Ode to E Pluribus Unum for Sunday February 26 2023

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Comet ZTF over Yosemite Falls

They are both falling. The water in Yosemite Falls, California, USA, is falling toward the Earth. Comet ZTF is falling toward the Sun. This double cosmic cascade was captured late last month as fading Comet C/2022 E3 (ZTF) had just passed its closest to planet Earth.

The orange star just over the falls is Kochab. With the exception of a brief encounter with a black bear, the featured image was a well-planned composite of a moonlit-foreground and long-duration background exposures - all designed to reconstruct a deep version of an actual single sight.

Although Comet ZTF is now fading as it glides back to the outer Solar System, its path is determined by gravity and so it can be considered to still be falling toward the Sun -- but backwards.

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The Falcon 9 Rocket and Endeavour Will Launch Tomorrow.

SpaceX Falcon 9 rocket carrying the Crew-6 Crew Dragon Endeavour spacecraft rolls to Launch Pad 39A of NASA's Kennedy Space Center in Cape Canaveral Florida for a Feb. 27, 2023 launch.
(Image credit: SpaceX)

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SpaceX Crew-6 Astronauts Launching to the ISS Tomorrow (?)

Crew-6 members seated from left: Andrey Fedyaev of Roscosmos; NASA's Warren "Woody"

Crew-6 will launch to the International Space Station (ISS) on Feb. 27 or so, with four astronauts on board a Crew Dragon spacecraft atop a SpaceX Falcon 9 rocket.

http://bit.ly/3IkOvyn

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What is ChatGPT Doing ... and Why Does it Work?

Imagine scanning billions of pages of human-written text (say on the web and in digitized books) and finding all instances of this text—then seeing what word comes next what fraction of the time.

http://bit.ly/3xJw5lU

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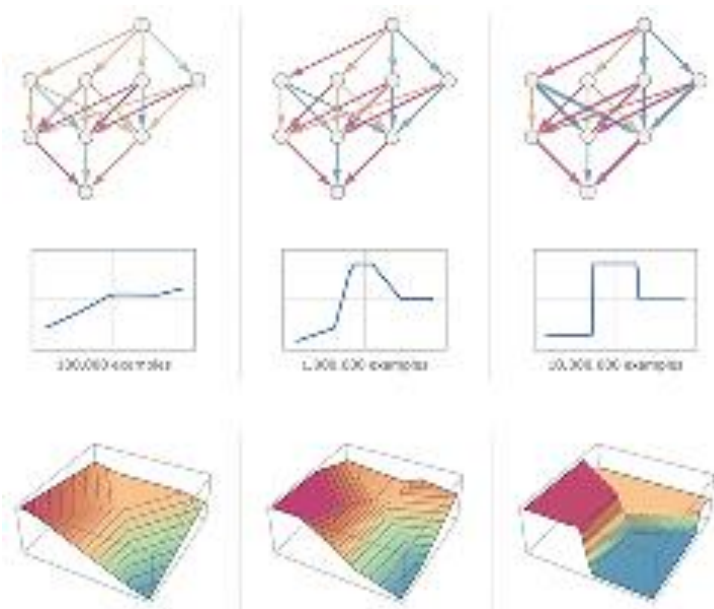
ChatGPT's Shake-up in Education

Faculty from the Stanford Accelerator for Learning share thoughts about how the new AI chatbot will change and contribute to learning and teaching.

The recent release of ChatGPT — a new natural language processor that can write essays, spit out a Haiku, and even produce computer code — has prompted more questions about what this means for the future of society than even it can answer, despite efforts to make it try.

Faculty from the [Stanford Accelerator for Learning](#) are already thinking about the ways in which ChatGPT and other generative artificial intelligence will change and contribute to education in particular.

Victor Lee, associate professor of education and the faculty lead for the accelerator initiative on generative AI in education, stresses the importance of educators in harnessing this technology. "If we want generative AI to meaningfully improve education," he says, "there is the obvious step we need to take of listening to the existing expertise in education — from educators, parents, students, and scholars who have spent years studying education — and using what we learn to find the most pertinent and valuable use cases for generative AI in a very complicated educational system."

