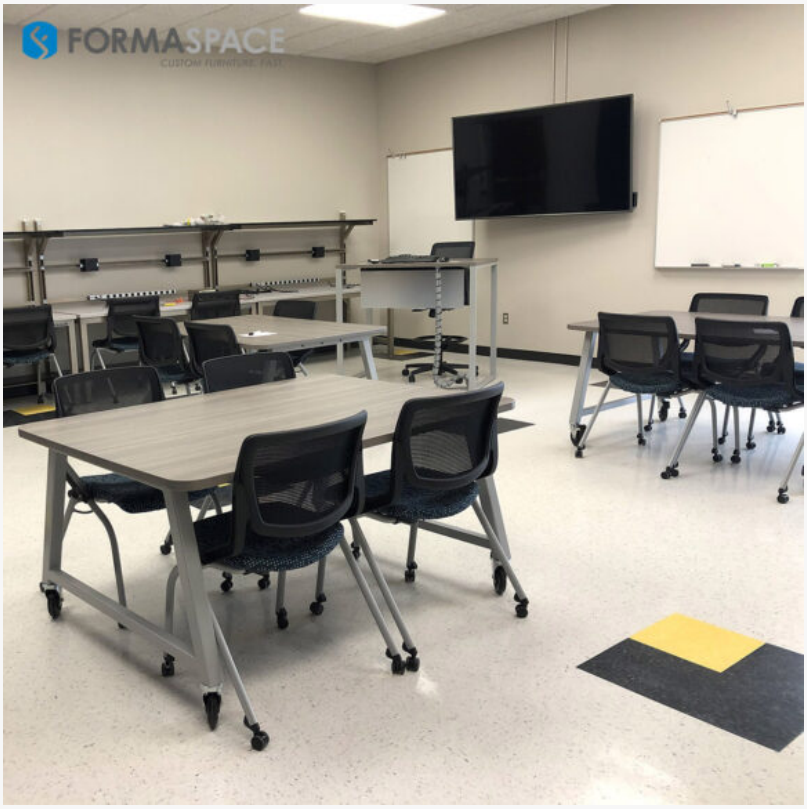
STEM Education to Fight Scientific Illiteracy

Find out what are the most important lessons we can teach today's STEM students to prepare them to become science and information literate.



AUSTIN, TEXAS, UNITED STATES, August 30, 2022 /EINPresswire.com/ -- Distrust Of Scientific Experts And Institutions Is Fueling The Rise Of An Anti-Science Political Identity

Educators have a unique role and responsibility in encouraging the next generation of young scientists, technology experts, engineers, and mathematicians – the STEM students who can help solve today's most pressing challenges.

However, there are strong prevailing headwinds impeding our progress at present.

Distrust of scientific experts has become a persistent phenomenon across the US in recent years, as many communities' negative views and distrust of science and technology have hardened into a heartfelt political identity.

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>
> *Formaspace*

Kristin Lunz Trujillo, a postdoctoral researcher at Northeastern University and Harvard University, recently wrote a paper in Political Behavior titled Rural Identity as a Contributing Factor to Anti-Intellectualism in the U.S. in which she attempts to correlate an anti-science outlook with those who maintain a strong identity as being from a "rural" area.

Lunz Trujillo argues that "rural identifiers" tend to view intellectuals and experts as members of

