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But it is not power over mechanism that fosters the birth of new ways to think, it is the ability of media to hold new ideas in new ways long enough for us to internalize them. Keeping the new ideas out in books or computers is outsourcing the very things we need to become better thinkers. Thoreau said “We become the tools of our tools” yet he didn’t mean this is inevitable, but just a very strong tendency as humans.

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Enlightened Imagination For Citizens

by Alan Kay

In a raging flood, a man risks his life to save a swept away child, but two years earlier he voted against strengthening the levee whose breaching caused the flood. During an epidemic people work tirelessly to help the stricken, but ignored elementary sanitation processes that could have prevented the outbreak. More astoundingly, as many as 200,000 Americans die each year from diseases spread by their own doctors who have been ignoring elementary sanitation (including simply washing their hands when needed), but who then work diligently to try to save the patients they have infected. Studies show that about 80% of Americans are “highly concerned” about climate change, yet this percentage drops to less than 20% when the issue is combined with what it will cost to actually deal with these changes.

These examples are failures of imagination, yet in other areas we seem to have abundant and paradoxical abilities to imagine. For example, we routinely ascribe scurrilous attributes to those outside our various tribal circles—including the seeming paradox of being simultaneously against geographical rivals within our country, but unite with those same rivals during the Olympics. Much of the world deeply believes in one form or another of non-physical entities who help or hurt our lives. More than 20% of Americans believe in witches. Many of the doctors who can’t imagine germs vividly enough to wash their hands are nonetheless religious, and

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are able to imagine a variety of deities. Many people who subscribe to a religion based on forgiveness are nonetheless astoundingly aggressive about exacting punishment and revenge. And so forth.

Those who study human behavior originally looked at differences between individuals and cultures, but soon discovered hundreds of similarities. All of the more than three thousand cultures studied had a language, stories, religious and magical beliefs, interest in kinship, had circles of rivalries, traditions of revenge and vendetta, etc. Each of these had somewhat different manifestations from culture to culture, but the categories were universally present. A child taken from one culture at birth could be raised to be a complete member of another culture.

These similarities also highlighted behaviors that were not found everywhere. For example, reading and writing are not universal. Deductive mathematics, empirical science, and systems theory are not universal. The idea of equal rights is very sparse in all cultures, and was not found in any traditional culture. These activities seem to be inventions, whereas the universal categories seem to be part of our genetic heritage as human beings.

When Einstein remarked that “Imagination is more important than knowledge”, he meant “enlightened imagination”—that is, imagination aided by specially obtained knowledge using methods that as much as possible are able to avoid being snarled by our naïve takes on what is around us.

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from the population as a whole (this was another early ideal for the great American experiment). We could argue that the current representatives are “all too representative”, but this is part of a slide in our political and social systems that needs to be shored up and improved. The idea of “national service” is now just a whisper, but it is what needs to be brought back into the forefront of what it means to be a citizen.

This brings us back to “the education of imagination” on all fronts, and not the least of this is to have a vivid imagination of being citizens. We are no longer hunters and gatherers from 100,000 years ago, even though we are still born with those propensities. We are not in this country to exploit its resources but to create abundant resources and high degrees of safety for all. Loose talk about “being more competitive” misses the larger fact that it was “learning and designing ways to cooperate” that created the opportunities and wealth of possibilities of developed civilizations.

These perspectives can provide us with much stronger vantage points for thinking about how education needs to be reformulated for the 21st century. The needed curriculum is neither “paper based” nor “computer based”. Getting distracted by “media for education” misses the central point that education is about ideas, processes, and transformations, and should use all means available for helping learners reshape their inner realities and powers of imagination.

That said, visions about developing much stronger abilities to imagine do provide powerful perspectives for thinking about how to use computers as “wheels for the mind” to help us extend what we

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consistently take actions that are against their best interests if there is gain to be had in the short term, even if detrimental in the longer term. These actions range from unhealthy eating habits to voting against improving the education of the next generations.

However, because of our deeply embedded human behavioral patterns, we are also easily fooled—in fact we pay to be fooled! So, to change opinions in the short term, there could be campaigns to fool the voters by various means including raising their fear, exploiting their xenophobia, or greed, or need for status, etc. But even though there are already many attempts to fool the public by businesses and politicians, we must see that this “normal behavior” is disastrous to a democracy. We must find a better way.