Over the next several weeks, the Stanford Accelerator for Learning will launch listening sessions and gatherings with educators to strategize a path for generative AI. Says Lee, "We need the use of this technology to be ethical, equitable, and accountable."

Here are some initial thoughts from accelerator faculty on the possibilities and risks of generative AI in education.

What's next for high school essays and writing?

"Teachers are talking about ChatGPT as either a dangerous medicine with amazing side effects or an amazing medicine with dangerous side effects. When it comes to teaching writing, I'm in the latter camp.

"First, ChatGPT may help students use writing as a tool for thinking in ways that students currently do not. Many students are not yet fluent enough writers to use the process of writing as a way to discover and clarify their ideas. ChatGPT may address that problem by allowing students to read, reflect, and revise many times without the anguish or frustration that such processes often invoke.

"Second, teachers can use the tool as a way of generating many examples and nonexamples of a form or genre. Often, teachers have the resources and bandwidth to find or create one or two models of a particular kind of writing — say, a personal narrative about a family relationship. As a result, students may come to believe that there is only one way to write such a narrative. ChatGPT allows teachers to offer students many examples of a narrative about family where the basic content remains the same but style, syntax, or grammar differ. With many examples to compare and analyze, students can begin to see the relationship between form and content. They can develop criteria for what makes a strong piece of writing, or how one verb might affect readers differently than another. For teachers, designing instruction has just become much easier — ChatGPT is essentially a tool for creating contrasting cases, and most teachers will be delighted that ChatGPT is doing a lot of the legwork for them.

"Obviously, teachers are less delighted about the computer doing a lot of legwork for students. And students still need to learn to write. But in what way, and what kinds of writing? A third side effect of this new medicine is that it requires all of us to ask those questions and probably make some substantive changes to the overarching goals and methods of our instruction."

— *Sarah Levine, assistant professor of education*

What will it mean for college admissions?

"There is some consternation in the admissions space about these technologies, and with obvious good reason. In one recent Twitter thread, someone posted an AI-generated essay and the results of an informal study showing that over half of admissions officers identified it as not being computer-generated. With SAT/ACT test score usage waning in many admissions sectors, the narrative portions of college applications may receive additional emphasis in evaluation of merit and deservingness. This was our worry when [we found](#) the content of admission essays to be more strongly correlated with income than are SAT scores.

"AI complicates this space immensely, though in what direction policy-wise, it's hard to say. My best guess is that access to the technology will make its use in admission essays more prevalent among lower-socioeconomic status households. Why? Because wealthier folks, as they've shown in the past, are quite savvy and will know that (1) places like ETS [Educational Testing Service, which develops standardized tests for K-12 and higher education] are already working on algorithms to accurately detect AI-written

essays; and (2) anything available to the masses is something to not only avoid but to counter with a more exclusive strategy. That might look like writing non-standard essays — poetry or a mini-screenplay, for example — or something else. The drive for maintaining social distinction and its attendant privilege is quite strong. And there certainly will be a for-profit cottage industry rising up to meet the demand to help richer families in their quest. Things are moving fast, though, and perhaps at such a speed that technology's potential democratic effects do surface in this space."

— Anthony Lising Antonio, associate professor of education

We need to remember that language, even from ChatGPT, is deeply linked to culture and cognition

"The innovation centers the capacity to replicate and, in some cases, enhance how human intelligence emerges in dialogue. On its merit, this advancement has the potential to improve how software supports students' learning through rich, computer-generated dialogue. This is an incredibly important technological advancement that must understand the cognitive and cultural benefits of dialogue as an educational tool. To replicate dialogue without an understanding of the cultural and cognitive benefits of dialogue runs the risk of centering a singular cultural lens: that of the designer.