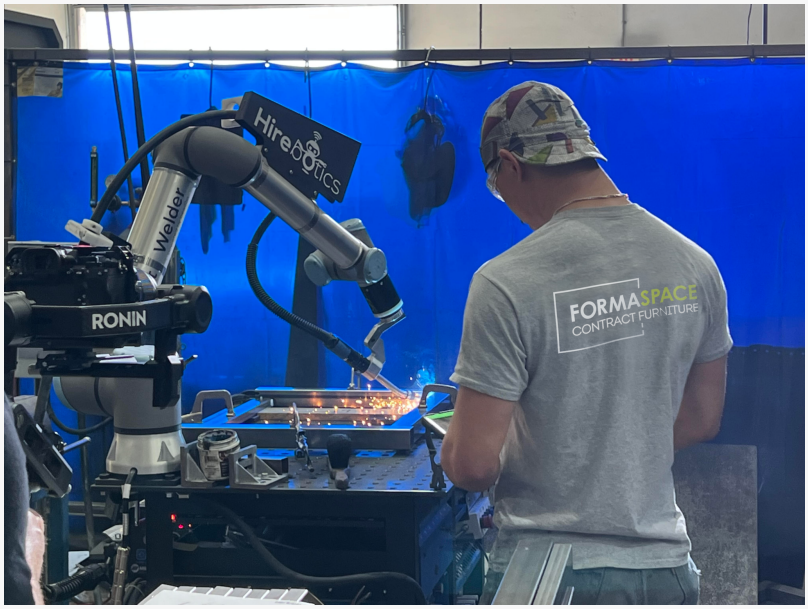
an “urban-affiliated” class who are “unduly telling others what to do while lacking in common sense—a norm affiliated with rurality.”

Distrust in science experts and technology is nothing new – we only have to look back at the Luddite Movement in the early 1800s, where traditional British craft workers producing textile goods by hand rose up to destroy factory knitting machines that threatened to undermine their livelihoods through advances in automation.

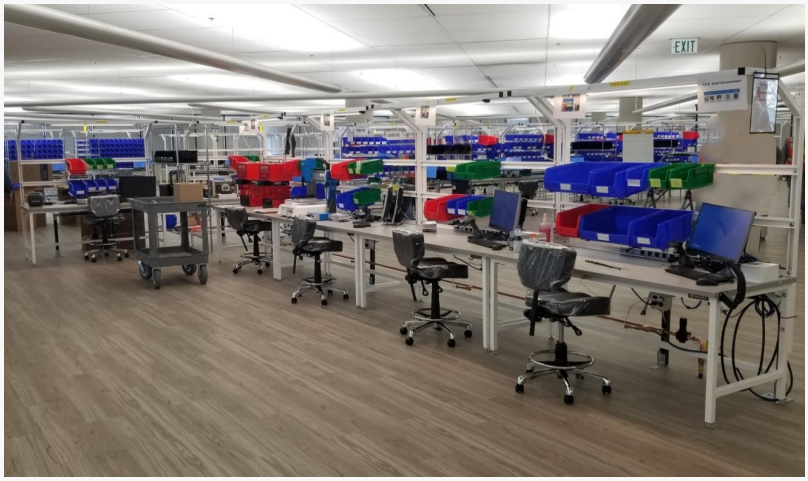
But what are the roots of today’s skepticism and outright resentment of expert opinions?

Some might point to the spectacular intelligence failure of the George W. Bush administration, which led us into the Iraq War based on the mistaken conclusion that the country harbored “weapons of mass destruction” as a turning point in undermining trust in subject matter experts and political institutions alike.

Others, such as writer Jonathan Haidt, whose recent article in the Atlantic, “Why the Past 10 Years of American Life Have Been Uniquely Stupid,” argues that the recent pervasive rise of social media has helped fuel the circulation of ever higher levels of damaging misinformation and conspiracy theories that have seriously undermined the intellectual quality and honesty of American social discourse.



Perhaps, contrary to common perceptions, manufacturing has become a high-tech industry in need of ever more STEM graduates. Shown above is a robot welder on the production line at Formaspace’s factory headquarters in Austin, Texas.



General Motors turned to Formaspace to build the workstations for its medical device division, manufacturing ventilators for Covid patients in hospital intensive care units.

Can We Live Long And Prosper In A World Without Experts? Scientific Illiteracy And Antipathy Toward Technology Can Reduce Future Economic Growth And Undermine Societal Health And Wellbeing

The growing incidence of scientific illiteracy and widespread distrust of science and technology experts is not without its costs to our society's economic and public health.

The world is not without its problems, ranging from recent pandemic diseases, rising costs for energy, the increasingly apparent impact of climate changes, and looming threats to our food supply – all of which support the need for educators to cultivate more skilled, creative, scientific minds to work together to solve or at least help mitigate these growing crises.

