

Creative Use of Teaching-Learning Materials

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A few hundred thousand years ago, *Homo Sapiens* walked on African soil, searching for food, shelter, perhaps companionship. Externally, their lives were completely different from ours today—but inside our skulls, our brains are remarkably similar to those of our ancestors. Children on the African savannah did not go to school, but their young brains were perfectly adapted to learn from their environment over a period of several years. Since the time scale of evolutionary change is so slow, the structure and function of children’s brains have not changed over the millennia. Learning from one’s environment is an integral part of childhood, and those of us who teach or design learning environments should keep this in mind. In this essay, I hope to persuade readers that the creative use of teaching-learning materials is a powerful way to align schooling with the way children’s brains are built to learn.

Childhood has evolved as a special stage of life, during which the individual has the time and opportunity to learn what it takes to survive in the particular situations into which he is born. For humans, this period of time can be as long as 18 years. Other animals either have shorter childhoods or need no parenting at all (for example, sea turtles are independent from their parents right from the moment they hatch). The disadvantage of shorter childhoods is a greater inflexibility in response to changes in the environment, because more has to be ‘programmed’ into the young, in the form of instincts. Instincts are responses to stimuli that have existed in the environment for millennia, so that if the environment changed abruptly, the same instinct could lead to death (for example newborn turtles move instinctively toward light, even if these are artificial lights strung along the beach). The value of our longer childhood is that we seem to have fewer programmed instincts, and therefore can learn to adapt to our environment over a period of time.

But to say that we have fewer instincts misses an important point; we are not born ‘blank slates’. In fact, children have a lot of programmed instincts that make them *ready to learn*. This readiness to

learn comes in the form of many strong tendencies and preferences that babies and children show, and if we want to teach them, we should work with these forces rather than ignoring or countering them.

One big mistake we have made is to forget that children are designed to learn from real-world environments. Decades of psychological research has documented how just in the first few years of life, children spontaneously develop an impressive and complex understanding in several domains of knowledge. They seem particularly tuned to the domains of language, of number and space, the properties and types of living things, the behaviour and thinking of other human beings and the properties and mechanics of physical objects. Through interaction, feedback, repeated trial and error learning, children make sense of these different worlds. They soon figure out how to understand and communicate in the language(s) they are surrounded with; and they begin developing a mental number line which will later adapt to include fractions and negative numbers. They learn which four legged-creatures are dogs, which are cats, and which are chairs without life and intention. They figure out the intentions of other people from reading into their actions or even just body language. They also learn countless things about the way objects move in space—force, speed, direction. All these areas of learning happen because children explore the world with their *whole bodies*, acting on things, interacting with people, and observing the effects of all this. Nobody needs to explicitly teach them any of this, and it isn’t even necessary to have expensive gadgets or toys—any normal environment will do. Of course, you might ask, we expect our children to learn a great deal more than all this, from quadratic equations to Carnatic music. Don’t we need special environments and explicit teaching for this? Absolutely we do, so we invented school—but we forgot that children’s brains, whether in school or outside, retain the same capacities to learn best from multiple concrete experiences!

In stark contrast to the real world, a classroom is very restrictive and affords so little opportunity for acting upon the world. Children sitting at desks in typical classrooms are expected to passively absorb what they hear or see on blackboards, posters or textbooks. They don't get to handle things, and are in fact expected to be silent most of the time. Many of the avenues usually open to a young learning brain are blocked. Teachers who realise this try their best to make their classrooms richer in terms of a variety of experiences for their students. At the governmental level too, there has been recognition of this need. The National Curriculum Framework of 2005 expressed it clearly:

Children learn in a variety of ways—through experience, making and doing things, experimentation, reading, discussion, asking, listening, thinking and reflecting, and expressing oneself in speech, movement or writing—both individually and with others. They require opportunities of all these kinds in the course of their development.

The *Sarva Shiksha Abhayan* allots a small fund for each government primary and upper primary school teacher to purchase concrete materials that enhance learning, including globes, blocks, rubber tubing and sticks for making polygons, and so on. So although we have taken children out of the real world and into the classroom, we are bringing in select materials that we hope will fulfil their need to learn through interactive experiences. Some are well designed, as for example material that allows you to play with exact fractions and put them together to make other fractions, wholes, and improper fractions. Some are particularly useful, such as models of molecules and maps. Materials like these teach children concepts that could not possibly be deduced by them simply in an open exploration of the real world. Similarly, 'raw' materials such as tubes and sticks allow children to explore the geometrical properties of shapes that are not easily found in nature.