"Dialogue serves many purposes. Social science research indicates that dialogue represents cultural membership, gender identification, and group membership broadly. Said differently, how something is said sends multiple messages. On one level all dialogic communications send a message of content. The message shares an idea. On another level a message sends a message of belonging and identity. How the message is communicated sends a cue of who the message is for and who the speaker is. This subtle intersection of language cues and language identities embeds a message in every dialogical exchange. So, artificial intelligence must embed the power of cultural cues in its communicative pathways. They are already there. How something is said sends a message of who the speaker expects to be.

"From my cognitive perspective, dialogue serves as both an assessment tool and a tool for developing mastery. It is vital that the AI developers create opportunities for students to explain their way toward expertise, to use artificial intelligence for feedback and corrective support, while explicitly ensuring all students are able to receive cues of cultural belonging. In thinking this way, all kids may benefit from AI technologies if developers do the important work of centering the intersection of language, culture, and cognition."

— Bryan A. Brown, professor of education

What about opportunities for kids with disabilities?

"In the disability space, I've been having conversations about (a) how we could use AI to code videos of teachers and other instructors to coach on instructional practices that have been demonstrated to be useful for kids (i.e., providing opportunities to respond; corrective feedback); and (b) ways AI could possibly help us develop smarter tutoring that is responsive to students' needs. There seem to be a lot of opportunities."

— *Chris Lemons, associate professor of education*

What will students need to know now?

"We have a glimpse of new things that are going to be built with generative AI. What do we need students to know and understand about how these are built, how they work, and the costs and benefits (financial, ethical, environmental, social) of different technologies for different visions of what education is supposed to do? As a first step, we need to seriously examine how generative AI is changing how different fields and disciplines do their work and what ideas students need to develop to both build and use AI *for* humans rather than *in place of* humans."

— *Victor Lee*

Faculty mentioned in this article: Victor R. Lee, Bryan Brown, Sarah Levine, Anthony Antonio, Christopher J. Lemons

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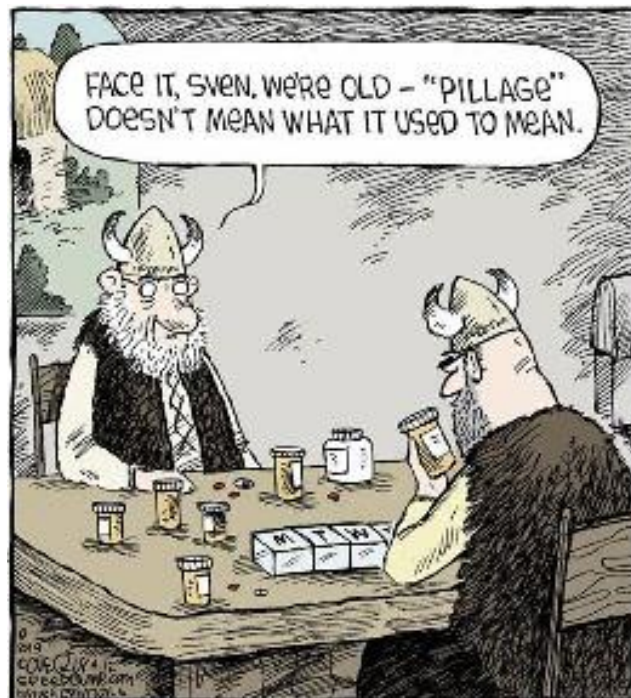
Ants Live 10 Times Longer by Altering Their Insulin Responses

Queen ants live far longer than genetically identical workers. Researchers are learning what their longevity secrets could mean for aging in other species.

http://bit.ly/3Ylw8zY

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Model T Ford...

This is really fun to watch . . . . the original Model T Ford being built, and then ride along on the roads (such as they were). The factory workers are almost dressed up and the heat must have been horrible in the summertime.

https://safeshare.tv/x/ShbgvwazCZ

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What the Earth Looked Like Millions of Years Ago

The Earth is more than four billion years old, with its features changing as its tectonic plates slowly shifted over time. This interactive display lets you travel back as far as 750 million years ago, to not only see what Earth looked like, but where your home address was.

https://dinosaurpictures.org/ancient-earth#750

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The Extraordinary Splendor of Ordinary Chemicals

From substances like artificial vanilla and vitamin C, a photographer creates a realm of enchantment.

