PEDAGOGY BEFORE TECHNOLOGY – 3S MODEL FOR EDUCATION

Abstract

When it comes to teaching 21st C children, the teaching framework based on the theoretical edifices of Freudianism and Behaviorism does not work anymore. Teachers and educators are increasingly finding it challenging to engage students in the classroom. In our study, we got to explore important understandings and concepts about the brain and educational neuroscience findings. We could identify some of the most widely accepted neuromyths within the teaching community and debunk false theories that ruled for over decades. Neuroscience is often considered complex and challenging for most teachers to understand conceptually. 3SME helps teachers with basic educational neuroscience in the context of building scaffolded teaching approaches that create neural circuits and increase understanding of the subject safely and stress-free. In this study, two different ways to implement the model within a classroom setting were explored. The goal of the study was to determine the 3SME model's effectiveness under a real-classroom scenario and to evaluate whether or not there is a shift in the learning that happened and did this model contributed to its effectiveness. Teachers used this model in their classrooms individually and the whole classroom. Students' performance on a pre-and post-3SME was analyzed and compared between students who attended 3SME and a control group receiving standard instruction. The data was analysed and found significantly greater learning gains who attended 3SME compared to the control. Online and One-premise implementation modes were effective in producing student learning gains relative to controls. In addition, students demonstrated 21st C skills effortlessly in 3SME. These results suggest that teacher-led neuroscience-based instruction can be effectively supported by a scaffolded, technology-supported curriculum which can be implemented in multiple ways to enhance student learning.

Keywords: Educational Neuroscience, safe classroom, stresses free learning, neuro-teaching, 21st C Classroom teaching.

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The 3S Model in Education (3SME) is a classroom-based approach to engage new age learners based on the research and discoveries in the world of Neuroscience. The 3SME model utilizes the cross domain functional knowledge involved in the study of mind science. Mind science or brain science till the quarter of last century languished in the shadows of hard sciences. All that we had to offer by way of explaining the human behaviour was based on the two theoretical edifices Freudianism and Behaviorism, both of which would be dramatically eclipsed in the 90's when the age of neuroscience truly dawned. The 3SME model has evolved from the discoveries and findings from the perspective of neuroscience and the collaborative efforts with teachers and students to develop an intriguing and engaging pedagogy for K-8 students.

The 3 SME stands for Safety, Satisfaction and Synapses Model in Education, 3SME has been designed to help the teachers and students to go about their activities that are consistent with the sequence of the developing brain. The most rapid periods of brain growth occur during the first four years of a child's life, which is when development can have a profound impact on brain development and functioning.

Now, what in the world can we mean by that sort of title 3SME? In this presentation, we are going to try to create—fundamentally—a framework for identifying those basic elements scaffolding strategies that matter most to you as teacher and student. And also for identifying those resources, and those experiences, that will help you meet those needs in your respective roles as students and teachers in concrete and abstract learning.

So, to do this I'll explore a bit about brain evolution with you. That will be a framework for talking about the three fundamental framework of engaging the students in classroom.

So, let's get to it. In terms of the evolution of the brain, it needs to be nested in a larger framework of biological evolution. Life's been on this planet for roughly three and a half billion years. Multi-celled creatures arose around 650 million years ago. And they were complicated enough, after roughly another 50 million or so years had passed that by 600 million or so years ago their sensory systems and their motor systems evolved and needed to be able to communicate with each other. That sharing and processing of information— for example "Gear up, that smells nice," "Ooh, Get back , that's dangerous"—that kind of information processing requirement was the basis for the first evolution of the nervous system.

So, evolution has continued. Roughly 200 million years ago, mammals arose. Another 40 or 60 million years ago, depending on how the category is defined, primates arose. And then our stone tool manufacturing hominid ancestors lived around two and a half million years ago. Our modern biological humans emerging around 150,000 years ago.

How do we think about that? I think, "What a long strange trip it's been." That's the line from the Grateful Dead, of course. Just to put it in perspective, if you think about typical human lifespan, at the upper limit optimistically—I'm going for it—let's say a hundred years. Well, the nervous system has been evolving and if you put them end to end, one after another, for about six million human life spans: that's how long it's been. It's important to appreciate how long it takes to evolve the nervous system in its current form in the human being—

headquartered by the brain. And it helps us to appreciate that solutions to survival problems faced by ancient creatures, ancient jellyfish in the primordial seas 600 million years ago in whom the nervous system began to arise—little crabs, little lizards, little mice, little monkeys, early humans—solutions to problems faced by these people, and other beings, other animal ancestors, solutions for the problems faced by these creatures have been now woven into our own nervous system.