Here I would like to highlight two TLMs for their immense learning value: the world of nature, and the world of other human beings. To allow our students to interact more freely with both worlds, we have to take them outside the classroom—there is no substitute for this. To 'use' nature and other people as TLMs means to structure children's interactions with both, to go beyond their spontaneous, playful interactions. Here are some examples of how my

colleagues and I have done this.

We are blessed with a campus in natural surroundings, far outside the city. It is a landscape of boulders, trees, grasses and paths that wind around everything before looping back to where you started. The children quickly gain as much or more comfort in the wild spaces as they do in the classroom. Their free play time is spent outdoors, in addition to which we teachers plan several specific, structured engagements with the natural world. For example, students do close observation of plants, insects, lizards and make very detailed drawings. They learn to draw what they see in front of them, rather than from their stored knowledge or imagination.

They grow vegetables in patches that they maintain through the rainy season. They go on walks, learn to climb trees and rocks, and learn to navigate using these as their trusted landmarks. Through such activities, students have questions about what they observe, and we take time to elicit and record these for everyone to consider. For example, *How can you tell a weed from a plant? How fast does the bamboo grow? Can we tame a bird in the wild? When will this rock fall down? And How did the centipede die?* Over the months, we figure out with them how we might investigate these questions. We encourage them to make guesses based completely on their own observations, and we do not refer to texts or the internet for any answers. These activities in our perception most closely match the way children learn in real world environments.

In older classes, our use of nature as TLM becomes more formal and rigorous. Courses in biology, environmental studies and geology can access the immense outdoors as the laboratory! Senior students can quickly 'download' information from textbooks and teachers, but we hope the spirit of investigative learning and hypothesis-generating is still alive. And young people who retain a close and affection contact with nature are so vital to the future of our planet. A teacher in a city school can take his students on short trips; maybe to a beautiful grove of trees just a half-hour walk away, or a park nearby. Schools already do trips like these, but the way their time is spent in these beautiful places needs to be re-imagined.

What about social interactions as TLM? In typical classrooms, the child's natural inclination to socialise is frowned upon: don't talk to your neighbour, don't talk out of turn, work alone and

don't help each other. All these rules can be relaxed if we have smaller class sizes and more flexible teaching styles. We must allow classrooms to be noisy discussion spaces for some time each day, and we must encourage students to work together in pairs or small groups. The benefits of all of this are well documented, yet what prevents us teachers from making it happen is partly our fear of losing control over the discipline of the class. If we realised how important these social interactions are to our children's learning and development, surely we will find ways to change classroom cultures to become more interactive, without becoming dysfunctional!

My colleagues and I make every effort to encourage students to engage with people in various learning contexts through the years. Social science and language classes are essentially all about human interaction. There are plenty of well-written books in these subject areas, and reading can give children a window into the world of other people; but nothing beats the immediacy of a face-to-face conversation. So whenever possible, we take small excursions outside school for students to meet and talk with people in the neighbourhood. Language classes often include interviews with family members or residents of the nearby village. Children have made 'Day-in-the-Life' booklets about a variety of people: ice cream seller, traffic policeman, *mochi* and auto-rickshaw driver. When we learn about the history of Bangalore, it always involves a few precious conversations with elderly people who have lived and worked in the city for decades, and who remember the old days with

vivid clarity. We have found that people from all walks of life are happy to talk with children—we have never yet been told we are being a nuisance! What the children understand about these lives is documented in illustrated booklets, and added to the school library.

Nothing can substitute for direct interactions with natural processes and with other people. We have to change our ideas about traditional classrooms to allow for these interactions, and I feel there is already a recognition of this among many educators and teachers. Progress is definitely happening...but recently I read something that made me wonder. It was an article¹ about an educational breakthrough called Connected Worlds (currently installed in a museum in America), described as 'a cutting-edge installation that aims to teach youngsters about environmental science by immersing them in it.' Immersing them in what? Well, a digital, virtual environment complete with animated waterfall, animated forests and creatures, and the computing capacity to respond to children's actions in this environment. The article states that children learn better when they see the connection between their actions and what happens in the environment, and that this does not happen easily in a classroom. It ends with this cheerful thought: '...the best thing we could hope for is that, a decade hence, an educational environment like Connected Worlds will seem totally ordinary.' Sometimes, I worry that we are going to go straight from classrooms to virtual worlds!

¹<https://www.wired.com/2015/08/key-digital-learning-bring-real-world/>

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