

# Our Student's Future

“Learning can, of course, take place in the classroom, but most of it doesn’t. Today’s learners are not just students; learning has suddenly become everybody’s business. In fact, learning “how to learn” may now be your most critical survival skill.” –*Eric Jensen Super Teaching*

Neil Postman said: “The new education has as its purpose the development of a new kind of person, one who...is an actively inquiring, flexible, creative, innovative, tolerant, liberal personality who can face uncertainty and ambiguity without disorientation, who can formulate viable new meanings to meet changes in the environment which threaten individual and mutual survival.”

Our brains respond to information that is highly meaningful relevant to what we know or understand. The old paradigm of thinking on a body of knowledge may not be an affective curriculum standard for today’s students who may require simply more “how to learn” strategies, specifically in this information age. Most curriculum writers, specifically those who write state standards are between ages 40 and 60. We hope that these people understand today’s classrooms, today’s learners, and today’s science. We hope they understand what kids will need to “know” in the next 20 – 40 years.

Considering what adults learned 20+ years ago in science, or in school for that matter, is much of it relevant to today? Did we have any idea 30 years ago that kids would not only have laptops and computer software, but their own cell phones? Did we anticipate they would be so computer literate to outpace adults from their abilities to write power point, excel, or websites where 23 year old have become billionaires? Did we have any idea that there would be careers involving neuroscience, nanotechnology, microbiology, or quantum physics? Do we know what skills students will need in 20 years? What careers will be available for these students in 20 - 40 years from today? Do we know how to prepare these students for careers that do not yet exist?

“Education is basically an art, and the teacher expresses the highest concept of this art when he or she keeps it from becoming routinized and lethargic.” –Howard A. Ozmon, Samuel M. Craver *Philosophical Foundations of Education*

Chances are good the future will not require much of the content knowledge presented in school today. Teachers are not naïve to believe all students will ‘remember’ all facts, figures, statistics, dates, and definitions. It is more the process of learning that we hope students will gain from schooling. The hope is that through this process, students will learn how to learn in many different ways. Science is a theme for learning how to learn science. The methods used for learning science are different than those used for social studies, or language arts, or math, or literature, or foreign language, or applied arts, or music. We do not expect, for example, students to leave the 7<sup>th</sup> grade knowing every organelle inside the cell. We expect that the process of that learning becomes encoded in the brain, and when confronted with finding information they are familiar enough with the topic to obtain the information needed with the proper skills to do so, not directly from their head by way of rote recall and memorization. The only place where it would

be beneficial for someone to have a massive amount of memorized information would be a game show.

“When we think about intelligence, we are really talking about our ability to react intuitively, creatively and constructively to a wide range of experiences.” –Robert Sternberg, PhD. *Mind in Context*

More effective skills that are needed include but are not limited to: curiosity, integrity, people skills, connection skills, and the “big picture skill” such as sustainability of our planet for example. Yet standardized tests do not examine these necessary skills do they? Assessment requires feedback on the whole picture. All memories are highly malleable, and need revising, they need more time if testing on models based upon recall. In this age of information overload, students simply need more time to encode catalogs of facts and figures. Learning to learn strategies are more essential than amassing knowledge, but where do we see “learning how to learn” on standardized tests? How do standardized tests determine if the student is a “good learner”? Students do not get tested for being a “good learner”. There is little reward for this important skill. Students can easily get tested for just knowing facts, which is not the same thing.

One of my early experiences that shaped my teaching was at Stevenson High School in Lincolnshire, Illinois. I took over for a teacher that was ill, and the class was senior honors biology. We were following the prescribed curriculum of dissecting fetal pigs for an entire week, and being early spring, I thought it might be good to take class outside to do some exploring. I had previously investigated the area in front of Stevenson High School where there are three human made ponds. Surrounding the ponds were plenty of dead fish revealed after the recent snow melt. When we arrived, I asked the students to tell me why the fish had died. They immediately came up with possibilities including poisoning, pollution, infection, or even ice fishing where the caught fish were thrown to shore only to get buried in the snow. I probed further asking them to recall the past winter and what was so significant about that season (lots of snowfall). Then to conclude what would happen if that snowfall covered the ponds. Still probing with clues, I led them to how the pond would be dark with all of the snow piled up, which, I probed, since the fish didn't need the light, what would? This led to dying plant life within the pond. Still probing and providing clues, I led them to what happens to plants as they decompose. Finally one honors student realized that decomposing plants absorb oxygen and without sufficient oxygen, the fish suffocated. It was this realization that affected my teaching from that point on. One can be book smart, know all of the definitions and terms, but application of that information is difficult for the brain to manage if it is so accustomed to memorizing facts.

Students will often say to their teacher “is this going to be on the test?” What they are really saying is: “my brain capacity is not unlimited, so, what is the most important thing to remember from all of these facts you're giving to us?” Teachers may be insulted by this and respond with “Everything!” but to the human brain, it is a relevant question. Many students can't express this, but adults can. How often do you as an adult find

yourself in a conversation where you're thinking "I wish this person would get to the point!" or "Too much information!"

Question: Do better test takers do better in their careers? Are the skills examined in standardized tests transferable to real life scenarios? How can students focus on test scores when they should really focus on real world stuff? Are making mental models, problem solving, critical thinking, or application of facts being tested? Here's one: Are people skills being tested? As adults all know, things like people skills turn out to be highly important in life. One may be very intelligent and 'book smart' with a catalog of facts but without people skills they will have some difficulty in their real world life experiences. We can also conclude that critical thinking, problem solving, managing, organization, and making mental models of ideas are in high demand in the working world today. I know of no employer that will say "tell me all the organelles within the living cell and I'll give you the job!" It is more likely that they will inquire about critical thinking and mental models. It is likely that they will present potential employees with problem based scenarios that include management, organization, and people skills to solve. Perhaps the same scenario occurred to you as you took part in the interview of the job you have today? I know mine did! And provided you responded with not only the right answers but clear ideals and visions, these were the keys to getting that job.

Howard Gardner stressed that mental models develop early in school. Kids have the wildest imaginations, have you ever said that? Yet this imaginative thinking, these mental models, this critical thinking, often disappears when students realize that it is a drill and practice world they are in. Neil Postman once noted: Too often, children who have entered school as question marks finish school as periods. By the middle school and high school years, many students have become conditioned to determine just what they are supposed to know. The skills that would allow them to keep asking questions and finding out ways to solve problems are buried.

Best practices in teaching that include elements of critical thinking, simulations, problem based learning, performance based assessments, and the inquiry approach in science education provides an antidote to properly preparing our students for their future.

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