In terms of the structure of your brain, you could imagine it being built a little bit like a house from the bottom up in three floors. The bottom floor of the house of your brain is the brainstem, loosely associated with the reptilian stage of evolution. On top of which sits the sub cortical regions, loosely associated with the mammalian stage of evolution. Regions like the Amygdala, hippocampus, hypothalamus, basal ganglia. Right there, sitting on top of the brainstem. And then, on top of that we have the cortex, very associated with the primate and especially human stage of evolution.

These three stages of evolution of the brain are alive and well inside us today. We have the brainstem part of us which tends to be reactive, and quick, and very involved with managing fundamental survival needs, like making sure that the heart keeps beating. On top of that we have those sub cortical regions which, as I said, were associated with the mammalian stage of evolution. They're very involved with emotion and aspects of motivation. Also, I should add, that mammals being warm-blooded, and also able to sustain pursuit, had advantages over their reptilian competitors in terms of being able to handle what happened roughly 65 million years ago. When something large struck the earth, leading to the mass extinction of the dinosaurs, creating lots of opportunities for our little rat-like ancestors to survive, and flourish, and have great-grandchildren like us today; because they were warm-blooded. They could hunt at night, they could stay warm, and they could sustain chasing some kind of prey.

And then we have, of course, the cortex sitting on top of all of that, which has roughly tripled in volume in the last several million years since our ancestors first began using tools to make tools; first began manufacturing stone tools.

Now, down that long run it's easy to subscribe to that increasingly popular meme these days that somehow the reptilian brain is bad. The reptile brain is bad, the primate, human brain is the good brain. The brainstem, the so-called reptilian brain, is the seat of unconsciousness. If you shut down circuits there, you put somebody into a profound coma. Also, there are receptor sites in the brainstem for Oxytocin, a neurotransmitter that's very involved in bonding and intimate experiences.

And also, the cortex—we'll say the prefrontal cortex, the most modern part of the cortex—is capable of some seriously wacko ideas. So, we need all parts of the brain working together and it's not that there's a good part of the brain that's the modern brain and a bad part of the brain that's the ancient brain. Each parts of the brain, as we'll see, have strengths and weaknesses. And wisdom is to be mindful of the operation of all of them, with a quality of safety and friendliness toward your students. And as a teacher, you can be mindful of your own teaching approaches, of course, toward these different aspects of yourself.

So, we have a basic framework now. We have the three floors of the house of the brain: brainstem, subcortex, and cortex; loosely associated with the reptilian, mammalian, and primate stages of evolution. And those stages of evolution of the brain are also associated with the ways in which we manage our three fundamental elements in teaching learning needs.

In other words, we need to be make the children feel safe, satisfied with their learning's, and creating synapses for long term Potentiation or learning. These aspects are managed by three overarching systems that are loosely associated with the reptilian (Hind brain), mammalian (Mid Brain), and primate (Cerebral Cortex) human stages of evolution.

As we know the whole brain works together today to manage these elements. In other words, we help students achieve safety through avoiding harms by making them feel safe by creating stress free classrooms, we help them achieve satisfaction through approaching rewards and paving way for sense of belongingness, and we help students achieve build long term connection through efficient use of Executive function. So, this is the kind of framework of 3SME model for 21st C Educational needs.

There's a lot under the heading of safety; the students need to feel protected in the classrooms. They need to not be flooded with anxiety. In terms of safety, we need to have some basic way in which we can make things happen for students rather than being helpless.

In terms of their needs for satisfaction, we have help them to accomplish goals, nudge and nurture them to experience the learning, to feel it's worth spending every minute in the classroom. And in terms of synapses, we have to make the students feel closer to their learning's.

So you can see the range of these aspects, managed by systems—motivational and regulatory systems—that are well-known in psychology in terms of avoiding, approaching, and attaching.

If you think about their basis, and the systems in terms of evolution, to avoid harms we need to stay away from those predators. It's important to not get eaten. Our ancestors were prey long before they were significant predators. Safety needs also include things like staying away from natural hazards, managing aggression coming at you, or dealing with pain. If the students feel that it's tough on them to learn the subject due to their "Neurobiological susceptibility" then they would began to feel unsafe in the classroom and would end up not learning what the teacher is teaching or taught.