For decades, the US has been a leader in helping solve the world's problems through scientific and technological discovery – from helping spearhead agriculture's Green Revolution of the 1950s and 1960s that helped feed the world to developing transistors, integrated circuits, and the Internet that power today's computing and communication sectors – while helping Americans enjoy ever higher living standards here at home thanks to the economic benefits of enhanced productivity brought about by advances in science and technology.

But could rising scientific illiteracy and outright antipathy toward science and technology erase those economic gains, causing our living standards to fall substantially in the coming years?

It's not an unreasonable question.

For example, for years now, Chinese researchers have outperformed Americans in per capita publication of research papers and patent filings. And, as China's BYD car company overtakes America's electric car innovator, Tesla, to become the world's largest producer of electric cars, Tesla owners here at home and public charging stations are the subject of rampant vandalism.

In some cases, we can chalk this up to resentment against those wealthy enough to afford a high-end Tesla car. But there may be more sinister motivations at work.

Of course, this vandalism phenomenon is not just limited to the USA; the UK has seen a spate of 5G telephone communication equipment being burned to the ground due to a false belief that they spread Covid. And even the Netherlands is not immune to its own conspiracy theories, as the appearance of 'protective' anti-5G necklaces (which turn out to be radioactive!) demonstrate.

But as the recent Covid epidemic demonstrated, the spread of anti-science and anti-expert conspiracy theories and hoaxes can also seriously impact our collective public health.

As we'll discuss in more detail in the next section, the Scientific Method encourages careful consideration of different, competing hypotheses, which are then rigorously tested in controlled studies, with the conclusions thoroughly examined for potential errors and inaccurate assumptions.

Yet, during Covid, we saw conspiracy theories spreading like wildfire on the Internet, from tragic

cases where individuals ingested bleach in the hope of eliminating the Coronavirus or stocked up on veterinary drugs, such as Ivermectin (used to treat roundworms, threadworms, and other parasites in dogs and cats) in the hopes they would be a preventative (prophylactic) or post-exposure cure for a serious case of Covid.

Does bleach have a role in public health? Of course! As a disinfectant. Does Ivermectin have a health benefit? Yes, it controls parasites. Could either be used in some fashion to treat Covid infections? Well, it's not likely. But anyone with a basic science education should know that a controlled study to test a hypothesis is the right approach – rather than follow advice from an unvetted Facebook post.

Unfortunately, what we saw during the height of the pandemic was a new low in scientific literacy, a phenomenon that researchers from the University of Pennsylvania have termed a "syndemic," e.g. more than one pandemic occurring at the same time.

In their view, the syndemic was a combination of the Covid pandemic itself and what the World Health Organization (WHO) calls an infodemic – defined as "deliberate attempts to disseminate wrong information to undermine the public health response and advance alternative agendas of groups or individuals."

A Thorough Understanding Of The Scientific Method Can Help STEM Students Fight Scientific And Information Illiteracy

It's critical that STEM educators help raise our students' overall scientific and information literacy in the fight against infodemics.

But the challenge is greater than ever.

Today's students (just like the public in general) are exposed to a non-stop firehose of information sources on social media (and the internet in general).

While some of the information is legitimate, vetted, and fact-based – it happens to be mixed in with posts from people expressing their valid personal opinions to a mixture of hoaxes, conspiracy theories, and even manipulated "deep fake" videos purporting to be real footage of interviews or news sources.

Fortunately, the scientific method itself is one of the most powerful tools we have in our arsenal to combat misinformation.

Of course, following the Scientific Methods is not as simple as the evergreen advice from Robert Fulghum in his 1990 classic book "All I Really Need to Know I Learned in Kindergarten," which includes this prophetic advice:

Share everything. Play fair. Don’t hit people. Put things back where you found them. Clean up your own mess. Don’t take things that aren’t yours. Say you’re sorry when you hurt somebody. Wash your hands before you eat. Flush. Warm cookies and cold milk are good for you.

But the Scientific Method comes a close second.

It teaches our students the tools they need to know to evaluate information, including how to identify credible sources, how to create a hypothesis and test it in a controlled way, and the importance of debating the credibility of established knowledge in light of new facts.

Read more...

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