. Over 30 percent of people are tactile learners (http://www.ipedr.com/vol5/no2/104-H10249.pdf) and benefit from using touch and movement experience to learn. ("The Power of Context: Learning Through Your Senses," 2018. learnthroughexperience.org/blog/power-of-context-learning-through-senses/)

> "Encouraging kids to use their hands brings out unsaid, and often correct ideas, which then makes them more open to instruction and more likely to learn," Goldin-Meadow said. She also found that showing two ways of doing a problem with speech had very little effect on learning, but showing two methods when one was in meaningful gesture helped learners. (Katrina Schwartz, 3-16-15. https://www.kqed.org/mindshift/39684/why-kids-need-to-move-touch-and-experience-to-learn)

Interactive activities that engage a number of our senses make it easier to learn a skill than do drill and rote memorization. The evidence of these results we all have experienced. Once we learned to ride a bike, we never needed training wheels again, and never forgot how to ride a bike. However, how much do you recall of all the material you memorized to pass tests in school? Can you name all the countries of the world (at least the names of those recognized when you were young), or all the U.S. state capitols?

Listening to and watching the teaching of phonics and phonemic awareness and memorizing symbols and sounds does not successfully teach at least 20% of our school population, particularly those who are dyslexic, to read well enough to be able to read to learn in grade 4 and above. Activities in the younger grades that involve the body in learning enable children to experience more fully and make the abstract known to self.

Pitch – Roll – Yaw

Pitch, roll and yaw (PRY) are directional dynamics of an airplane's travel, and of most of our body motions. PRY are the dynamics of the gyroscopic feature of smart phones and tablets. Also, they are important aspects of body motion and balance. For instance, what happens when you stand up, close your eyes, and move all your weight onto one foot? Your body quickly moves through PRY adjustments to keep you balanced on that one foot. When these adjustments do not balance you sufficiently, you tip over!

We use our vision and hearing, as well as the stretch of our skin, the proprioceptive input of joints, muscle tissues, and the input of the semi-circular canals in our ears to alert our proprioception system (regulates touch and movement awareness) to adjust our conscious and unconscious motion.

The architecture of Sky Village – Trail of Spells will include brand new technology for helping a child learn to read. Some of this technology will involve using the PRY aspect of smart phones and tablets to learn to stabilize the Mind's Eye on a point of focus, "The Spot", and to understand how the roving Mind's Eye can underlie the many versions of letters that dyslexic individuals can see – for example, confusing d, b, p, q; or reorganizing the shape and location of letters in a word.

Non-Linear Learning – Experiential Learning

Truly interactive education involves as many of the senses as possible, including touch and motion, to immerse a student in the experience of learning. For best results, this kind of education is not linear in form, and does not involve rote memorization to be successful. Instead, taking part in the action of words, directions, events, information enhances the ability to remember and learn them. Another piece of truly interactive education uses tools that make abstract concepts experiential and available to sensory understanding and learning.

While playing Sky Village – Trail of Spells, a player's focus connects them to identify with and become the avatar on the screen; their finger and hand movements move them toward success in the challenges, and to progress in making new discoveries; and their eye movements, visual input, head motions, and responses to audio input inform their brain of what is happening in the game and the success of their performance. Learning during the play of Sky Village – Trail of Spells occurs because of the experience of processing the input of many sensory signals, the positive feedback of success, and the enjoyment of continuing the practice until mastery or completion has occurred. The player has the fun and focused involvement of a digital game, and along the way, because it is built into the architecture and technology of the game, they learn to master and read abstract words and symbols.

Learn to Read, so you can Read to Learn. ™