In terms of satisfaction managed through approaching rewards, some basic primal rewards are things like who you are as a person? Recognizing your talents, and then, of course, there are opportunities to create friendship with others and have sense of belongingness.

And then, in terms of creating synapses, when we have both of these aspects attended to, and then we can enable students move into metacognitive zone of learning. Now if anyone is there in this zone, I would say without any doubt 100% learning happens.

Now, to make a little point but an important one in its own way, all these systems draw upon each other to meet and create a cohesive elements or framework for learning. For example, if someone were feeling unsafe and they wanted to avoid harms—let's say sitting in a classroom and learning a subject that is going overboard, doing the best they can, let's say they can't leave the classroom, they're stuck there—one way to manage that need for safety would be to completely shut off during the learning or if the student is slightly mischievous will distract others in the classroom while learning. That would be a very direct way to manage that need for safety. Or the student could approach the rewards of making that subject clear by attending asynchronous / extra classes of personal coaching / tuition to the learn the subject altogether. All these are in the areas of avoiding harms. And then, also, a person could share his experience with other classmates who are facing similar threats and get other classmates to join the tuitions, as a way to achieve the end of avoiding harms. So this is a way to think about these aspects in a complex way.

If we were to kind of summarize it, I'm going to use a kind of goofy metaphor here that works for me as a teacher. It's as if inside each one of us, I certainly experience this, there's kind of inner menagerie. An inner zoo with reptiles, mammals, and primates inside the head of every student including us. So, if you think about any successful teachers then you must understand that the successful teachers were at ease in the managing these three elements, the kind of goofy but memorable way, perhaps, to think about this is they knew how to pet the reptile. They knew how to soothe and ease the students, didn't make the students feel so scared and the students always felt safer being in their classrooms. They also knew how to reward the mammalian brain. They rewarded it by feeding right kind of food. We all need our food of one kind or another. We need to feel rewarded. If we don't feel rewarded in life in some significant ways it feels like we're just sort of empty. Or that spending our precious time in the classroom is irrelevant. It lacks meaning or fulfillment. What's the point? So, we need to feed the mammal. And additionally, of course, in terms of our needs for synapses, we need to collaborate with others to take others perspective in our learning, so that the learning becomes more robust.

So, we have kind of a framework here and a way to call out things to be mindful of yourself in the classrooms; become more and more aware of, engaging the human brain. Now I'm going to raise a fundamental question: now that we've identified with these elements, now how do we go about creating a harmony between these elements? How can we take care of engaging students in the classroom using these frameworks in important ways?
Well, to give you some examples, let's start with our needs for safety, achieved through avoiding harms. Various kinds of experiences will help us feel safer in the moment. And if we internalize these experiences—fully use the power of experience dependent Neuroplasticity—to increasingly enable and help these experiences of avoiding harms, experiences of safety, or resources that can help us avoid harms, or give us experiences of safety, if we take these experiences and help them get encoded in neural structure, we can grow them as strengths inside ourselves. This will then, of course, enable us to be safer down the road.

I. KEY FOR EDUCATORS / TEACHERS - ENSURE YOU HAVE A BRAIN FRIENDLY LESSON PLAN.

Then we have the approach and reward system, so that we're satisfied. There is so much stimulation already, it's kind of mind boggling because so much of information comes into the brain from the resources that are available at students disposal, so much information is coming to the brain that what we actually do is filter out a tremendous amount of it. So, if you relax some of those filters and become more porous to allow all the stimuli landing on you from the outside and also emerging up from within your own experience —woah—who could want for anything more. There's a sense of the real learning, whether or not it's perfect.

Other key resource experiences and satisfaction systems are things like accomplishing goals, getting things done, putting things behind you and moving forward in your learning.
Key - " Means are as important as ends; methods are as important as goals" How do you offer the content, is there a choice for consuming the content in the manner students like?

And then, let's take a look at the last system: Creating Synapses. There are many wonderful experiences that can help us create more connections and strengthen it and experiences that are the basis for growing resources inside. When the students are here, we put them in the place of learning, so this is where their attitude towards learning would change and finally the thinking brain, as you know which is just 4 million years old, in homosapines time in evolutionary period, this is where we reflect, analyze, thinking and creation happens. Where we are predicting and planning at the same time. So if we understand how our brain works in terms of the three evolutionary part of our brain, we as teachers can connect them to create and amazing opportunity for the children to learn, and we can implement this scaffolding strategies of learning, we can do this every single day, but we need to understand what to do and how to do it to make it happen. And if we do that then we can have children in our classroom who would be amazing learners.

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