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A Valentines Story:

A crusty aviator found himself at a gala event local women's liberal arts college. There was no shortage of extremely young, idealistic ladies in attendance, one of whom approached the pilot for conversation. She said, "Excuse me, sir, but you seem to be a very serious man. Are you this way all the time, or is something bothering you?"

"No," the pilot said, "just serious by nature."

The young lady looked at his awards and decorations and said, "It looks like you have seen a lot of action."

The aviator's short reply was, "Some."

The young lady, tiring of trying to start up a conversation, said, "You know, you should lighten up a little - relax and enjoy yourself."

The pilot just stared at her in his serious manner.

Finally, the young lady said, "You know, I hope you don't take this the wrong way, but when is the last time you had sex?"

The aviator continued to stare at her and replied, "1955."

She said, "Well, there you go; you really need to chill out and quit taking everything so seriously - I mean, no sex since 1955, isn't that a little extreme?"

Then, glancing at his watch, said in his matter-of-fact voice, "Oh, I don't know. It's only 2130 now!"

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NASA Awards Mars Mission Launch to Blue Origin

<div align="center">By Patrick Hilsman</div>

NASA has chosen Blue Origin to launch the ESCAPADE mission, which will send a spacecraft to Mars' to study the planet's magnetosphere.
Illustration by NASA/Press Release

Feb. 10 (UPI) -- NASA has commissioned private space launch company Blue Origin, to launch a mission to study the magnetosphere of Mars.

The Escape and Plasma Acceleration and Dynamics Explorers mission, known as ESCAPADE, is planned to launch in late 2024 on Blue Origin's New Glenn rocket.

Blue Origin is among 13 companies selected for contracts under NASA's Venture-Class Acquisition of Dedicated and Rideshare launch services program, with a maximum total of $300 million over five years.

The private spaceflight company that was founded by Amazon founder and former CEO Jeff Bezos.

The mission "will study Mars' magnetosphere -- the magnetized area of space around the planet -- using two identical small spacecraft, which will provide simultaneous two-point observations," NASA said in a news release.

"ESCAPADE is a twin-spacecraft Class D mission that will study solar wind energy transfer through Mars' unique hybrid magnetosphere," Blue Origin said in a news release Thursday.

"ESCAPADE follows a long tradition of NASA Mars science and exploration missions, and we're thrilled NASA's Launch Services Program has selected New Glenn to to launch the instruments that will study Mars' magnetosphere," said Blue Origin CEO Jarret Jones.

The mission will take 11 months to reach Mars, and the two spacecraft will subsequently require several months to adjust orbits to begin studying the planet's magnetosphere, NASA said.

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Our Reality May Be a Sum of All Possible Realities

Richard Feynman's path integral is both a powerful prediction machine and a philosophy about how the world is. But physicists are still struggling to figure out how to use it, and what it means.
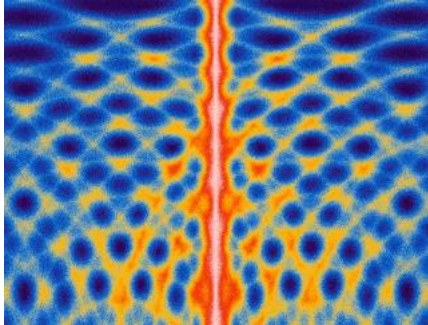
A particle's straight-line path through space can be understood as the sum of all its possible paths.
Kristina Armitage/Quanta Magazine