A stronger recourse would be to educate children to grow up with “enlightened imaginations” who can actually participate as the bedrock of our political system, who will make decisions and take actions because they are actually good ideas for the country and world as a whole. This idea was the original basis for public schooling in the US, and was famously articulated by Jefferson: “I know no safe depository of the ultimate powers of the society but the people themselves; and if we think them not enlightened enough to exercise their control with a wholesome discretion, the remedy is not to take it from them but to inform their discretion by education.”

There is still time to restore this well enough to aid fundamental changes in how our societies make decisions, and especially to start to better deal with the large potential systems disasters we face.

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to move beyond our barriers even with the help of education. Even more problematic, many recent studies have shown people’s opinions are not just strengthened by similar opinions and confirming evidence, but are *also strengthened by contrary expert opinions and evidence*.

Yet it is Education done differently and better—the “Education of Imagination”—that must be pressed into service to deal with the challenges of the present and future.

The complex processes we call “systems” present special challenges to our uneducated imaginations. We tend to think additively, and are constantly surprised when something that seems to be “just added in” causes surprising and often disastrous changes. For example, in 1859 in Australia, Thomas Austin said “The introduction of a few rabbits could do little harm and might provide a touch of home, in addition to a spot of hunting.” The result was not the Australian ecology + rabbits, but an entirely new ecology, which in many cases became a landscape of ruins. None of the efforts since then to “subtract” the rabbits from the ecology have come close to working.

One of the reasons the consequences were not imagined is that our human commonsense tends to think of “stability” as something static, whereas in systems it is a dynamic process that can be fragile to modest changes. One way to imagine “stability” is to take a bottle and turn it upside down. If it is gently poked, it will return to its “stable position”. But a slightly more forceful poke will topple it. It is still a system, but has moved into a new dynamic stability, one which will take much more work to restore than required to topple it.

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In our world, we have enough power to topple our most important systems, but not the power to restore most of them.

Being heroic in the face of disaster—as humans often are—will not help in most of these cases. This means that we have to “learn about consequences before they happen”. We have to be able to summon vivid enough imaginations of the disasters to be heroic long before they happen. And we have to educate our imaginations how to do this without introducing superstitions and paranoid delusions.

We are embedded in four large “systems of systems”: the natural universe, our social systems, our technological systems, and the “systems that are us” (biological, psychological, etc.). We need to start imagining how to educate our imaginations well enough to both gain more intuition about these systems, but perhaps more importantly, to know when we cannot trust our intuitions but must rely on colder, more remote means of reasoning that nonetheless have to result in early actions on our part.

An example of “modern rabbits” are the several hundred large oceanic dead zones caused by lack of oxygen in the water. Studies since the 1970s have shown that the main cause is excessive nitrates and phosphates from farming fertilizers brought to the oceans via river runoffs. These stimulate the growth of algae which deplete the oxygen. For example, the dead zone in the Gulf of Mexico is now much larger than the state of Florida. This dead zone recovered briefly during the great drought of 1988, which dried up the Mississippi River and prevented the fertilizer runoff from getting to the Gulf. But it is now back larger than before, and growing. “Dead fish in the Gulf don’t vote in Missouri”, nor in the other states on the

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Mississippi River, and there is no controlling authority for the river itself. Not only has little action been taken, but the interest in raising corn for alcohol threatens to put much more fertilizer into the runoff.

A more complex example is the Earth’s climate. For some time there has been abundant evidence that not only is the climate undergoing considerable change, but that human activities are likely a major part of the cause. Our current understanding of our planet’s climate and the ecosystems it supports—including us—shows it be a complex system with many possibilities for toppling, and most of these topplings are adverse to human wellbeing.

An important strategy in cases where exact prediction is very difficult is to look at the actual costs of a topple. For example, simulations indicate that if the average ocean temperatures rise by less than 3 degrees, this will likely give rise to hurricanes never previously experienced with power about 10 times that of Katrina. These “super hurricanes” can sustain themselves over land instead of dying out.

When the costs of an imperfectly understood event are high or essentially irreversible, measures have to be taken even when perfect proofs are lacking. This idea is understood by most developed societies—and carried out in the form of levees and pumps, food and water stocks, etc.—but is nonetheless resisted by many of the voting public.

How can the voting public be helped to make better decisions? Most people who study human perceptions of value—for example, behavioral economists—have found that many people will

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