https://bit.ly/3Id0Og8

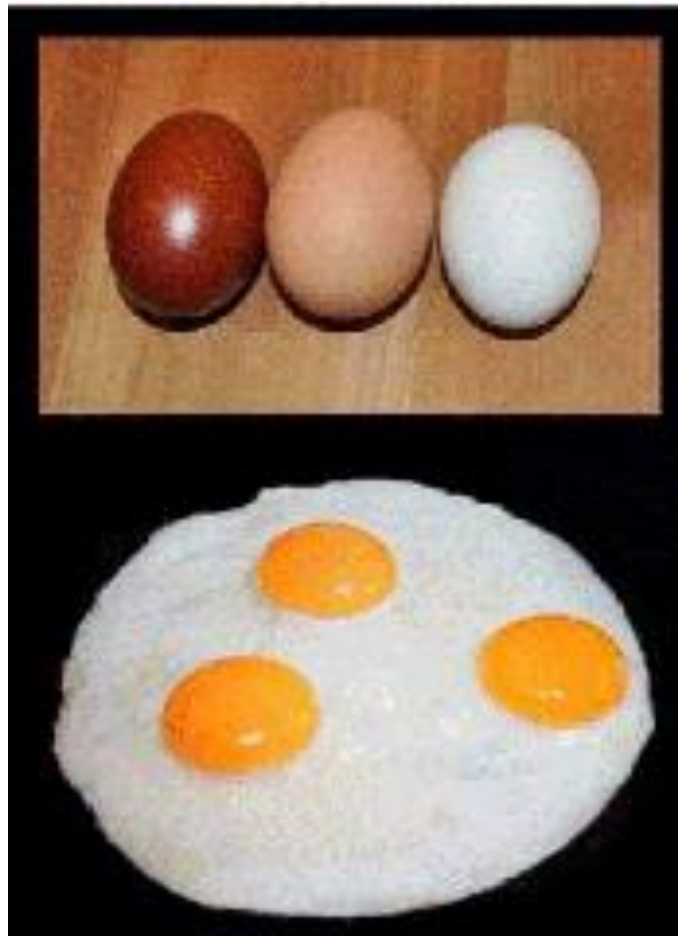===========

January's Best Science Images

The month's sharpest science shots, selected by *Nature*'s photo team.
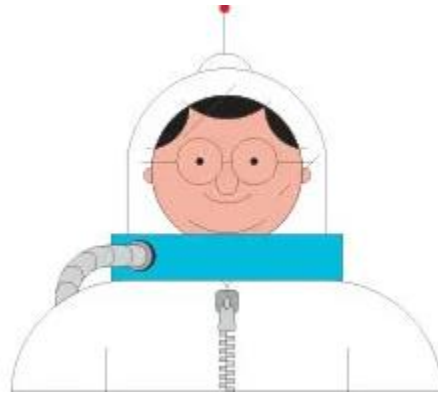
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'Nuff said?

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The WIRED Guide to Artificial Intelligence

Supersmart algorithms won't take all the jobs, but they are learning faster than ever, doing everything from medical diagnostics to serving up ads.

http://bit.ly/3YIMF0V

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Complex Ecosystems Existed Earlier Than Previously Thought

Field photo of a fish fossil from the Baishuilong section. / Photo de terrain d'un fossile de poisson (section de Baishuilong).
Credit: Xu Dai

Now, the discovery of fossils dating back 250.8 million years near the Guizhou region of China suggests that complex ecosystems were present

on Earth just 1 million years after the Permian-Triassic <u>mass extinction</u>, which is much earlier than previously thought.

<u>http://bit.ly/3ZclLP2</u>

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The Cause of Depression Is Probably Not What You Think

Al Capp's Joe Bltsflk

Depression has often been blamed on low levels of serotonin in the brain. That answer is insufficient, but alternatives are coming into view and changing our understanding of the disease.

<u>http://bit.ly/3lrgkgH</u>

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improving performance by adding an afterburner to your gas stove

Gas range improvement for the Great Santini Room

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Can California Save Rainwater to Protect from Future Droughts

A hydrogeologist looks at what it would take for California to collect storm runoff and use it later.

https://bit.ly/3HkrRXC

The *need* and the *how* have been recognized for decades. The political *will* is the issue.

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Picturing the Drought

Documenting the water crisis in the West, a photographer confronts distress, beauty and man's complicity.

"Lake Powell looks like a prehistoric sea on the surface of another planet."
Michael Friberg

http://bit.ly/3IaUTJK

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Into the Deep, Each of Which Has Its Unique Challenges.

In the Atlantic, our first of the 'deeps' to conquer, it was the challenge of the unknown; at nearly 8,400m it was our first foray into extreme depth. In the Southern Ocean it was the weather and the sub-zero water temperature. In the Pacific it was the colossal depths; the ultimate test of the engineering and technology.

http://bit.ly/3XIe9DF

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Andreas Wannerstedt's Visions

https://www.youtube.com/watch?v=SZtTupRKSKY
https://www.youtube.com/watch?v=3ZOlGMdaV8w
https://www.youtube.com/watch?v=lsl305JsQbI
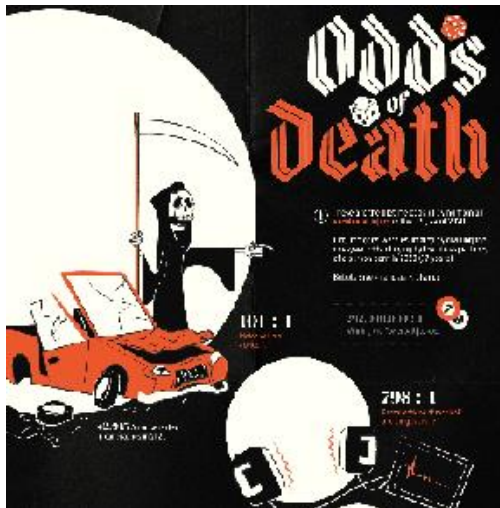
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Plumber of the Year Competition

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Visualizing the Odds of Dying from Various Accidents

The leader's a no-brainer but it's number two that should grab your attention.

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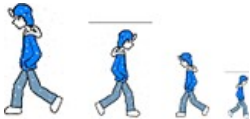## 19-Seater Plane is First to Run on a Hydrogen-Electric Engine

ZeroAvia's successful test flight was the latest step in the company's plan to remove emissions from commercial flights.

https://bit.ly/3wizqYI

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My Walking Thoughts

For Sunday February 26 2023

An Example of Where a Lot of Our Education Funds Go.

I don't mean to pick on San Diego County, but its education data seem particularly accessible, offering an ability to tease out details that often are difficult to find elsewhere. A good starting place is Ed Data found at https://www.ed-data.org/county/San-Diego .

Some Highlights

The average public school teacher salary in San Diego, CA is $60,461 as of January 26, 2023, but the range typically falls between $50,494 and $73,732. Salary ranges can vary widely depending on many important factors, including education, certifications, additional skills, the number of years spent in the profession.

While that's a step up from the $41,546 and $54,616 a waste truck driver makes in the area, it falls short of both the average ($93,888) and median ($88,372) San Diego

County public employee salaries, both of which are significantly higher than similar postings elsewhere in the US.

A little harder to find in official records is the compensation of some of the area's school administrators as brought to light in a recent newbreak.com article titled See how much San Diego County's school superintendents were paid in 2021 (http://bit.ly/3EybxAM), a tidbit sent to me by Sara Feeley in the wake of last week's Walking Thoughts.

Maybe you can make some sense out of these figures, but not only am I stumped, I am really hacked off by what I view as unbridled bureaucratic robbery. Granted student achievement San Diego schools is noteworthy by comparison with many districts but I don't feel it justifies administrative salaries that lie far beyond that of other County employees…particularly teachers who are on the front line of the education effort.

Does the gulf between school administrator salaries and that of teachers in your area mirror those in San Diego, and if so does that seem reasonable?

It seems to me a good way to address shortfalls in our education programs is to question where the money goes and its relevance to the real needs of the system.

Any thoughts?